National Ageing Research Institute

Challenging barriers to undertaking physical activity amongst CALD groups

www.nari.unimelb.edu.au

Challenging barriers to undertaking physical activity amongst CALD groups

September 2008

National Ageing Research Institute

Acknowledgements

This study was undertaken collaboratively between the National Ageing Research Institute and the HealthWest Partnership. The teams below indicate staff who contributed to the study.

National Ageing Research Institute Team:

- Kay Ledgerwood
- Kirsten Moore
- Karen Borschmann
- Emma Renehan
- Melissa Russell
- Xiaoping Lin
- Will Fearnley-Sander
- Sue Hunt

HealthWest Partnership Team (implementing interventions):

- Colin Brown
- Jasmine Sison

A project working group met throughout the course of the project to oversee progress:

- Colin Brown, HealthWest Partnership
- Rachel Whiffen, HealthWest Partnership
- Jasmine Sison, HealthWest Partnership
- Agnieszka Miller, Australian Polish Community Services
- Diana Sterjovska, Macedonian Community Welfare Association

We would like to acknowledge Agnieszka Miller and Diana Sterjovska for liaising with the various social groups to be involved in the study.

We would like to thank Antoaneta Janeva and Polaron Interpreting Services for providing reliable and timely interpreting services.

We would especially like to thank all the group leaders for their time and assistance in recruiting participants as well as the participants who took part in the study.

Macedonian Groups:

- Hobsons Bay
- Hopper's Crossing
- Sunshine West
- Pelister / St Albans

Polish Groups:

- Albion
- Altona
- StAlbans

Table of Contents

Tables and Figures

Acronyms

AAS	Adjusted Activity Score
AIHW	Australian Institute of Health and Welfare
BMI	Body Mass Index
CALD	Culturally and Linguistically Diverse
DHS	(Victorian) Department of Human Services
ERASS	Exercise, Recreation and Sport Survey
HAP	Human Activity Profile
NARI	National Ageing Research Institute
NICE	National Institute for Health and Clinical Excellence
PCP	Primary Care Partnership
PICF	Plain language participant Information and Consent Form
SF-36	36 Item Short Form Survey Instrument
WMR	Western Metropolitan Region

1. Introduction

Two Primary Care Partnerships (PCP) in the Western Metropolitan Region of Melbourne, the Westbay Alliance and Brimbank Melton PCP, formed a partnership to undertake a research initiative relating to falls prevention in their catchment. With 'Whole of Community' falls prevention funding from the Victorian Department of Human Services (DHS), these two Falls Prevention initiatives were concerned with the issue of falls and falls related injuries for their large population of people from Culturally and Linguistically Diverse (CALD) backgrounds. In particular, they were interested in exercise as a key intervention for reducing falls risk and improving balance. In 2007, these two PCPs engaged the National Ageing Research Institute (NARI) to undertake a research study to investigate a strategy for reducing barriers to undertaking physical activity. This report presents the findings from a randomised controlled trial investigating a health professional lead intervention to overcome barriers to undertaking physical activity amongst older Macedonian and Polish people in the Western suburbs of Melbourne. Importantly, during this time, these two PCPs formalised their strategic alliance across the Western Region of Melbourne and are now the HealthWest Partnership.

1.1 Physical activity and older people

Research evidence from randomised controlled trials indicates that physical activity can improve a range of physiological health outcomes for community dwelling older people, including improving function, muscle strength, balance, and reducing falls (Wolf et al, 1996; Barnett et al, 2003; Day et al, 2002; Campbell et al, 1997). Various physical activity modalities have also been shown to improve psychological outcomes, including reduced depression and anxiety (Singh et al, 1997; Bravo et al, 1996) and improved quality of life (Singh et al, 1997; Kerse et al, 1999).

The latest Exercise, Recreation and Sport Survey (ERASS), conducted by the Australian Sports Commission, indicates that the majority of respondents aged 65 years and over were involved in organised and/or non-organised physical activity (71.6%), with similar figures in both men and women (72.5% and 70.8% respectively) (Standing Committee on Recreation and Sport - Australia 2005). Non-organised activity was the most common type of physical activity, but people did not necessarily participate in one type to the exclusion of the other. The absolute participation rates (any form of physical activity) decreased with age across the sample (from 91.7% in 15 to 24 year olds), but the proportions for organised versus non-organised physical activity were similar across all age groups. Walking was the commonest form of activity that older people participated in (47.6%), followed by aerobics/fitness programs (12.1%) and golf (8.6%). Older people participated in fewer types of activity (1.6 different types on average). Participation in organised physical activity was lowest amongst older people (30.7%, compared to 66.1% in the 15-24 year age group). The mean number of weekly sessions of activity was 4.6 (4.5 and 4.8 for men and women respectively), with a median of 3.9.

Despite these promising figures, and the clear evidence of potential benefits associated with physical activity for older people, research shows that the majority of older Australians are not undertaking sufficient levels of physical activity to achieve health and other benefits (recommended as a minimum of 30 minutes / day of moderate physical activity on most days of the week). A national survey found that of Australians aged 60-75 years, 18% are

sedentary and 39% categorized as doing 'insufficient' physical activity, indicating inactivity is still a major problem amongst older Australians (Armstrong et al, 2000).

The findings from the ERASS survey contrast with those produced from the population based National Health Surveys. The figures are higher than in the multipurpose national surveys because they relate to the physical activity patterns of those responding to a specific physical activity survey, and are unlikely to be representative of the overall older population. Many of these data sources are limited by the fact that they are based upon self reports in cross sectional surveys.

One study found that the main reasons nominated by older people for avoiding physical activity were medical conditions, fear of falling, lack of a companion to do physical activity with (women only) (Satariano et al, 2000), being physically unable to do exercise or not wishing to exercise (Bauman et al, 2002). Other factors that influence participation in physical activity for older people include transport issues, cost, opportunities for social interaction and a sense of capability to perform physical activity (Bauman et al, 2002, Haralambous et al, 2003; McAuley et al, 1993).

1.2 Physical activity and older people from CALD Backgrounds

People from Culturally and Linguistically Diverse (CALD) backgrounds are at greater risk for the health consequences from physical inactivity, given their higher rates of sedentary behaviour (Wilcox, Castro et al. 2000). There are cultural and ethnic differences in physical activity patterns. Much of the evidence emanates from the US however and thus has limited relevance with regard to the different CALD communities in Australia. In 2006, 35% of the older population in Australia were born overseas, with 39% of these coming from the main English-speaking countries and 61% from non-English-speaking countries (AIHW, 2007). One in five older Australians come from non-English speaking countries, and this part of the older population is growing faster than any other segments (AIHW 2007). Although people from non-English-speaking countries made up only 15% of the very old population (85 years and over) they represented a more significant part of the population aged 75-84 years (21%) and of those aged 65-74 years (23%) (AIHW, 2007). The proportion of older people from CALD backgrounds is projected to increase, reaching 22.8% of the Australian population aged over 65, by 2016. In addition it is projected that one in four people aged 80 or over will be from CALD backgrounds in 20 years time. The older, overseas born CALD background population will increase more rapidly over this period than the Australian born older group.

The Western Metropolitan Region is the most culturally diverse area in Victoria (DHS, 2002) and the Local Government areas within the catchment for this study (Hobson's Bay, Maribyrnong, Wyndham, Brimank and Melton) are also characterised by a culturally diverse population. In particular, the City of Brimbank has 54% of its population from a non-English speaking background[1] and a high percentage of people aged 65 and over who come from CALD backgrounds, and very low levels of English proficiency (ASR Research Pty Ltd, 2004). In the City of Maribyrnong, 44% of residents speak a language other than English (DHS, 2002).

[1] Western Region Profiles: Statistical profiles for local government areas of Brimbank, Melton, Maribyrnong and Moonee Valley, March 2004 as cited in: (Westbay Alliance, 2005).

A recent study in the Western Metropolitan Region (WMR), "Community participation and physical activity for older people" (unpublished findings, Feldman et al, 2007), conducted by the Centre for Population Health in the West and Western Health, examined barriers to undertaking physical activity amongst various CALD groups and English speaking participants. The study found that some barriers to participation were influenced by cultural background, while others were common across cultural backgrounds. An example where perceived barriers differed between older people of different cultural backgrounds was that 'being too tired' was reported by 89% of Macedonians to be a barrier to exercise compared to 59% of Croatians, 52% of Italians and 42% of Anglo-Celtics. Another study investigating factors influencing participation in physical activity among seven ethnically diverse groups of older people in the USA identified many common themes, but also some variations between groups (Belza et al, 2004). For example, the importance of getting into a routine was a prominent theme among Cantonese speaking Chinese and the Vietnamese groups, while the importance of community / group activities, laughter and socialising appeared to be important for the Filipino group. These findings support the need for person-centred approaches to health promotion and physical activity promotion to address individual barriers.

1.3 Strategies for increasing physical activity

There is an increasing amount of published literature investigating best practise methods for physical activity promotion. The UK based National Institute for Health and Clinical Excellence (NICE) guidelines recommend, "…when providing physical activity advice, primary care practitioners should take into account the individual's needs, preferences, and circumstances. They should agree goals with them. They should also provide written information about the benefits of activity and the local opportunities to be active. They should follow them up at appropriate intervals over a three to six month period."

A randomised controlled trial compared two physical activity counselling styles designed to increase fitness and physical activity levels (inclusive of interactive correspondence and behavioural counselling or telephone counselling and behavioural classes) with regular care of physician advice and written educational materials (The Writing Group for the Activity Counselling Trial Research Group, 2001). The study was conducted with a population of sedentary Americans and found that the two counselling interventions were equally effective in women in improving cardio-respiratory fitness over two years compared with recommended care. In men, neither of the two counselling interventions was more effective than recommended care (The Writing Group for the Activity Counselling Trial Research Group, 2001).

Carroll and colleagues (2008) used the 5A (Ask, Advise, Agree, Assist, Arrange) model to promote patient behaviour changes in primary care and to assess primary care physicians' discussions with underserved populations about physical activity in Rochester, New York. In the 'assist' component, the clinician assists the patient to change their physical activity/exercise plans by addressing any challenges or barriers that the patient may face. The clinician assists the patient to strategize and develop a plan to meet their physical activity goals. The clinician might also mention available community resources, programs, or referral options for physical activity/exercise programs. The 'Arrange' step involves helping the patient complete the plan by providing referrals, reminders, access to resources, specify future arrangements (follow-up visit, call, reminder) to follow up on progress. The clinician and

patient explicitly discuss a follow up plan. The patient sample was 51% African-American and predominantly female (70%), with the majority having a high school-level education or less (66%) and an annual household income <$39,000 (57%) (Carroll et al, 2008). The researchers reported that communication about physical activity that included Agree, Arrange, and Assist statements of the 5A model was infrequent. The researchers concluded that health promotion interventions in underserved populations should target these steps and prompt patients to initiate communication to improve physical activity.

Smitherton et al (2007) completed a qualitative review of 16 studies investigating the effectiveness of cognitive and behavioural strategies employed by physicians and nurses for interventions based on increasing physical activity levels in middle aged and older adults. They concluded that a mix of strategies should be instigated, within resource allocation, and include education, advice, self-monitoring, counselling and telephone follow-ups.

1.4 Hypotheses and Aims

The study will explore the use of health professional facilitated sessions aiming to challenge perceived barriers to participating in physical activity amongst Macedonian and Polish older people (55+) in the WMR of Melbourne. The study has the following aims:

- to determine whether a health professional facilitated education intervention increases physical activity and fitness amongst the target population;
- to determine whether a health professional facilitated education intervention assists the target population to progress in their readiness to undertake physical activity; and

The primary study hypothesis for the project is:

- that a health professional facilitated education session program targeting identified barriers to physical activity for two CALD groups (Polish and Macedonian) will result in improved readiness to undertake physical activity and improved participation in physical activity.

2. Methodology

The study used a randomised controlled trial methodology to examine the impact of health professional facilitated sessions to overcome barriers to undertaking physical activity.

2.1 Ethics Approval

Ethics approval was obtained for undertaking the research through the Melbourne Health Human Research and Ethics Committee. A plain language participant information and consent form (PICF) was developed and translated into Polish and Macedonian. The form included details of how information collected will be kept anonymous in reports, that consent can be withdrawn at any time and that participation in any research is voluntary.

2.2 Recruitment

Recruitment took place through three Polish (approximately 235 members) and four Macedonian (approximately 210 members) local community groups in the WMR of Melbourne, Australia. These local community groups are targeted to specific cultural groups and are aimed at increasing opportunities for socialisation for older people. Volunteers generally run programs that are usually held on a weekly basis. Lunch is usually provided during the program along with other activities. The participating agencies generally played bingo each week with an outing organised a few times a year. The agencies are also used as health and government services information sources for the CALD communities. They have guest speakers from health promotion services (Quit Smoking, Breast Cancer awareness) and government services (Centrelink).

Research staff with interpreters attended different groups held at the targeted centres to promote and discuss potential benefits of the project and to recruit participants. The project was also promoted in these centres through brochures and posters. To engage interest a first recruitment meeting was conducted to introduce the project to the whole group and to disseminate and discuss the PICF. If participants were interested in participating they were given the PICF form, questionnaires and a pedometer to wear for the next week. They were also booked in for the baseline assessment at the centre a week later. The following week the researcher discussed and signed the consent form with the participant, collected the pedometer, and completed the questionnaires and physical assessments. During this second visit, researchers repeated the recruitment presentation to try to recruit more participants at the centre.

Recruitment was maximised through research staff having face-to-face contact with potential participants and explaining the requirements and potential benefits of the study. Providing the intervention within a setting that participants were already attending on a regular basis supported recruitment as participants had demonstrated means to travel to the venue. Having other friends/acquaintances from existing social programs at the same community venue was also an enabler for recruiting participants.

Inclusion criteria for participants were:

- Aged 55 years or over,
- Attending one of the Polish or Macedonian community groups involved in the study

- Able to understand and participate in verbal discussions (in either English, Polish or Macedonian).
- Able to walk independently indoors for at least five minutes, with or without a walking aid (stick, frame, crutches etc).

2.3 Power Analysis

A power analysis was undertaken before recruitment commenced to determine the sample size required to detect significant differences in the key outcome measures (pedometer readings and stages of change questionnaire).

2.3.1 Pedometer readings

Data from a sample of community dwelling older people indicated that the older subgroup averaged 6700 steps / day for men and 7000 steps / day for women (Sequeira et al, 1995). In another study, <5000 steps / day was considered "sedentary", 5000-7499 was considered typical of daily activity excluding sports / exercise, and was considered "low active", while >7500 steps / day was considered to incorporate some volitional activities and classified as "somewhat active" (Tudor- Locke and Bassett, 2004). Assuming an average across genders of 7000 steps / day at baseline, standard deviation of 1000, and aiming for a power of 80%, a change of 10% (i.e. 700 steps / day) and significance value of 0.05, a sample size of 41/group (i.e. 82 participants overall) would be required.

2.3.2 Stages of Change Questionnaire

The Stages of Change questionnaire explores the preparedness of a person to undertake specific health promoting behaviours. It has been used to investigate a range of health promoting behaviours, including participation in physical activity. The majority of older people living in the community have been shown to be in precontemplation / contemplation / occasional physical activity (Belza et al, 2004; Nigg et al, 1999). Assuming approximately 60% of the sample are in the pre-contemplation and contemplation stage for participation in physical activity at baseline, and aiming for half of this group to move up at least two stages on the stages of change questionnaire (i.e. only 30% of the sample in the pre-contemplation and contemplation stage for participation post intervention), with a power of 80% and alpha of 0.05, a sample size of 43 / group would be required.

Based on these two estimates, a sample of 43 / group (intervention and control) would be sufficient to identify changes on both of these outcomes. Assuming a 25% dropout rate across the study duration, a sample of 118 subjects was required to commence the study.

2.4 Data Collection

Participants were assessed at the participating community venues on the usual day of their social group. A research assistant, physiotherapist and interpreter were present to undertake assessments of individual participants. The research assistant gained consent from the participant and went through the questionnaires to see whether they had been completed fully by the participant. If not, the research assistant helped the participant to complete the questionnaires. The physiotherapist went through the physical tests with participants. The interpreter was involved at participants' request. Participant assessments took approximately 20 minutes to complete.

Approximately nine weeks after baseline assessments all participants were asked to complete a follow up assessment to determine whether there had been any changes in attitudes to physical activity as well as actual levels of exercise. The data collected during assessments is described below.

2.4.1 Demographics

Participants reported their age, gender, living arrangements and CALD background.

2.4.2 Descriptive data

Participants were asked a series of questions enquiring about their current physical activities (frequency and duration), medical history and current medication usage.

2.4.3 Body Mass Index

Body Mass Index is used to estimate an adult person's total body fat. It is a statistical ratio between height and weight measurements, calculated as [height (m)/ weight (kg)2]. On the basis of mortality, the ideal body mass index is higher in older adults with a normal or "optimum" BMI for people older than 65 being equal to the young adults "overweight" range of 27-30 kg/m^2 (Heiat et al, 2001). In this study, participants' body mass index scores were classified using the following standards designed for people older than 65; underweight BMI <27 kg/m^2, normal weight BMI 27-30 kg/m^2 and overweight BMI >30 kg/m^2 (Heiat et al, 2001).

2.4.4 SF-36

Two questions relating to self rated health from the 36-Item Short Form Survey Instrument (SF-36) were used. The first question was "In general, would you say your health is" with five responses categories including; excellent, very good, good, fair and poor. The second question was "Compared to one year ago, how would you rate your health in general now?" with five response categories including; much better now, somewhat better now, about the same now, somewhat worse now, and much worse now. Use of the SF-36 has shown a high level of internal consistency and construct validity when used in an interview format with older people (Lyons et al, 1994).

2.4.5 Human Activity Profile (HAP)

Activity level was assessed using the Human Activity Profile (HAP; Fix and Daughton, 1988). This questionnaire evaluates 94 activities, which are rated by the subject as "still doing", "have stopped doing", or "never did". The Adjusted Activity Score (AAS) was reported, which is calculated by subtracting the total number of "have stopped doing" items from the highest numbered activity still being done. Therefore a higher AAS score indicates a higher level of activity.

2.4.6 Stages of change questionnaire

The Stages of Change questionnaire was used to monitor the participants' current state of preparation to undertake physical activity. Prochaska and DiClemente (1983) developed the stages of change model as a framework to describe the different phases involved in the acquisition and maintenance of a behaviour (Marcus, Selby et al, 1992). The stages of change questionnaire asks participants to indicate how strongly they agree or disagree with 24 statements relating to physical activity. Participants are categorised into one of six stages:

pre-contemplation (non-believers in exercise), pre-contemplation (believers in exercise), contemplation, preparation, action or maintenance according to what stage they scored the highest in. The benefit of the stages of change model is that it focuses on the dynamic nature of health behaviour change allowing examination of the different transitions in adoption and maintenance of exercise behaviour (Marcus, Selby et al, 1992).

2.4.7 Pedometer readings

When pedometer readings were collected, participants were asked to report the number of days that they had worn the pedometer. An average steps per day rate was calculated by dividing the total number of steps on the pedometer with the number of days the participant reported wearing it. The pedometer used was the DIGI-WALKER SW-200 by Yamax, which had the single function of step counting. Two previous studies that assessed the accuracy of ten pedometers in measuring steps taken over a 400-meter walk (Schneider, Crouter et al, 2003) and five minute walks at varying walking speeds (Crouter, Schneider et al, 2003) both indicated that the Yamax brand pedometer was one of the best in regards to accuracy and reliability. Pedometers were taped shut during assessment phases to reduce participant interference with the device.

2.4.8 Six minute walk test

The 6-minute walk test involved the participants walking for 6 minutes to cover as much distance as possible (Guyatt et al, 1985). Distance covered has been shown to be significantly greater for active, compared to inactive individuals (Harada et al, 1999). The Borg exertion scale and pre and post pulse rate measurements were also used to rate the level of perceived and actual exertion at the end of the test respectively. Due to the limitations of using the Borg, results from the Borg test were excluded from the analysis.

2.4.9 Six metre walk test

Participants were asked to walk at their normal walking pace over a ten-metre walkway. Average walking speed and stride length was calculated over the central six metres of the walkway so that the measurement occurred during a constant velocity phase of gait. Gait velocity, metres walked per minute, and stride length, the length of two consecutive steps were recorded. Morris et al. (1996) reported on a group of healthy older people with an average age of 72.5 years a gait velocity of 71 metres per minute and a stride length of 1.27metres.

2.4.10 Sit to stand test

The time that it takes to stand up and sit down five times from a chair is a measurement of global leg strength. Participants were assessed on a standardized chair with no arm support. In a sample of community dwelling 60-70 year old women (with no mobility limitation), the mean score for this test was 11.3 seconds (SD=2.44sec) (McCarthy et al, 2004). In a sample of community dwelling people (17% using gait aid) aged over 75 years, mean time was 12.8sec (SD=5.9) for men and 12.9sec (SD=5.1) for women, with no significant difference between men and women (McCarthy et al, 2004).

2.5 Randomisation

Block randomisation was undertaken to control for the social group attended. As control and intervention sessions were to be conducted at each venue, there needed to be roughly equal numbers of participants in control and intervention groups at each centre. This also meant that the CALD group was controlled for with approximately half of the Polish and half of the Macedonian participants in the intervention group.

The process for randomising participants was conducted after all baseline assessments were completed at each centre. If twenty participants had been assessed at a centre, ten invitations to the intervention sessions and ten to the control session were randomly drawn and then allocated to each participant according to the order in which they were assessed. If there were an odd number of assessments, an additional invitation was included to allow an equal number of invitations for each experimental group. The invitations indicating the date and time of the sessions were then posted to the participants. The research assistant also notified the health professionals conducting the intervention and control group sessions, which participants had been allocated to each group. The physiotherapist undertaking baseline assessments was not informed of group allocation and was also blind at follow-up assessments. The research assistant undertaking the follow-up assessments was a different research assistant to the one who undertook the baseline assessments and randomisation and was therefore also blinded to group allocation. Whilst different Polish interpreters were used, many of the Macedonian assessments and interventions were conducted with the one interpreter who would not have been blinded to group allocation.

Of the 121 participants recruited, 61 were randomised to the intervention group and 60 were randomised to the control group. Participants were not informed as to which group was under investigation, i.e. whether they were in the control or intervention group.

2.6 Experimental groups

The intervention used existing health professionals who were involved in the Standing Strong and Walk Tall Don't Fall falls prevention projects (being run by the HealthWest Partnership). One health professional conducted the intervention group sessions while another health professional conducted the control group sessions.

2.6.1 Intervention group

Researchers worked with and attended sessions run by the health professional to ensure they were able to carry out the sessions, provide adequate support and assist participants in developing physical activity goals and plans. A written plan was developed for the health professional to follow (See Appendix 1). The intervention included three 1 hour sessions conducted at the community venue where each participant was recruited.

Session 1

The first session entailed a presentation to participants regarding the benefits of physical activity, focusing on challenging existing barriers to physical activity identified in previous research undertaken with CALD communities in the WMR. Previous research identified that for Macedonian participants, lack of energy, being too tired and not being motivated were major barriers to undertaking physical activity. Furthermore, these factors were more commonly

reported as barriers amongst Macedonian participants than other CALD and Anglo-Celtic participants in the study. Participants were given an opportunity to discuss their personal motivators and barriers to undertaking physical activity and these motivators and barriers were discussed amongst the group. A problem solving approach was employed to develop practical strategies for overcoming barriers. Participants were assisted to develop physical activity goals and a plan for undertaking physical activity during the coming fortnight. This was mounted on a fridge magnet so that participants could be reminded of the plan on a frequent basis. Participants were also provided a practical component that illustrated basic physical activity exercises that could be completed in their own home without supervision.

Session 2

Two weeks after the first session, participants met to discuss their physical activity plan and whether they were able to achieve their goals. Again barriers and motivators were discussed and plans were modified where necessary.

Session 3

The third session was run approximately four weeks after Session 2 (approximately six weeks after the first session). Again goals were reviewed and strategies for maintaining physical activity long term were discussed including pre-empting future challenges to undertaking physical activity.

2.6.2 Control group

Participants in the control group were invited to attend a presentation that discussed general health promotion including topics such as nutrition, falls prevention, having check-ups etc. Physical activity was mentioned, but was not a focus of this presentation. In this way, there was some attempt to control for the additional contact of the intervention group with the researchers/ health professionals.

2.7 Statistical Analysis

All data was analysed using intention to treat to determine whether there were any differences at baseline between intervention and control groups. For interval data, t-tests were conducted. For categorical data chi-squared tests were used, unless there were fewer than five participants in a category, where Mann Whitney U tests were used. Although not a primary aim of the study, baseline differences between Polish and Macedonian participants were also compared using these statistical methods to examine the similarities and differences between the two groups.

Dependent variables in the study included pedometer readings, sit to stand test, six minute walk test, velocity and stride length in the six metre walk, SF-36, HAP-AAS, and the Stages of Change questionnaire. To examine overall changes from baseline to follow-up for the dependent variables, one sample t-tests (test value = 0) were used. Non-numeric dependent variables (SF-36 and Stages of Change questionnaire) were analysed by related nonparametric tests to compare changes in the two experimental groups. Data for these variables was also rated as "improved" "same" or "worse" from baseline to follow-up. Chi-squared tests were used to determine whether there were differences in these categories between the intervention and control groups.

Linear regression was used for numeric dependent variables to compare group differences in changes from baseline to follow-up. Numeric dependent variables that were not normally distributed were transformed according to skew direction and strength (Refer to Appendix 2). The study used two sets of models to conduct the regression. The first set of models (the simple models) used follow-up scores as dependent variables and baseline scores and group membership (control vs. intervention) as independent variables. The second set of models (the complete models) adjusted for the possible effects of clinical differences between control and intervention groups. However, besides baseline scores and group membership, the independent variables also included variables where a difference between intervention and control groups was present at baseline (See Appendix 3). Independent variables that were adjusted for included living arrangements, BMI, increased blood pressure, cancer history, cardiac conditions and diabetes. Living arrangements was only adjusted for the models investigating pedometer readings and the HAP-AAS as these were the only variables expected to be impacted on by living arrangements. CALD background (Polish or Macedonian) was also adjusted for due to the block randomization process.

3. Participants

One hundred and twenty one people out of approximately 450 who attended seven culturally and linguistically diverse (CALD) social groups were recruited to the project. The following chapter provides an overview of participants in relation to demographic background, health status and physical activity levels. In addition to providing a profile of participants at baseline, baseline variables were also compared between control (n=60) and intervention (n=61) participants to determine whether there were any differences between the two groups. Although not a primary aim of the project, differences between the 30 Polish and 91 Macedonian participants are also described.

Due to the block randomisation process used for each CALD group, there was no statistical difference in numbers of CALD background distribution between intervention and control groups. The Polish group had 15 participants in each experimental group; and the Macedonian group had 46 intervention and 45 control group participants.

3.1 Demographics

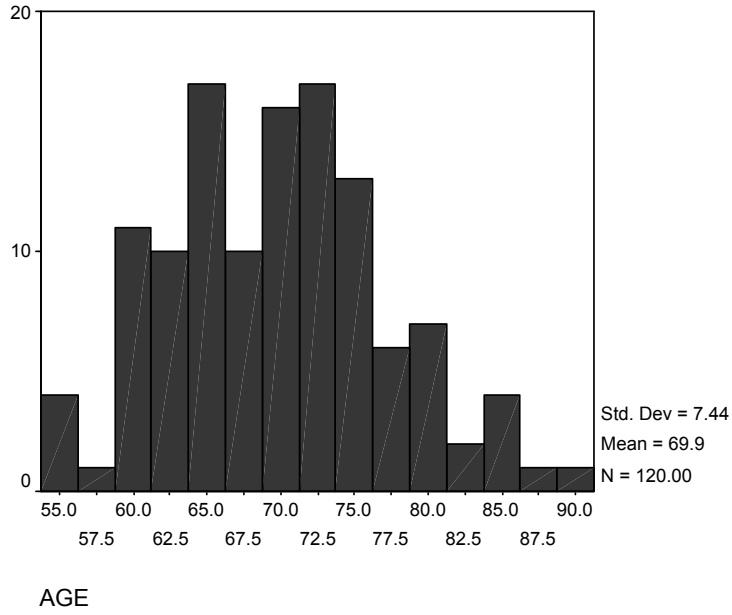
3.1.1 Gender

In total 76 females (63%) and 45 males (37%) participated in the study. There was no significant difference in gender distribution between the experimental groups with females representing 60% of the control group and 66% of the intervention group, $\chi 2$ (1)= 0.40, p = 0.53. There was a significant difference in gender distribution between the two CALD groups with females representing 80% of Polish participants and 57% of Macedonian participants, $\chi 2$ (1)= 5.05, p=0.03.

3.1.2 Age

The mean age of participants was 69.9 years (sd 7.42; range=55-89). Figure 1 shows the age distribution of all participants.

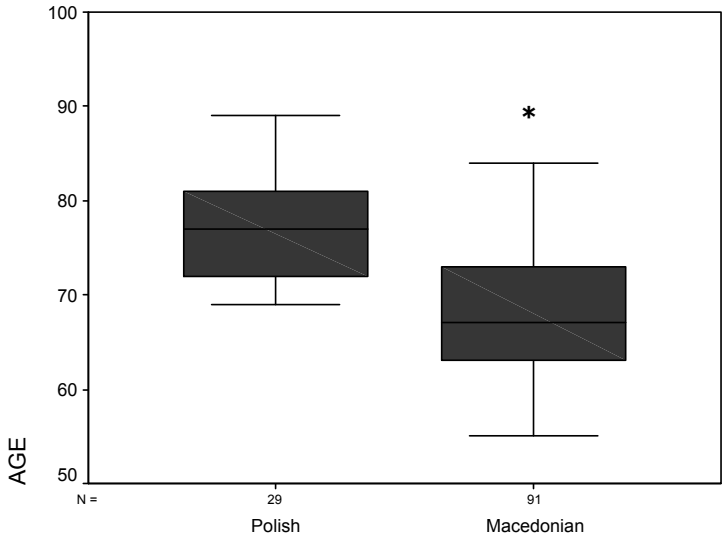
Figure 1 Age distribution of participants



The average age of the intervention group was 69.3 years (*SD*=7.57) and control group was 70.4 years (*SD*=7.3). There was no significant difference between the ages of the two experimental groups, t (118) = - 0.83, *p* =0.41.

There was a significant difference in age between the two CALD groups with the Polish participants significantly older (mean age=77.1, range 69-89, SD=6.09) than the Macedonian participants (mean age=67.5, range 55-84, SD=6.27; t (118), p=0.00). See Figure 2 for the age distribution of the different CALD groups.

Figure 2: Age Distribution by CALD group



3.1.3 Living Arrangements

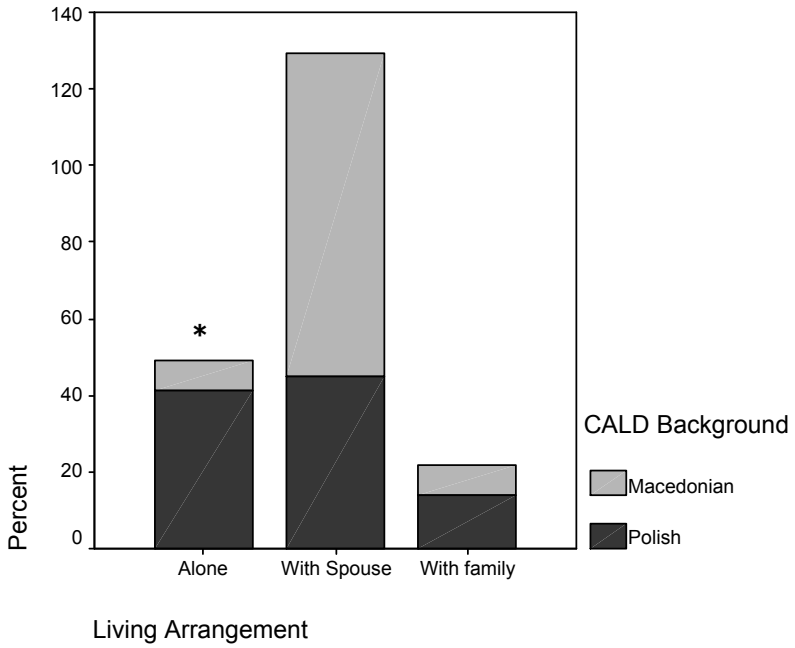
Most participants lived with their spouse or other family, with only 16% of participants living alone (Table 1). Although there was a trend for a larger number of control participants to be living alone than living with others ('with spouse' and 'with family' grouped together) than intervention participants, a chi squared test found no significant difference between the two groups, $\chi 2$ (2)= 1.95, p=0.38.

Table 1: Intervention and Control Groups by Living Arrangement

	Alone (%)	With Spouse (%)	With family (%)	Total (%)
Intervention	7 (11.7)	48 (80.0)	5 (8.3)	60 (100)
Control	12 (20.3)	41 (69.5)	6 (10.2)	59 (100)
Total	19 (16.0)	89 (74.8)	11 (9.2)	119 (100)

Living arrangements between the Polish and Macedonian groups was significantly different, $\chi 2$ (1)=56.03, p=0.00, with a greater proportion of Polish participants living alone compared to Macedonians (Figure 3).

Figure 3: Total Population Living Arrangements: Support at home

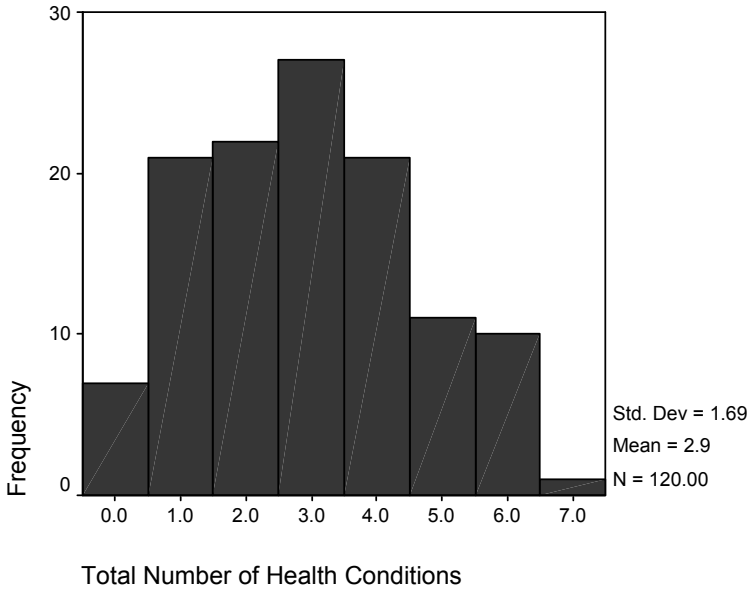


3.2 Health Status

3.2.1 Health Conditions

The average number of health conditions reported by participants was 2.9 (range 0-7, SD=1.67, Figure 4). There was no significant difference between the experimental groups, t(118)=0.16, p=0.80, nor the CALD groups, t(117)= 0.51, p=0.61.

Figure 4: Total Number of Health Conditions



The seven health conditions most commonly reported by participants included; increased blood pressure, arthritis, high cholesterol, diabetes, back pain, cardiac and respiratory problems. Figure 5 illustrates the proportion of all participants as well as participants in the control and intervention groups reporting each condition. The proportion of participants with all health conditions reported is provided in Appendix 3. Whilst there were a higher proportion of intervention participants reporting high blood pressure and a higher proportion of control participants reporting cancer history, cardiac conditions and diabetes, the differences only reached significance for diabetes $\chi 2(1)=4.27$, p=0.04.

Figure 5: Seven most common health conditions by experimental group

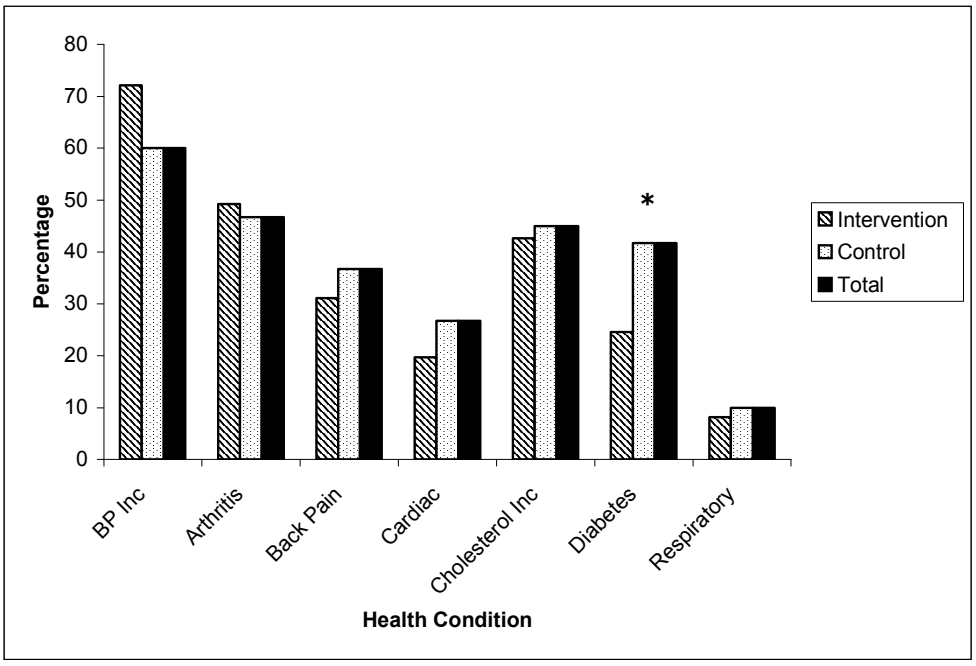
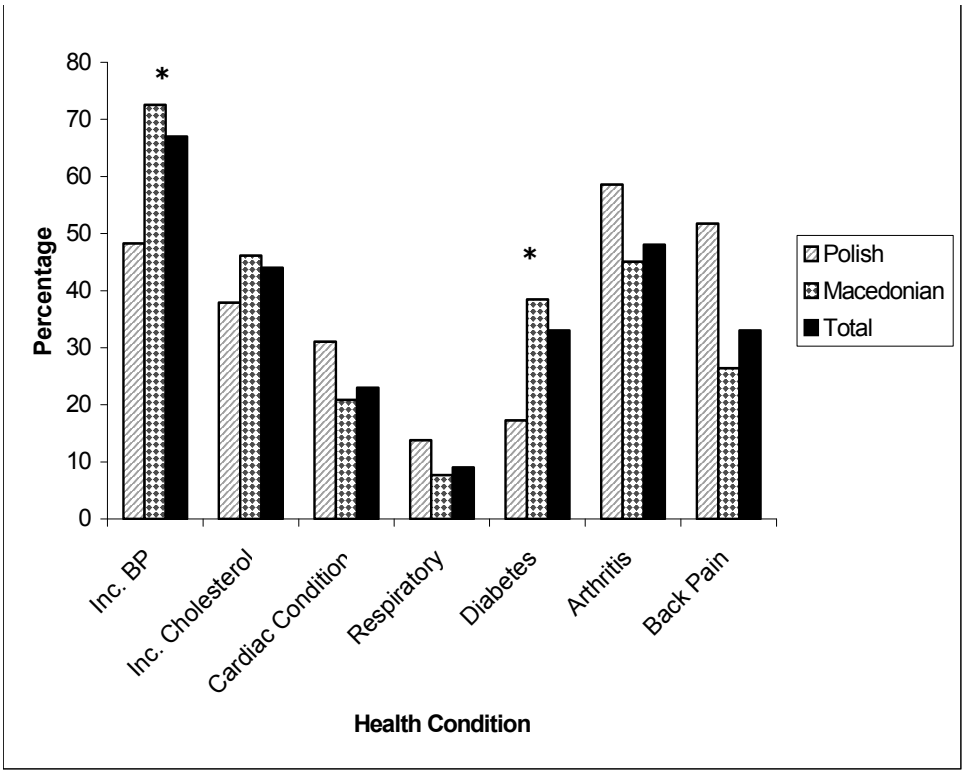


Figure 6 shows the seven most common health conditions according to the CALD background of the client. There appeared to be some differences between the two groups with a higher proportion of Macedonians reporting increased blood pressure, increased cholesterol and diabetes, whilst a higher proportion of Polish participants reported cardiac and respiratory conditions, arthritis and back pain. Significant differences were only evident for increased blood pressure ($\chi 2[1]=5.8$, $p=0.02$) and diabetes ($\chi 2[1]=4.46$, $p=0.04$).

Figure 6: Seven most common health conditions by CALD group



3.2.2 Medication Usage

Twenty five percent of all participants took four or more medications, which has been shown to be an indicator of falls risk. Table 2 indicates that the proportion of participants taking four or more medications was similar for the control and intervention groups, $\chi 2$ (1)= 0.27, p=0.60.

Table 2: Medication usage by experimental group

	0 to 3 medications (%)	Four or more medications (%)	Total (%)
Intervention	45 (73.8)	16 (26.2)	61 (100)
Control	45 (76.3)	14 (23.7)	59 (100)
Total	90 (75.0)	30 (25.0)	120 (100)

There was no significant difference between the two CALD groups, $\chi 2$ (1)=0.54, p=0.46.

3.2.3 Falls and Accidents

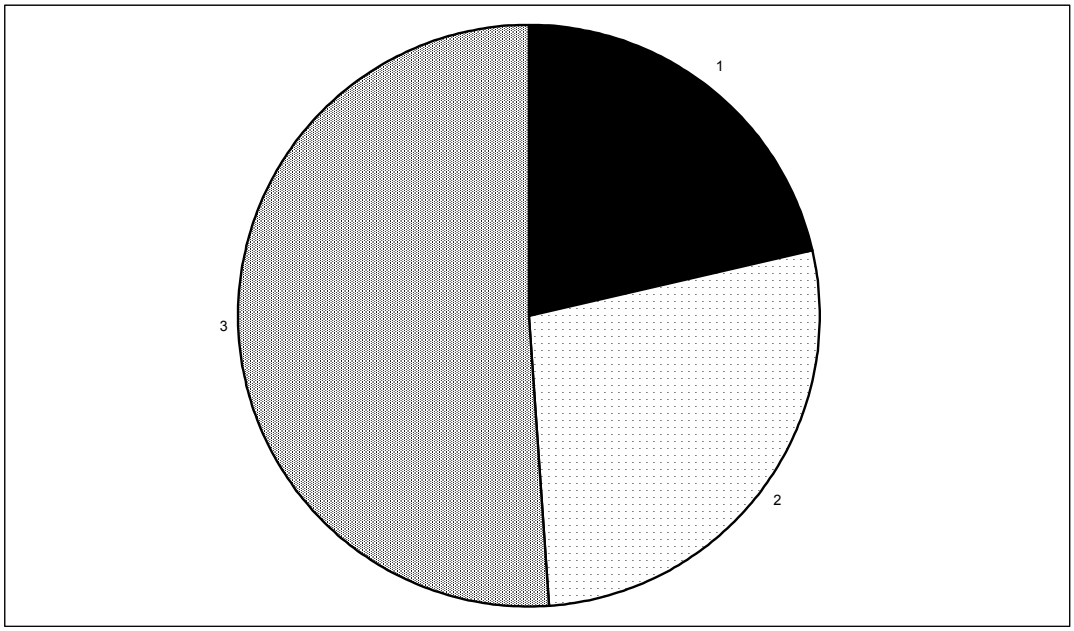
One hundred and thirteen participants (93%) reported they had not fallen in the past three months, six participants (5%) had fallen once and one participant had fallen more than once. Additionally, one person had injured their back and leg, and one had injured their arm. One woman who was keen to join the research project broke her ankle before she was consented

to participate. Ninety percent of Polish participants and 96% of Macedonian participants did not report any falls in the past three months.

3.2.4 Body Mass Index (BMI)

Using the Body Mass Index (BMI) standards designed for people older than 65 (Heiat et al, 2001) over half of the participants (51.3%) were categorised as overweight, 27.4% of participants were categorised as normal weight, and 21.4% were categorised as underweight (Figure 7).

Figure 7: Participants' Body Mass Index



Key: Body Mass Index Categories
1= Underweight [BMI <27 kg/m^2]
2= Normal weight [BMI 27-30 kg/m^2]
3= Overweight [BMI >30 kg/m^2]

Table 3 provides the breakdown of weight according to age group and shows that there were similar proportions of normal weight and overweight participants in the three different age categories. There was a lower percentage of underweight participants in the younger aged category (55-64) when compared to the two older categories (aged 65-74 and over 75).

Table 3: BMI Category and Age Group

Age Group (n)	Underweight	Normal Weight	Overweight
Aged 55-64 (33)	6.1%	33.3%	60.6%
Aged 65- 74 (55)	29.1%	23.6%	47.3%
Aged Over 75 (29)	24.1%	27.6%	48.3%
Total (117)	21.4%	27.4%	51.3%

Table 4 shows the number of intervention and control group participants in the different weight categories. There were no significant differences between control and intervention participants in the proportion of participants in the different weight categories, $\chi 2$ (2)= 2.45, p 0.29. There were also no differences between the two CALD groups, $\chi 2$ (2)= 4.05, p 0.13.

Table 4: Intervention and Control Groups by BMI Category

	Underweight	Normal Weight	Overweight	Total
Intervention	11 (18.6%)	14 (23.3%)	35 (57.4%)	60 (100%)
Control	14 (24.6%)	18 (31.6%)	25 (43.9%)	57 (100%)
Total	25 (21.4%)	32 (27.4%)	60 (51.3%)	117 (100%)

3.2.5 Self Reported Health

In response to the SF36 question, "In general, would you say your health is..." 84% of participants reported their health as good, very good or excellent, with the majority reporting 'good'. Table 5 provides the responses for the intervention and control groups. Mann-Whitney U tests revealed no significant group differences (z = - 5.23, p = 0.60). There was also no significant difference between the CALD groups, (z = - 1.52, p = 0.13).

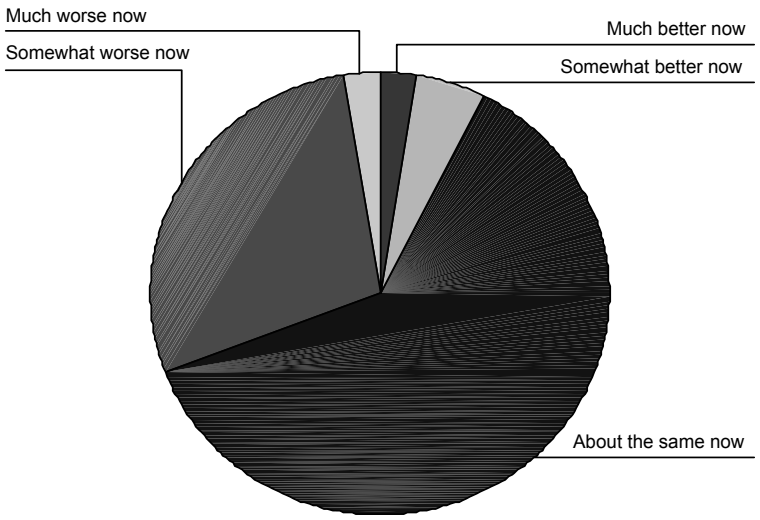
Table 5: Responses to "In general, would you say your health is"

	Excellent (%)	Very Good (%)	Good (%)	Fair (%)	Poor (%)	Total (%)
Intervention	2 (3.3)	10 (16.4)	39 (63.9)	8 (13.1)	2 (3.3)	61 (100)
Control	4 (6.8)	10 (17.0)	36 (61.0)	7 (11.9)	2 (3.4)	59 (100)
Total	6 (5.0)	20 (16.7)	75 (62.5)	15 (12.5)	4 (3.3)	120 (100)

In response to the question "Compared to one year age, how would you rate your health in general now?", 62% reported that their health was about the same and 30% reported that

their health was somewhat or much worse (See Figure 8). A number of participants who reported health deterioration stated, "Well, I'm older, therefore my health has gone down".

Figure 8: Responses to "Compared to one year ago, how would you rate your health in general now?"



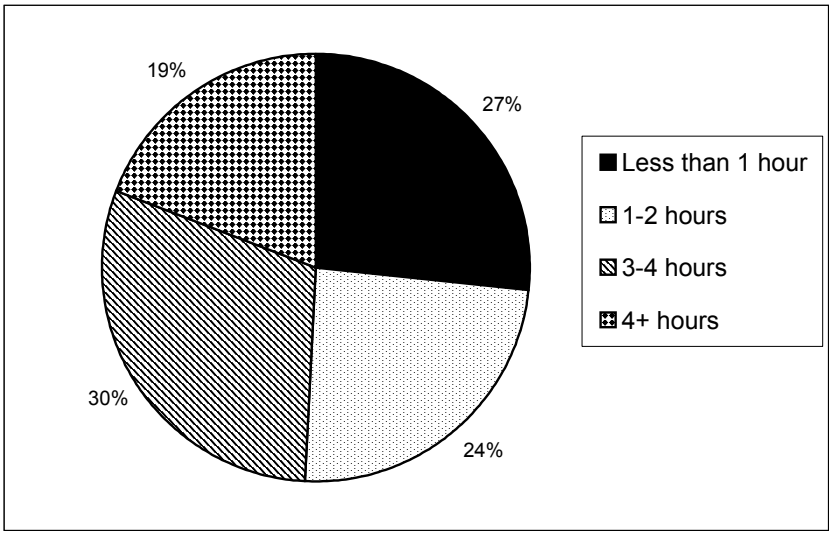
There were no significant differences between control and intervention group participants (z=-1.01, *p*=0.31) nor between CALD group participants (z=-0.49, *p*=0.62).

3.3 Physical fitness

3.3.1 Physical Activity levels

The most common regular physical activities were walking, housework and gardening. Twenty seven percent of participants reported that they walked less than one hour per week (Figure 9).

Figure 9: Walking Hours per Week



There was no significant difference between the control and intervention participants on hours of walking per week with 13 control participants (22%) and 19 intervention participants (31%) reporting walking less than one hour per week, $\chi 2$ (3)= 4.82, *p* 0.19. Fourteen control participants (23%) and nine intervention participants (15%) reported more than four hours walking per week.

The number of hours' walking per week was not significantly different between the CALD groups, $\chi 2$ (3)= 3.32, p=0.35.

Figure 10 indicates the most common physical activities reported by intervention and control group participants (excluding walking). Just over 10% of participants in both groups reported undertaking home based exercises and caring duties. Gardening and housework were much more commonly reported with around half reporting doing this each week. The control group less frequently reported undertaking heavy housework on a weekly basis than the intervention group.

Figure 10: Four most common physical activities (excluding walking) by experimental group

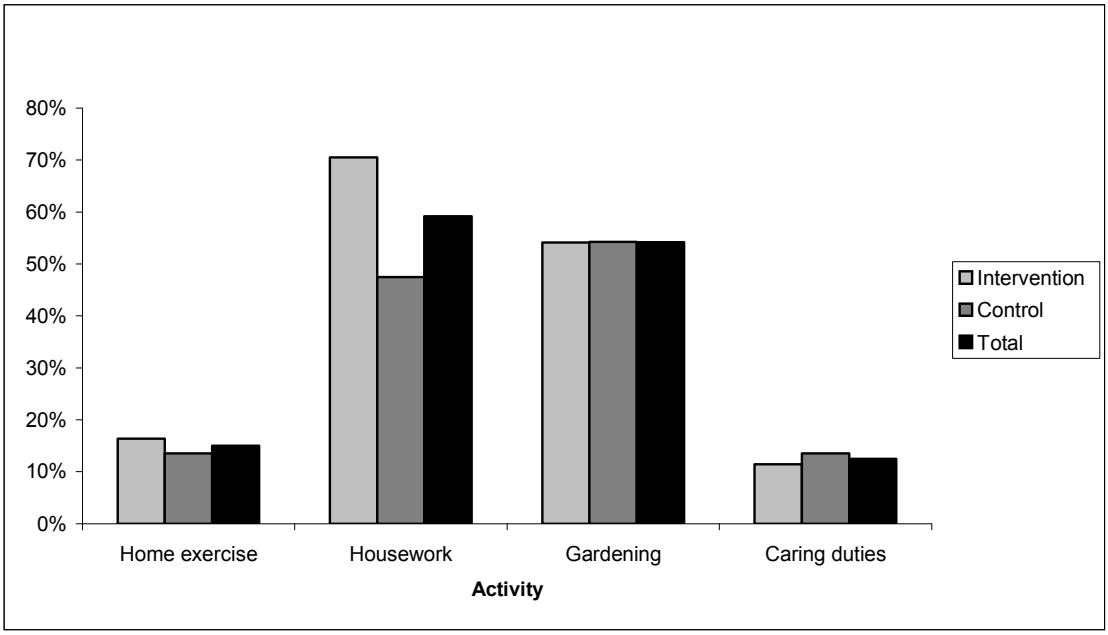
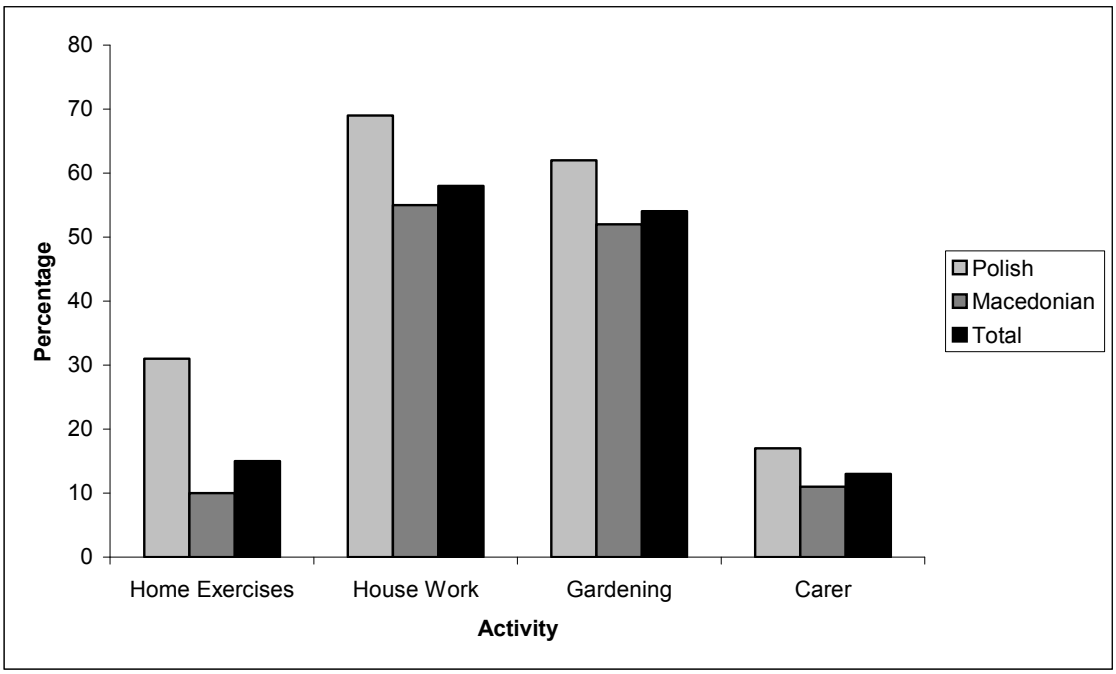


Figure 11 provides the same breakdown as Figure 10, except for Polish and Macedonian participants. The Polish participants appear more likely to report undertaking any of the activities, particularly home based exercises. Details of physical activity undertaken by Polish and Macedonian participants can be found at Appendix 4.

Figure 11: Four most common physical activities (excluding walking) by CALD group

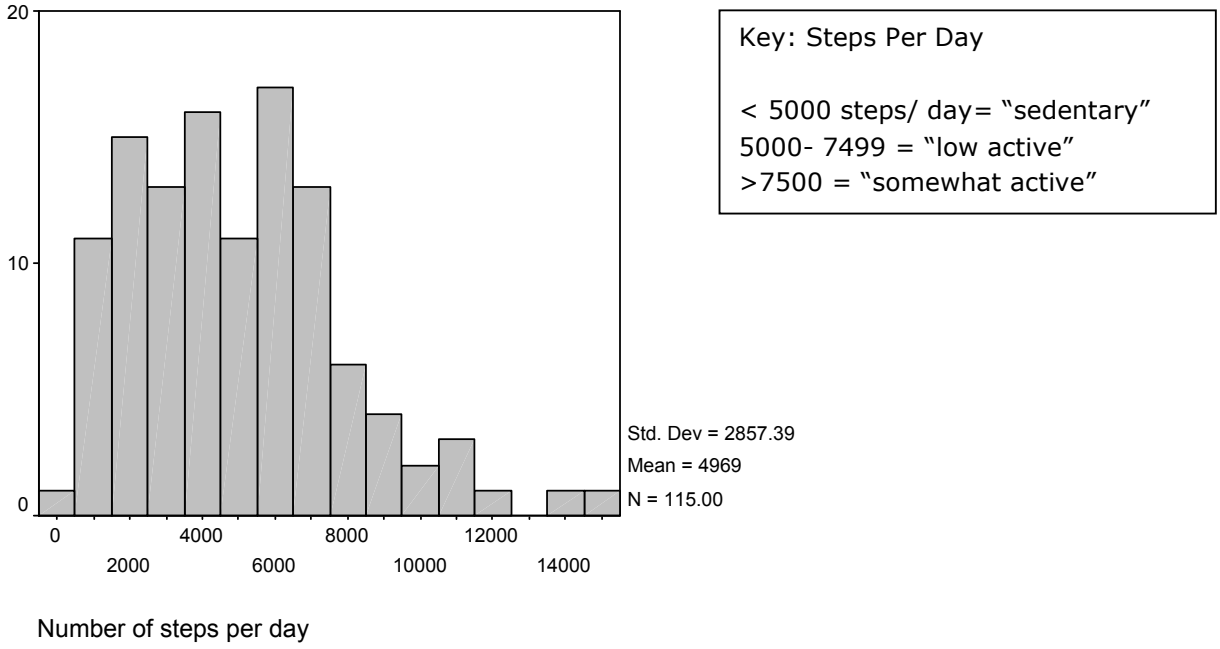


3.3.2 Steps per Day

Based on pedometer readings, the participants averaged 4969 steps per day at baseline (n=115, range 287-14,882. SD=2857). Females averaged 5083.70 (n=73, SD=2836.55) and males 4769.68 (n=42, SD=2916.87). The gender difference was not significant, $t(113)=0.57$, $p=0.57$. There was also no significant difference between the intervention group (mean=4971.2, SD=2654.6) and the control group (mean=4966.6, SD=3088.2; t(113)=0.01, $p=0.99$). No significant difference was evident between the CALD groups t(113)=-0.81, $p=0.42$.

Based on previous literature, this study considered less than 5000 steps as sedentary, 5000-7499 as low active and more than 7500 steps as 'somewhat active'. Sixty-two participants (54%) were sedentary, 35 (30%) were "low active" and 18 (16%) were "somewhat active". Figure 12 provides a plot of the steps per day recorded for participants at baseline.

Figure 12: Steps Per Day

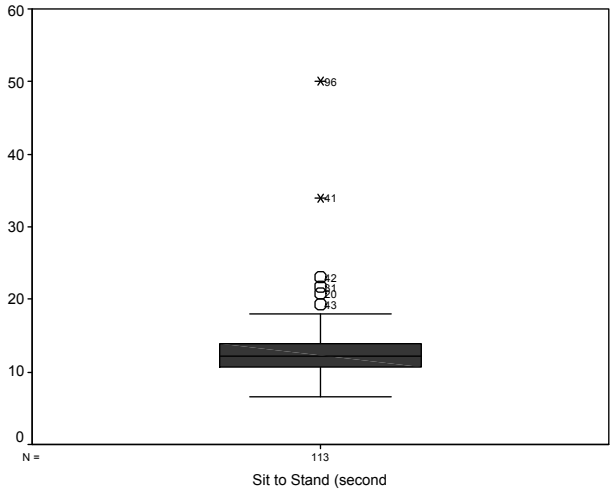


3.3.3 Sit to stand test

Participants at baseline who completed the five times sit to stand test (n= 113) averaged 13.0 sec (range 6.6-50 sec, SD=4.99). Women averaged 13.1 sec (SD=5.8) and men 12.7 sec (SD=3.26). There was no significant difference between gender groups, [t (111), $p=0.66$], experimental groups [t(111), $p=0.72$) or CALD groups [t(111), $p= 0.56$] in this test at baseline.

Figure 13 shows the distribution of scores for all participants at baseline.

Figure 13: Five times sit to stand in seconds



3.3.4 Six Metre Walk Test

3.3.4.1 Velocity

The average velocity of normal paced walking for participants at baseline was 65.2 metres per minute (n=116, SD=13.12) as assessed on the six metre walk test. This was a lower score than that reported in previous research for health older people (Morris et al. 1996). There was no significant difference in gait velocity between the intervention group (mean= 64.3m/min, SD = 9.20) and the control group (mean=66.0 m/min, SD=16.27), t (87.86)=-0.70, *p*=0.49.

3.3.4.2 Stride Length

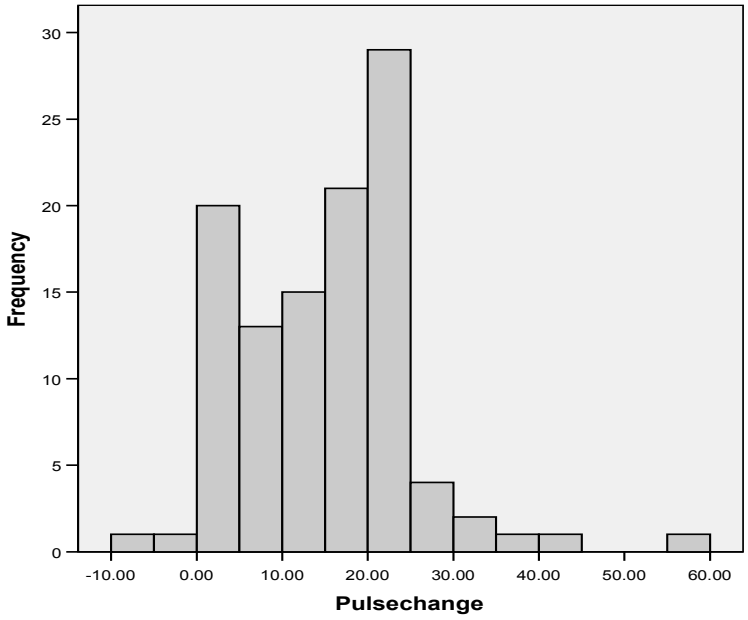
Stride length (two consecutive step lengths) averaged 1.16m (n=115, SD=0.22) for participants at baseline and again was lower than that reported in the literature for a group of healthy older people (Morris et al. 1996). There was no significant difference in the stride length between the intervention (mean=1.13m, SD=0.17) and control groups (mean=1.18m, SD=0.27), *t*(95.84)= - 1.11, *p*=0.27.

3.3.5 Six Minute Walk Test Results

The average distance walked in six minutes by participants at baseline was 364m (n=114, range 153-510m, SD=73.68). There was no significant difference between the intervention group (mean=362.6m, SD=57.17) and the control group (mean=360.6m, SD=97.42), *t* (87.92), *p*=0.90). There was also no significant differences between the CALD groups *t*(112), *p*=0.55, nor between genders *t* (112), *p*=0.15.

The average pulse change pre and post the six minute walk test was 14.8 beats per minute (n=109, range= -8 to 56, SD=9.76). The distribution is shown in Figure 14.

Figure 14: Change of Pulse Rate Pre and Post 6 minute walk test

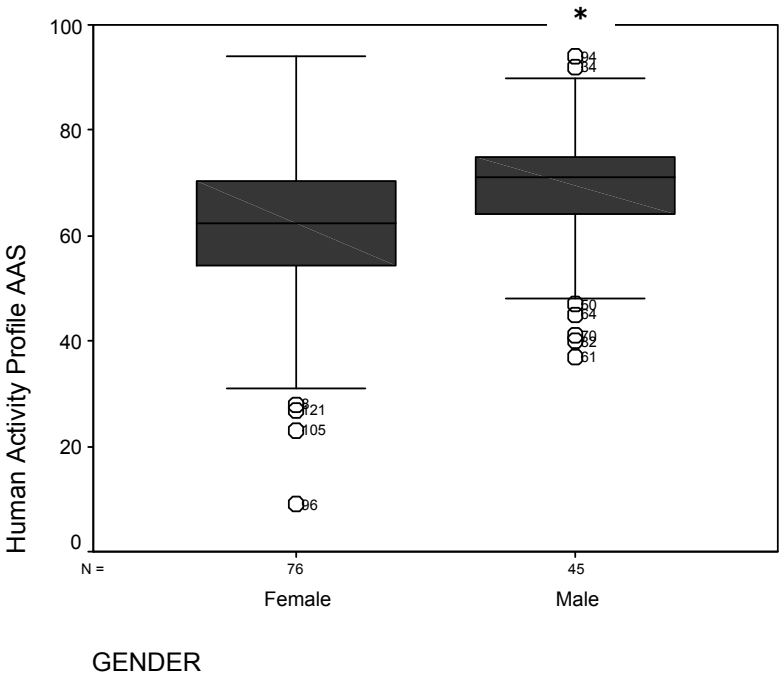


There was no significant difference between the intervention group (mean=14.6 beats per minute, SD=9.53) and the control group (mean=14.71 beats per minute, SD=10.05) in pulse rate change pre and post completion of the six minute walk test, t(109)= - 0.04, p=0.97.

3.3.6 Human Activity Profile (HAP)

The mean Adjusted Activity Score (AAS) was 63.71 (range 9-94, SD=14.95) out of a possible score of 94. The AAS was not significantly different between the intervention group (mean=65.6, SD=12.34) and the control group (mean=61.8, SD=17.25), t (106.37), *p*=0.16. There was also no significant difference between CALD groups, t(119), *p*=0.75. There was, however, a significant difference between genders (t[119], *p*=0.01), with females reporting lower levels of activity (mean=61.1, SD=15.5) than males (mean=68.0, SD=13.0). The distribution is shown in Figure 15.

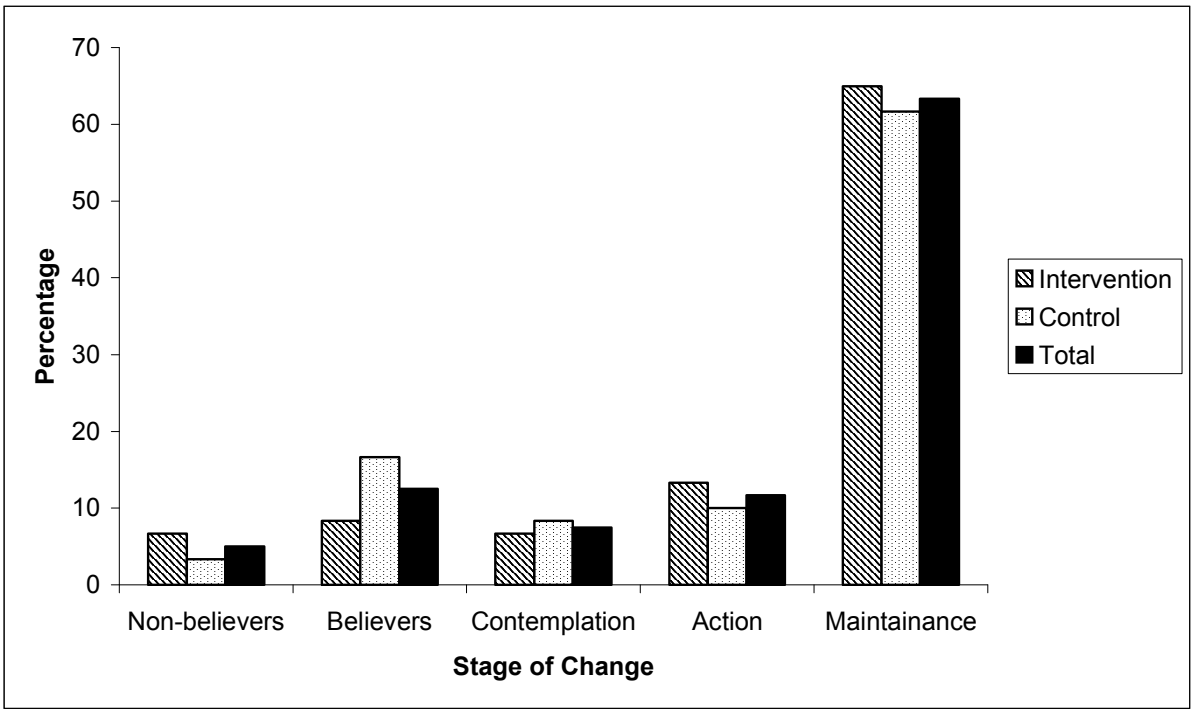
Figure 15: AAS Scores and Gender



3.3.7 Readiness to change physical activity levels

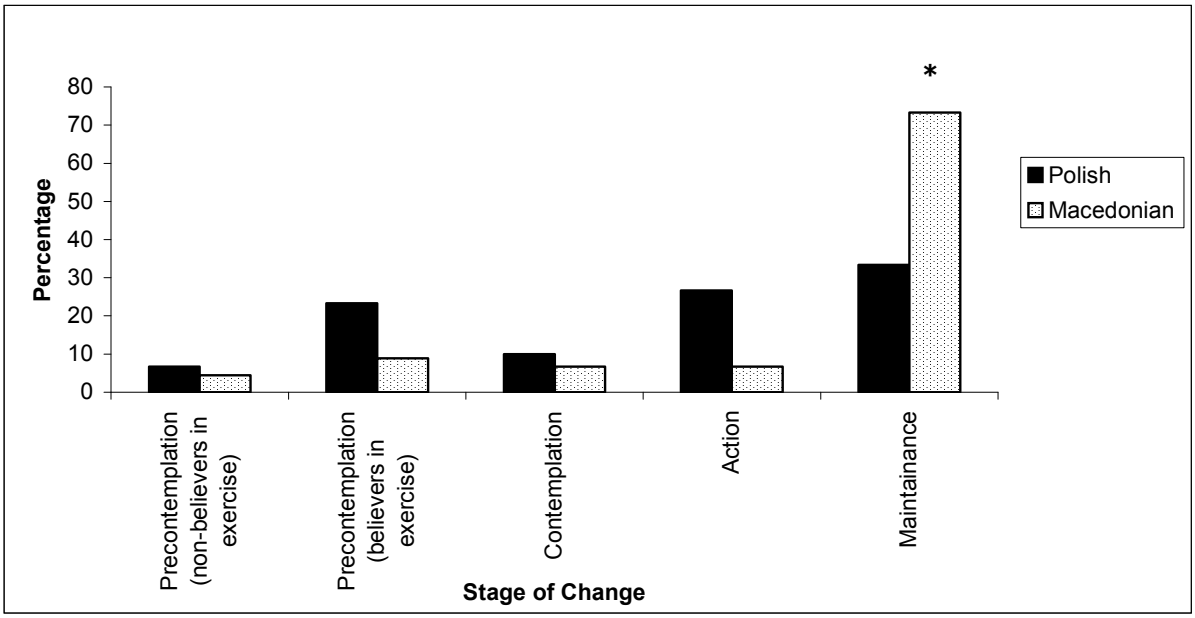
Sixty-three participants (63%) reported being in the maintenance stage, the highest stage on the stages of change questionnaire, indicating that the importance of exercise is understood and that a routine exercise program is maintained (Figure 16). A small proportion of participants (18%) reported being in the pre-contemplation stage, although a higher proportion of these participants understood the benefits of exercise (believers) compared to those who didn't (non-believers, See Figure 16). The nonparametric Mann-Whitney Test found there was no significant difference between experimental groups (z= -0.46, P=0.65) in readiness to change.

Figure 16: Baseline stages of change score by experimental group (n=120)



However, a significant difference in readiness to change was found between the two CALD groups, z= -3.57, P=0.000, with more Macedonian participants in the stage of maintenance (See Figure 17).

Figure 17: Baseline stages of change score by CALD group (n=120)



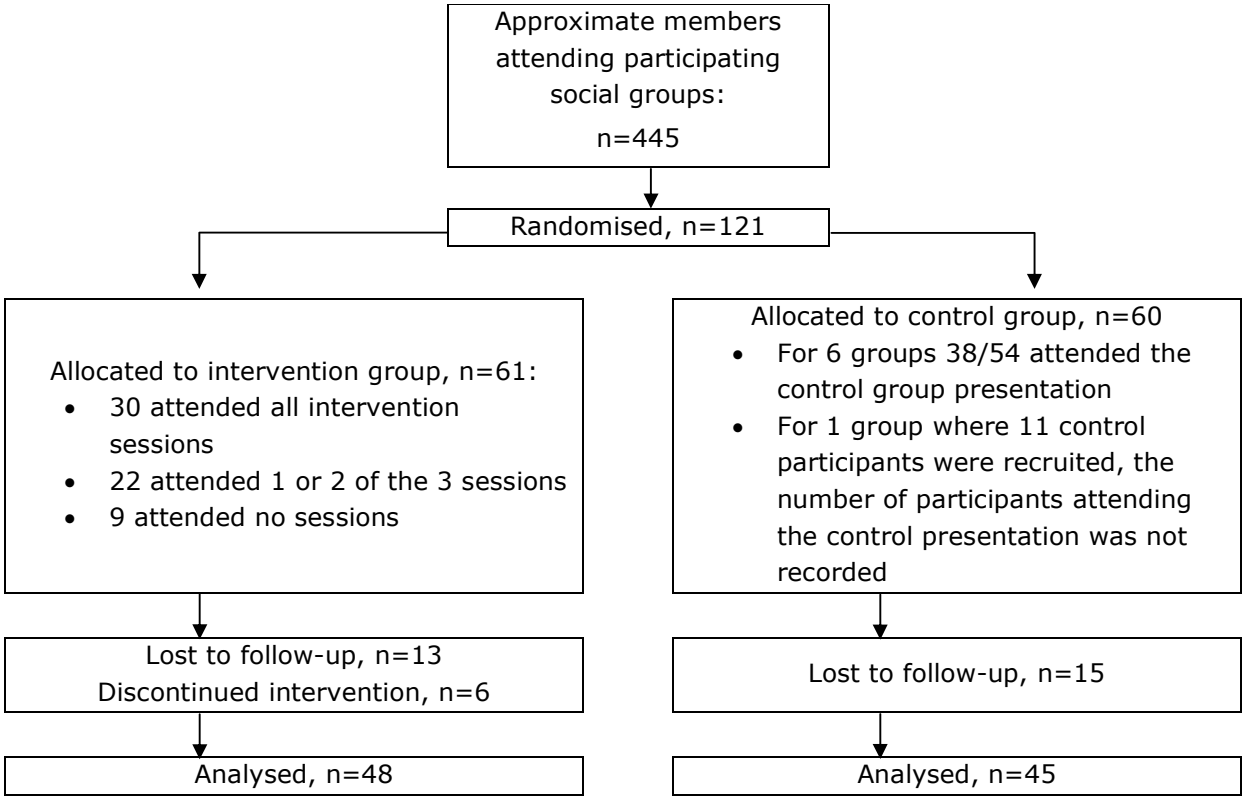
4 Results

Of the 121 participants who completed the baseline assessment, 93 (77%) completed the follow-up assessment, including 48 intervention (79%) and 45 control (75%) participants.

Of the original 61 intervention participants, 30 (49%) attended all three intervention sessions while 22 (36%) attended one or two of the sessions, with six of these participants dropping out after the first session. Nine intervention participants (15%) did not attend any sessions. Of the nine who didn't attend any sessions, eight were not sure about the intervention or did not give a reason for not wanting to participate in the sessions. However, one participant stated that they did not want to participate because they already knew physical activity was good for them and that they were currently doing plenty of physical activity. Two groups were not able to conduct their final sessions because of clashes with Macedonian Easter.

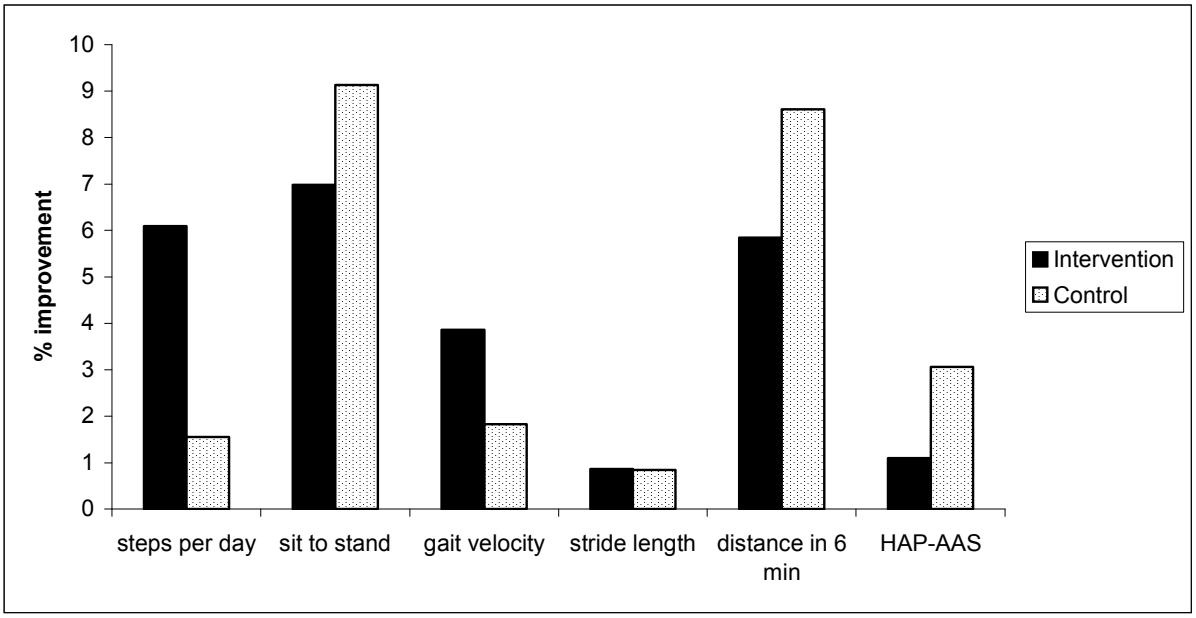
Reasons for dropping out after the first intervention session varied between participants. One participant no longer wanted to continue with the intervention because the impact it was having on their position as secretary in the social group. Another participant, as noted by the group facilitator, appeared disinterested from the outset and stated that they had now had enough of the sessions. Similarly two more participants, after attending the first physical activity session, stated that they were already too fit, were doing lots of physical activity and that they did not need the group as they had no problems. The final two participants decided not to continue with the physical activity intervention, as they were not in a good mood on the day. The flow of participants through the study is shown in Figure 18.

Figure 18: Flow of participants through the study



Participants showed general improvements in all numeric outcome measures (See Figure 19). Repeated t-tests found that for the intervention group, only two variables (sit to stand and distance in 6-minute walk) showed significant changes from baseline to follow-up. For the control group, distance walked in six minutes increased significantly.

Figure 19: Percentage improvement in numeric variables by experimental group



Both regression analyses models (adjusting for CALD background, living arrangements, BMI, increased BP, cancer history, cardiac conditions and diabetes, and not adjusting for these variables) were not able to detect any significant effects for experimental group for the six numeric dependent variables (See Table 6). As results from the two models were similar, only results from the adjusted models are presented (see Table 6).

Table 6: Regression Analyses Testing the Effects of Group Membership on follow-up test scores

Dependent Variables	Control Group				Intervention Group				Regression model	
	n	Baseline (SD)	Follow-up (SD)	Differences	n	Baseline (SD)	Follow-up (SD)	Differences	Group differences when both baseline differences and other related variables are adjusted	*p*
Number of steps per day*	41	5118.28 (2908.60)	5197.76 (3031.88)	79.48	41	5657.49 (2644.90)	6002.18 (2849.00)	344.69	0.19 (-0.03 - 0.41)	0.08
Sit to Stand (seconds)^	40	12.49 (4.52)	11.35 (3.14)	-1.14	40	12.90 (2.82)	12.00 (3.13)	-0.9	-0.01 (-0.17 - 0.16)	0.92
6 metre walk test – velocity*	40	69.14 (15.85)	70.40 (13.51)	1.26	41	65.83 (8.97)	68.37 (9.32)	2.54	-218.38 (-832.84 - 396.07)	0.48
6 metre walk test - stride length*	40	1.19 (0.25)	1.20 (0.20)	0.01	40	1.16 (0.19)	1.17 (0.14)	0.01	-0.07 (-0.23 - 0.10)	0.42
Distance in 6 min (meters)*	39	365.36 (84.99)	396.82 (77.84)	31.46	37	367.08 (56.62)	388.54 (53.57)	21.46	0 (-0.06 - 0.05)	0.89
HAP- AAS*	43	63.63 (14.11)	65.58 (13.57)	1.95	45	64.38 (12.30)	65.09 (12.82)	0.71	0.66 (-4.51-5.86)	0.80

*Higher scores indicate better performance

^ Lower scores indicate better performance

Related non-parametric tests were used to compare changes in average ranking from baseline to follow-up in the two groups for the two SF-36 self-rated health questions and the Stages of Change questionnaire. No significant differences were found for the intervention group, whilst the control group significantly improved on the Stages of Change questionnaire.

These three variables were also coded into three categories: better rating (improvement in stages), same and worse rating (decrease in stages) from baseline to follow-up. Chi-squared tests were used to compare group differences in frequencies of these categories, with no significance differences detected. Figures 20 and 21 illustrate the changes from baseline to follow-up for the two SF-36 questions. Both figures indicate there were a higher proportion of intervention participants reporting a better rating at follow-up than control participants.

Figure 20: Changes in SF-36 question, "In general, would you say your health is" from baseline to follow-up by experimental group

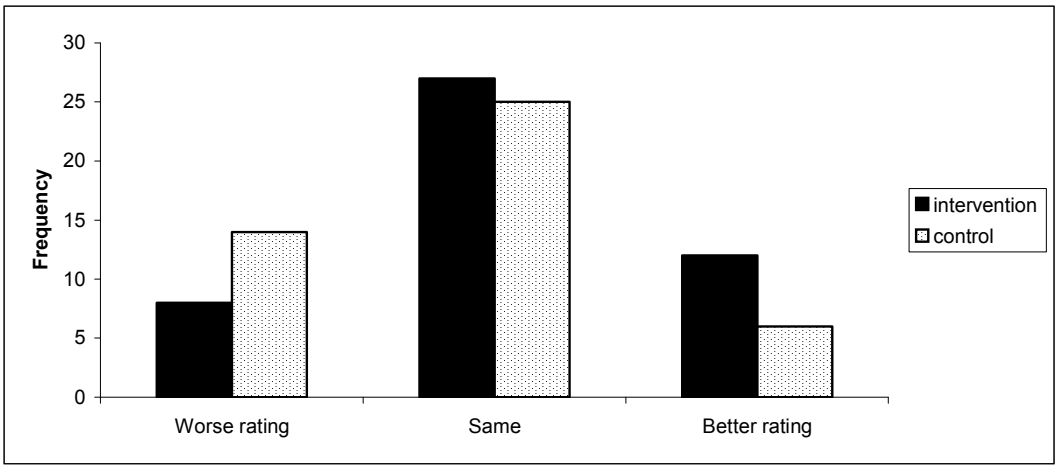


Figure 21: Changes in SF-36 question, "Compared to one year ago, how would you rate your health in general now?" from baseline to follow-up by experimental group

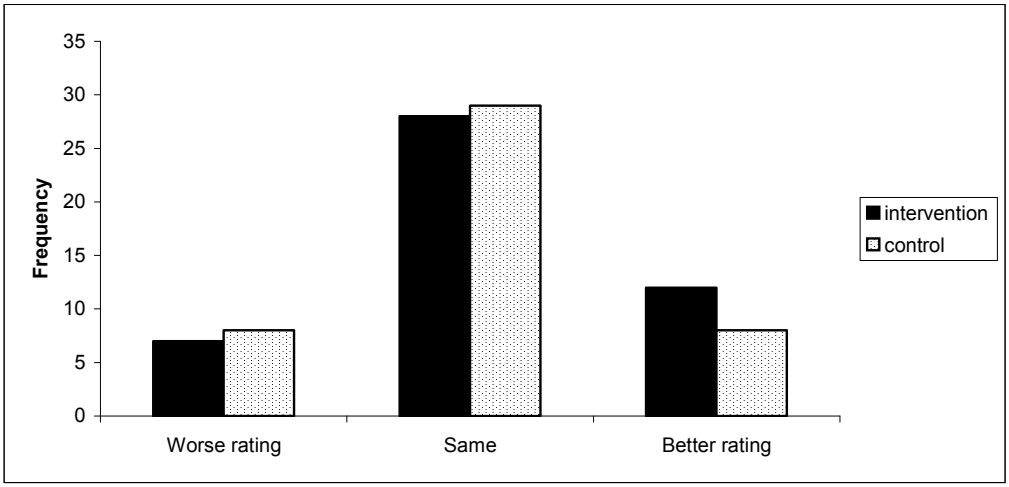


Figure 22 indicates that a higher proportion of intervention participants decreased in their stage of change.

Figure 22: Changes in stages of change questionnaire from baseline to follow-up by experimental group

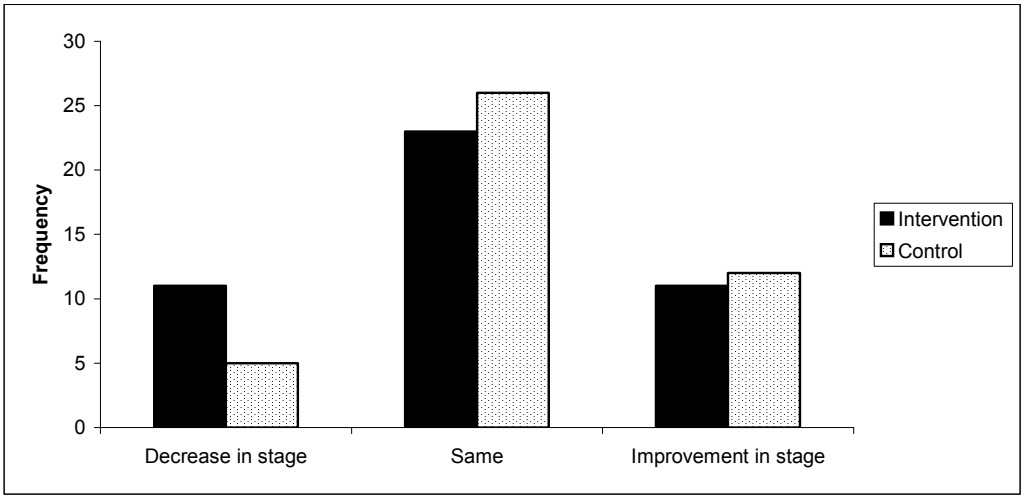
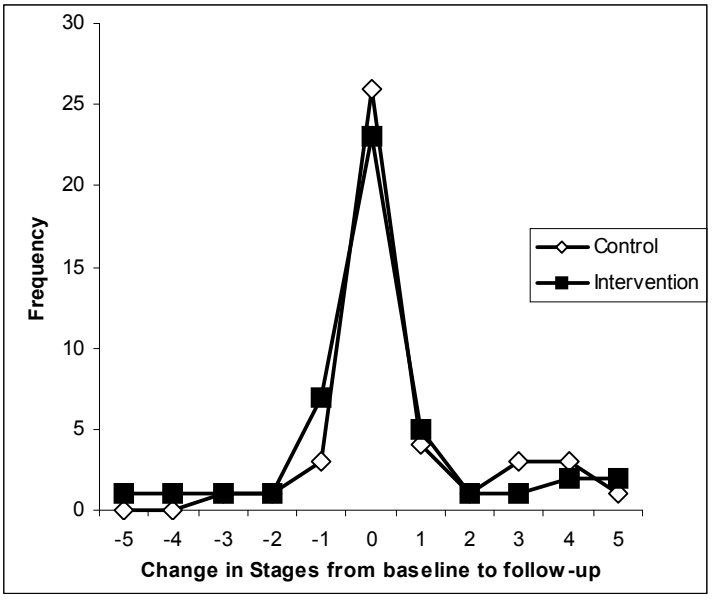


Figure 23 provides a more detailed breakdown of the data in Figure 22. It illustrates the changes reported from baseline to follow-up for the stages of change questionnaire. A zero score in the diagram indicates that the participant reported the same stage at both baseline and follow-up assessments. A score of +1 indicates an increase of one stage (e.g. from action to maintenance) and a score of -1 indicates a decrease in one stage (e.g. from maintenance to action).

Figure 23: Changes in stages of change questionnaire from baseline to follow-up by experimental group



5. Discussion

This study investigated health professional facilitated sessions aiming to challenge perceived barriers to participating in physical activity and developing physical activity goals amongst Macedonian and Polish older people (55+). A randomised controlled methodology was used to determine whether the intervention increased physical activity and fitness amongst the target population and/or progressed participants' readiness to change.

One hundred and twenty-one participants from seven Polish and Macedonian social groups in the WMR of Melbourne were recruited to the study. At follow-up, 93 (77%) participants completed the follow-up assessment, achieving the predicted sample size required to have adequate power for statistically significant differences to be detected.

Throughout the study, written materials were translated into Polish and Macedonian and interpreters were available. Participants had the choice of using or not using the interpreter. They also had the choice of using the translated or English versions of questionnaires and the participant information and consent form. Some participants were not able to read in either language and so written information was read to them in their preferred language. In most cases the participants elected to use the translated questionnaires.

Baseline characteristics were compared between intervention and control participants and between Polish and Macedonian participants. There was only one significant difference between the experimental groups with control participants more likely to have had diabetes. Whilst the Polish participants were significantly older and more likely to be female and living alone, there were few differences in their health status when compared to the Macedonian participants. More Macedonians reported high blood pressure and diabetes and were more likely to report being in the maintenance stage of change. One gender difference was identified at baseline with females reporting significantly lower levels of activity on the HAP-AAS despite recording on average 300 more steps per day on the pedometer (not significantly more than males).

The results indicated a trend for improvement on all outcome measures for all participants. The only measures where significant improvements were found were for the distance walked in six minutes for both groups, the sit to stand for the intervention group and the stages of change questionnaire for the control group. Regression analyses, both adjusting and not adjusting for CALD background, living arrangements, BMI, increased BP, cancer history, cardiac conditions and diabetes did not find that the intervention group improved significantly more than control participants. Possible explanations for the lack of an effect from the intervention are detailed below.

5.1 Possible explanations for the lack of effect

5.1.1 Baseline characteristics

Particularly in relation to the Stages of Change questionnaire, the lack of effect from the intervention may have been due to the large proportion of participants already reporting that they were in the maintenance stage and therefore there was no room for further progression in readiness to change. However, the pedometer readings indicated that the majority of

participants were not highly active. A high proportion of overweight participants (51%) also does not support that adequate levels of physical activity were being achieved prior to the study. According to the health professional that conducted the intervention sessions, participants were generally reporting the recommended 30 minutes of moderate activity each day at the start of the study. This activity was generally in the form of housework, gardening and walking rather than formal exercise programs, although many reported doing exercises at home that were prescribed by a health professional, or were on television (SBS / Channel 31).

Also, agreeing to participate in a study about physical activity indicates some interest in the topic and perhaps openness to change. This sample may have different characteristics and patterns of behaviour in relation to physical activity than people who chose not to participate in the study.

5.1.2 Intensity and length of the intervention

One possible explanation for the lack of effect from the study could be that the intervention was not intensive or long term enough to create significant improvements. Also, the length of time after the intervention was completed was only one week and it is unlikely that some of the physical fitness tests, such as the six-minute walk, the six-metre walk and the timed sit to stand tests would have been substantially improved after a nine week period, even if participants had increased their activity levels. However, the primary dependent variables in the study (pedometer readings and stages of change questionnaire) could have identified short-term changes in physical activity levels and participants' readiness to change.

5.1.3 Attendance

Not all participants included in the intervention sessions attended all sessions and therefore the lack of effect may have been due to not attending the whole intervention. There seems to have been a number of factors impacting on attendance. Seven participants reported that they did not need the intervention as they were already sufficiently active, whilst another eight did not attend any sessions without an explanation provided. An evaluation form for the intervention may have been useful for getting participants feedback on how useful they found the program. Feedback from the facilitator indicated that participants enjoyed setting goals and talking about how they had accomplished them and most appeared to enjoy the sessions as long as they did not interfere with the activities being run in the group (particularly bingo). This later difficulty would not be an issue if the intervention were rolled out in these groups for all members of the group, rather than a research study where only a select number of participants were being taken out of the group. Clashes with public holidays and Easter created many delays in running intervention sessions and due to project timeframes, two groups were unable to complete their third intervention session. This was also likely to have impacted on effectiveness of the intervention.

5.1.4 Limitations of the outcomes measures and testing procedure

Testing settings were not consistent and depended on each community groups' clubrooms. Some assessments had to be conducted outdoors under shelter in various weather conditions. Participants appeared to put in more effort when the test location was geographically removed from other group members. Some participants chose to complete their tests in private while others appeared to enjoy the group dynamics and completed their assessments in view of the group.

The Borg scale was difficult to administer, despite using a translated scale and using an interpreter. A number of participants were unable to classify their level of exertion using either a numerical category or set descriptive term. "I'm OK" was a common response, so the researchers occasionally substituted the terms "relaxed", "more effort but not tired", "tired but OK" and "very tired" for the usual categories. Due to these limitations and the difficulty in interpreting the findings from the Borg scale, it was excluded from all analyses.

The steps per day results from the pedometers may not be fully accurate as participants did not always wear their pedometer for the full day and some guessed how many days they had actually worn it for. Future research may investigate the difference in results between wearing the pedometer in this prescribed manner with physically attaching a pedometer to the body with adhesive dressing, as has been done using the "uptime device" in studies to measure time spent upright in a 24 hour period (Bernhardt et al 2005).

There were a few cases of participants filling in the Human Activity Profile in a manner that appeared not reflective of their abilities. For example, one participant who had a below average 6 minute walk test indicated that she was able to "run or jog 3 miles in 30 minutes or less". Another participant indicated that she was "unable to walk one block" when she had in fact walked over 300 metres during the six minute walk test. This may have been influenced by the translations of the original English scale into Polish/ Macedonian. The word "block" is not a part of these languages' vernacular and often had to be explained to participants by the interpreter. Questionnaires may have benefited from using the Brislin model of back-translations, as described by (Bonner and Kanrick 2006), who report that "…the process of translating concepts developed in one culture for use in another is fraught with problems of semantics". The double cost of doing back-translations is an important consideration when budgeting for research with people from CALD backgrounds as well as pilot testing the questionnaire to ensure participants understand it.

Body Mass Index was calculated from height and weight measurements, and is used as an indicator of body fat composition. It is a measurement that is quick and easy to administer and was well received by participants. Waist circumference measurements are potentially more invasive for participants, but may be a better indicator of body composition related health risk.

5.1.5 Contamination

Non-significant findings between experiment groups may have been attributed to possible contamination of participants. Of the 121 participants recruited at baseline there were 26 married couples. Twelve of the 26 married couples were randomised to the same experiment group while fourteen married couples were randomised to different experiment groups. Of the fourteen married couples that were randomised to different experimental groups, eleven couples completed both baseline and follow-up assessments, two couples were absent at their scheduled follow-up assessments and for one couple, only one spouse completed both assessments. Therefore, the randomisation of married couples into different experimental groups may have contaminated results for 23 of the 93 participants who completed both baseline and follow up assessments; approximately 25% of the study's sample. Having married couples in different experimental groups may have resulted in control participants having knowledge of and access to the intervention group's physical activity information and

activities. Part of the planned intervention was for individuals to develop physical activity goals and a physical activity plan that was to be conducted in the participants' homes. Furthermore the intervention also taught participants simple exercises that could be integrated into their daily living. Therefore intervention participants may have provided motivation for their spouses in the control group resulting in both increasing their physical activity levels and changing their attitudes towards physical activity.

Contamination may also have occurred as control and intervention participants socialised at the same venue on a weekly basis. The general improvements on dependent variables for both control and intervention groups provide some support for possible contamination.

5.2 Recommendations

Based on the findings of this study, the following recommendations are made for future research and physical activity interventions:

- Future research combines qualitative and quantitative data strategies to provide a richer understanding of the effectiveness of an intervention
- Further research be conducted to determine effective strategies for reducing barriers to physical activity. Multi-faceted approaches may be beneficial
- When budgeting for research with CALD people, factor in costs for back-translations and also pilot testing questionnaires to ensure questions are understood in different cultural contexts
- Develop and validate a broader range of health and physical activity outcome measures suitable for different CALD populations and available in different languages
- Ensure interventions and research studies take account of existing programs and cultural customs and celebrations that the target group is involved in
- Further research be conducted to develop a more sophisticated understanding of stages of change. For example, can the stage of change move from perceived action or maintenance to contemplation if a person learns that the amount of exercise they are doing is not adequate?

5.3 Conclusion

The research has provided an important contribution to the investigation into strategies for increasing physical activity amongst older people from CALD backgrounds, an area where there is a dearth of existing research. It highlights some methodological considerations for undertaking research with older people from CALD backgrounds.

References

Australian Institute of Health and Welfare (2007). Older Australia at a glance: 4th edition. Cat. No. AGE 52. Canberra: AIHW.

Armstrong, T., Bauman, A. and Davies, J. (2000). Physical activity patterns of Australian adults: results of the 1999 national physical activity survey. Canberra, Australian Institute of Health and Welfare.

ASR Research Pty Ltd (2004) Older persons Population and Service profile.

Bauman, A., Bellew, B., et al. (2002). Getting Australia active: Towards better practice for the promotion of physical activity. Melbourne, Australia, National Public Health Partnership.

Barnett, A., B. Smith, S.R. Lord, M. Williams, et al., (2003) Community-based group exercise improves balance and reduces falls in at-risk older people: a randomised controlled trial. Age and Ageing. Vol. 32(4):407-14.

Bernhardt J, Borschmann K, Crock D, Hill K, McGann A and DeGori M (2005) Stand up and be counted: measuring time spent upright after hip fracture and comparison with community dwelling older people Physiotherapy. Vol. 91:215-222.

Belza B, Walwick J, Shiu-Thornton S, Schwartz S, Taylor M, LoGerfo M. (2004) Older adult perspectives on physical activity and exercise: Voices from multiple cultures. Prev Chronic Dis. [serial online]. Available from http://www.cdc.gov/pcd/issues/oct/04_0028.htm.

Bonner A and Kenrick M (2006) Development and validation of the Human Activity profile into Chinese language: Lessons in determining equivalence Nursing and Health Sciences Vol 8, p 36-43

Bravo, G., P. Gauthier, P. Roy, H. Payette, et al. (1996) Impact of a 12-month exercise program on the physical and psychological health of osteopenic women. Journal of the American Geriatrics Society, Vol. 44:756-62.

Campbell, A., M. Robertson, M. Gardner, R. Norton, et al. (1997) Randomised controlled trial of a general practice program of home based exercise to prevent falls in elderly women. British Medical Journal. Vol. 315:1065-9.

Carroll J, Fiscella K et al (2008) Clinician-Patient Communication About Physical Activity in an Underserved Population The Journal of the American Board of Family Medicine. Vol. 21(2):118-27.

Crouter, S.E., Schneider, P.L., Karabulut, M. & Bassett, D.R., (2003) Validity of 10 Electronic Pedometers for Measuring Steps, Distance, and Energy Cost. Medicine and Science in Sports and Exercise. Vol. 35(8):1455-60.

Day, L., B. Fildes, I. Gordon, M. Fitzharris, et al. (2002) Randomised factorial trial of falls prevention among older people living in their own homes. British Medical Journal. Vol. 325(7356):128.

DHS (2002) Western Metropolitan Region Health and Social Wellbeing Profile 2nd Edition. Department of Human Services Victoria.

Fix, A.J. & Daughton, D.M. (1988) Human Activity Profile. PAR Psychological Assessment Resources, Inc., Odessa, FL.

Guyatt, G.H., Sullivan, M.J., Thompson P.J., Fallen E.L., et al. (1985). The 6-minute walk: a new measure of exercise capacity in patients with chronic heart failure. Can Med Assoc J. Vol.132:919-23.

Harada N.D., Chiu V. & Stewart A.L., (1999) Mobility-related function in older adults: assessment with a 6-minute walk test. Arch Phys Med Rehabil. Vol. 80:837-41.

Haralambous, B., Osborne, D., et al. (2003). Participation in physical activity amongst older people. Melbourne, National Ageing Research Institute. Report to the Department of Human Services.

Heiat, A., Vaccarino, V. & Krumholz, H.M. (2001). An Evidence-Based Assessment of Federal Guidelines for Overweight and Obesity as They Apply to Elderly Persons. Arch Intern Med. Vol.161:1194-1203.

Kerse, N., L. Flicker, D. Jolley, B. Arroll, et al. (1999). Improving the health behaviours of elderly people: randomised controlled trial of a general practice education program. British Medical Journal. Vol. 319:683-7.

Lyons, R., Perry, H., & Littlepage, B. (1994) Evidence for the validity of the short-form 36 questionnaire in an elderly population - SF-36. Age and Ageing. Vol. 23(3):182-4.

Marcus, B.H., Selby, V.C., Niaura, R.S. & Rossi, J.S., (1992) Self-Efficacy and the Stages of Exercise Behaviour Change. Research Quarterly for Exercise and Sport. Vol. 63(1):60-6.

McAuley, E., C. Lox and T. Duncan, (1993) Long term maintenance of exercise, self exercise, and physiological change in older adults. Journal of Gerontology. Vol. 48:218-24.

National Institute for Health and Clinical Excellence (NICE). (2006) Four commonly used methods to increase physical activity: brief interventions in primary care, exercise referral schemes, pedometers and community-based exercise programmes for walking and cycling. London (UK) (Public health intervention guidance; no. 2). http://www.guideline.gov/summary/summary.aspx?ss=15&doc_id=9739&nbr=5213

Nigg C, Burbank P, Padula C, Dufresne R, Rossi J, Velicer WF, Laforge R, Prochaska J. (1999) Stages of change across ten health risk behaviors for older adults. Gerontologist. Vol. 39:473-82.

Prochaska and DiClemente (1983) Stages and processes of self-change of smoking: toward an integrative model of change. J Consult Clin Psychol. Vol. 51(3): 390-5.

Satariano, W., T. Haight and I. Tager, (2000) Reasons given by older people for limitation or avoidance of leisure time physical activity. Journal of the American Geriatrics Society. Vol. 48: 505-12.

Schneider, P.L., Crouter, S.E., Lukajic, O. & Bassett, D.R. (2003) Accuracy and Reliability of 10 Pedometers for Measuring Steps over a 400-m Walk. Medicine and Science in Sports and Exercise. Vol. 35(10):1779-84.

Sequeira M, Rickenbach M, Wietlisbach V, Tullen B, Schutz Y. (1995). Physical activity assessment using a pedometer and its comparison with a questionnaire in a large population survey. American Journal of Epidemiology. Vol. 142:989-99.

Singh, N.A., K.M. Clements and M.A. Fiatarone, (1997) A randomized controlled trial of progressive resistance training in depressed elders. J Gerontol A Biol Sci Med Sci. Vol.52(1):M27-35.

Smitherman T, Kendzor D, Grothe K, Dubbert P (2007) State of the Art Review: Promoting Physical Activity in Primary Care Settings: A Review of Cognitive and Behavioral Strategies. American Journal of Lifestyle Medicine. Vol. 1(5):397-409.

Standing Committee on Recreation and Sport - Australia (2005). Participation in exercise, recreation and sport: Annual report 2005, State/Territory Departments of Sport and Recreation.

The Writing Group for the Activity Counseling Trial Research Group (2001) Effects of Physical Activity Counseling in Primary Care. The Activity Counseling Trial: A Randomized Controlled Trial, Journal American Medical Association. Vol. 286 (6):677-687.

Tudor-Locke C, Bassett D. (2004) How many steps / day are enough? Preliminary pedometer indices for public health. Sports Med. Vol.34:1-8.

Westbay Alliance. (2005) Falls Prevention Program Whole of Community Falls Prevention Program. Funding Submission

Wilcox, S., Castro, C., et al. (2000). Determinants of leisure time physical activity in rural compared with urban older and ethnically diverse older women in the United States. Journal of Epidemiology and Community Health. Vol. 54:667-72.

Wolf, S., H. Barnhart, N. Kutner, E. McNeely, et al., (1996) Reducing frailty and falls in older persons: An investigation of Tai Chi and computerised balance training. Journal of the American Geriatrics Society. Vol. 44:489-97.

Appendices

Appendix 1 Intervention session plan

Session 1

Welcome, introductions and outline what you are going to discuss in the session.

1. What is physical activity/active living? (10 minutes)

Ask the participants to think of examples of physical activities they are doing already and examples of activities they used to do and enjoy and have stopped doing. Give an example "I play golf once a week for 4 hours".

Feedback answers – go around the group and ask each participant to name one activity they enjoy and are doing regularly or something they used to do or would like to be doing.

Discuss - *Living so physical activity is enjoyed and part of every day life.*

Most people are physically active as part of every day life - use activities mentioned by the group, particularly emphasise that activities are / can be enjoyable. Talk about physical activity that can be incorporated into each day and give examples of what you [the facilitator] are doing e.g. walking briskly to the shops.

Discuss - *Recommendations for active living and how to get the benefits from physical activity*. Include in the discussion that housework/gardening are all physical activities. The level of benefit to health is dependent upon the person's level of health/fitness. Need to be active at a moderate level for a health benefit e.g. a slight but noticeable increase in your breathing and heart rate.

2. Concerns about being physically active (15 minutes)

People have concerns about doing physical activity.

Ask people to discuss with the person next to them "What do they believe are the negative things/ things that stop them doing of physical activity?". Each pair should write down three ideas. **(Give 2 or 3 minutes until all pairs look ready)**

Feedback and Discuss – Each pair gives one possible idea, each time ask for hands up for who else had the same idea. After each idea is suggested and there has been a show of hands offer counter arguments to the idea (suggestions below).

Worry/negative things/barriers	Possible reply from the facilitator
Makes you tired/lack of energy	Doing more physical activity can increase energy levels. Use example: if having stopped doing something for a while then start again it is harder, but if keep going, it gets easier. Physical activity can also help you sleep better at night. If worried about getting tired build up slowly.
Having a heart` attack	If worried or have heart troubles see your doctor before you start for a check up.
Falls	Physical activity prevents falls. If worried see a physio, get some balance exercises, start a supervised exercise class. Acknowledge that increasing exercise can increase exposure to falls so if concerned need to be cautious – but in the longer term increased muscle strength, improved balance etc will protect against falls.
Medical conditions	Physical activity can help some medical conditions, if they are worried get the all clear from their doctor first.
Arthritis	Physical activity helps, makes muscles stronger to protect sore joints. Exercise in the pool or see a physio, will make you feel better.
Injury	Not if increased at a steady level.
The environment (nowhere to walk)	Consider a group, water aerobics, exercise at home (every day things or a program designed by a physio/fitness instructor at the Community Health Centre).
Lack of transport	Consider home based physical activity as above, car pool with friends, walking.
Lack of time	Include physical activity in the things you are already doing, being fitter/stronger will help you get the things you need to get done.
Back Pain	Physical activity helps, makes muscles stronger, which will help support bones and help decrease pain over time. Best to get help from a physio, advice from doctor if have back pain.

3. What are the benefits of physical activity? (10 minutes)

Ask the participants to discuss in their pairs the benefits they might have from being more physically active. Each pair should write down 3 benefits. **(Give 2 or 3 minutes until all pairs look ready)**

Feedback and discuss - Each pair gives one possible benefit, each time ask for hands up for who else had the same idea. After each benefit is named discuss it more fully.

Once you have asked each pair for a benefit ask the group if there are any more benefits they have written down that have not been covered and discuss. Ideas below can be given to prompt the discussion or can be added at the end if not covered.

Potential areas to prompt from the facilitator:

- Can give you more energy.
- Increases independence in doing activities such as having the strength and balance to perform household tasks or the endurance to walk around the supermarket, find it easier to get down on the floor and play with their grandchildren (were things easier when they were younger? not just age, also fitness/staying physically active).
- Can reduce symptoms of anxiety and depression.
- Decreases the risk of fracture and falls.
- Reduce the risk of developing coronary heart disease or stroke, high blood pressure, colon cancer and diabetes.
- Can improve some medical conditions, such as arthritis and diabetes if you already have them. (See doctor first if have these a medical condition and planning increasing physical activity levels, particularly diabetes).
- May improve sleep patterns as long as it is not done in the evening.
- Increases independence in activities of daily living such as having the strength and balance to perform household tasks or the endurance to walk around the supermarket.
- Reduces problems of constipation.
- Maintains social networks if physically active in a group.

Break for 10 minutes and encourage participants to leave their seats / move around the room. (Maybe as a group go for a walk outside if it is fine weather).

4. Explain the recommendations for active living and how to get the benefits from physical activity (5 minutes)

The Australian Physical Activity Guidelines for Adults

- Think of movement as an opportunity, not an inconvenience.
- Be active every day in as many ways as you can.
- A base of 30 minutes of moderate activity on most days.
- Does not need to be one block of 30 minutes, can be three blocks of ten accumulated throughout the day.
- Best to build up slowly to 30 minutes if not been doing physical activity for a while.
- Moderate intensity will cause a slight but noticeable increase in your breathing and heart rate. Good example is brisk walking, at a pace you are able to talk comfortably but not sing.
- Moderate activity is different things for different people. **Examples:** For someone who has medical problems, difficult to move around the house: could be getting dressed, a supervised program by a physio, walking to the letterbox. For a healthy older person could be a brisk walk, sweeping outside, an exercise group, dancing. Other examples: things the participants said at the start to increase or think about getting back to.

5. Developing individual physical activity goals and plans. (20 minutes)

Discuss the process of steps involved in becoming more active. Turn barriers and aims into a three-step plan for each individual:

1. Identify suitable activities and see the doctor if have any medical conditions.
2. Practical considerations e.g. buy shoes for walking, find out what programs are available locally.
3. Begin the activity e.g. regular walking, swimming, gym etc.

Example: Mrs G has always liked swimming and would like to try a water aerobics class but is worried about her varicose veins.

1. Go to the doctor to check whether it will be OK to do water aerobics with varicose veins.
2. Call the council to find out what classes are available close by.
3. Commence classes.

Ask participants to start to think about their own plan and make some notes:

- What physical activity would they like to do more of (any interests, anything they used to do that they would like to get back to, continue what doing and build up, or something new?
- How they could incorporate more physical activity into their everyday routine?
- Ask participants to think about how they would start to do these things.
- What would stop them (worries about medical conditions, time), what things could be done to overcome these problems (See section 2 above)

Give 5 minutes /until all participants look ready.

Discuss - Give people a chance to raise questions, and share their activity ideas (level of discussion will depend on time available – keep brief if necessary).
Safety considerations to mention if participants are starting new to walking programs/physical activity programs:

- If have medical conditions (especially diabetes) get the all clear from their doctor.
- Avoid doing physical activity during the hottest part of the day if a hot day.
- Avoid their new program straight after a meal.
- Have a drink before/during/after being physically active.
- No pain no gain is not true, if painful see a doctor/physiotherapist.
- Wear sturdy shoes e.g. lace up/velcro flat shoes.
- Avoid their new program if they are unwell.
- If they have a walking aid, continue to use it.
- If there is any problem or they are worried (pain, dizziness, nausea) stop and speak to a doctor.

Handout materials for writing final version and ask each participant to complete their own plan in bullet-points.

Summary:
Briefly recap the discussion (time allowing) and remind participants of the time and date of next session.

Session 2

Welcome, introductions and outline what you are going to discuss in the session

1. Around the room with how the three step plans are going. Count number of steps achieved.
2. Discuss what stopped people carrying out their plans.
3. Discuss what helped/motivated people to carry out their plans
    - People to tell their own stories.

4. Review any of the first week's material that is indicated. E.g benefits of physical activity, guidelines for physical activity.
5. Redo plans for those that have not enacted the plan: change activity to be undertaken, change preparation for physical activity plans, add in overcoming any barriers acknowledged by the participant.
6. Allow time for questions.

Session 3

1. Repeat steps for week 2.
2. Add in advice for maintaining physical activity levels:
   - Vary what they are doing if they are getting bored.
   - Continue to use their pedometers for interest.
   - Do the activity with others, can encourage each other then;
   - Any other motivators from the participants.

3. Book in participants for their follow-up assessment. Redistribute pedometers and questionnaires for follow-up assessments. Ask participants to wear their pedometers over the next week and not to reset it.

Appendix 2: Transformation of data

	Baseline variables	Follow-up variables
Data normally distributed and did not require transformation		• HAP
Data is mildly positively skewed and used square root to transform	• Steps per day	• Sit to stand
Data is moderately positively skewed and use logarithmic to transform	• Gait velocity • Stride length • Pulse change	• Steps per day • Distance in 6 min • Pulse change
Data is positively skewed and use reciprocal to transform	• BMI • Sit to stand	• BMI
Data is mildly negative skewed and use square to transform	• Distance in 6 min	• Gait velocity • Stride length
Data is negatively skewed and used cubic to transform	• HAP	

Appendix 3: Independent variables at baseline

	Intervention (n=61)	**Control (n=59)**	**Difference at baseline**
Age	69.3 (SD=7.57)	70.42 (SD=7.33)	-
CALD (% Polish)	24.6%	25.0%	-
Gender (% female)	65.6%	60.0%	-
Living Alone	11.7%	20.3%	✓
More than 4 medications	27.9	23.7	-
BMI - obese	58.3%	43.8%	✓
Health Conditions:			
Arthritis	49.2%	46.7%	-
Back Pain	31.1%	36.7%	-
High Blood Pressure	72.1%	60%	✓
Cancer History	3.3%	10%	✓
Cardiac	19.7%	26.7%	✓
Cholesterol Inc	42.6%	45%	-
Depression	3.3%	1.7%	-
Diabetes	24.6%	41.7%	✓
Dizziness	1.6%	5%	-
Gout	1.6%	1.7%	-
Hearing	1.6%	3.3%	-
Joint replacement	0%	5%	-
Osteoporosis	4.9%	1.7%	-
Respiratory	8.2%	10%	-
Stroke	4.9%	5%	-
Thyroid	3.3%	6.7%	-
Ulcers	0%	5%	-
Vision	1.6%	3.3%	-

Appendix 4: Health Conditions by experimental and CALD group

	Intervention (n=61)	Control (n=59)	Polish (n=29)	Macedonian (n=91)	Total (n=120)
Arthritis	49.2	46.7	**58.62**	45.05	47.90
Back Pain	31.1	36.7	51.72	26.37	31.90
BP Inc	72.1	60	48.28	72.53	66.40
Cancer History	3.3	10	3.45	8.79	7.60
Cardiac	19.7	26.7	31.03	20.88	22.70
Cholesterol Inc	42.6	45	37.93	46.15	43.70
Depression	3.3	1.7	3.45	2.20	2.50
Diabetes	24.6	41.7	17.24	38.46	32.80
Dizziness	1.6	5	3.45	3.30	3.40
Gout	1.6	1.7	0.00	2.20	1.70
Hearing	1.6	3.3	6.90	1.10	2.50
Joint replacement	0	5	3.45	2.20	2.50
Osteoporosis	4.9	1.7	10.34	1.10	3.40
Respiratory	8.2	10	13.79	7.69	9.20
Stroke	4.9	5	6.90	4.40	4.20
Thyroid	3.3	6.7	3.45	5.49	5.00
Ulcers	0	5	0.00	3.30	2.50
Vision	1.6	3.3	6.90	1.10	2.50

Appendix 5: Physical Activity per week by CALD group

		Polish %	Macedonian %	Total %
Walking hours per week	Incidental (<1hr p/w)	34.5	25.3	27.7
	1 - 2hr p/w	31.0	23.1	25.2
	>2 - 4hr p/w	20.7	30.8	28.6
	>4 hr p/w	13.8	20.9	19.3
Swimming		3.5	4.4	4.2
Cycling		0.0	3.3	2.5
Water Exercise		6.9	1.1	2.5
Dancing		0.0	7.7	5.9
Physiotherapy		0.0	1.1	0.8
Gym Program (strengthening)		3.5	3.3	3.3
Bike, Treadmill, Stretching, aerobics done at home		31.0	9.9	15.1
Exercise Classes		10.3	0.0	2.5
Heavy Housework		69.0	55.0	58.8
Gardening		62.1	51.7	54.6
Carer for children, dependant spouse or other adult		17.2	11.0	12.6
Manual Work		0.0	2.2	1.7