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Review Article

Adherence to community based group exercise interventions for older people: A mixed-methods systematic review

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ABSTRACT

Objective. Lifelong physical activity provides some of the best prospects for ageing well. Nevertheless, people tend to become less physically active as they age. This systematic review assessed the views and adherence of participants attending community based exercise programmes of ≥ 6 month's duration.

Method. Searches were carried out in eight online scientific databases (January 1995–May 2014) to identify relevant primary studies. Studies were assessed for quality and data extracted. Results were synthesised thematically and narratively. Qualitative findings were compared against quantitative studies.

Results. A total of 2958 studies were identified and screened against the inclusion/exclusion criteria. Ten studies met the inclusion criteria (five quantitative, three qualitative and two mixed-methods study designs). None were excluded on the basis of quality. Six key themes were identified from the qualitative studies as important for adherence to group exercise programmes: social connectedness, participant perceived benefits, programme design, empowering/energising effects, instructor and individual behaviour. The mean adherence rate of studies with comparable measures was (69.1% SD 14.6). When the views of participants from the qualitative synthesis were juxtaposed against the quantitative studies, programme design was a common feature across all studies.

Conclusion. Evidence surrounding these programmes is limited both in terms of long-term adherence measures and the views of participants. However, based on limited findings there is some indication that community based group exercise programmes have long-term adherence rates of almost 70%. Incorporating the views of older people into programme designs may provide guidance for innovative interventions leading to sustained adherence.

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Abbreviations: NDCs, Non-communicable diseases; CBGEP, Community based group exercise programmes; PA, Physical activity.

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1. Introduction

Physical inactivity is a global phenomenon, with estimates of one in four adults not being active enough (WHO, 2015). The consequences of physical inactivity cannot be disregarded, with heightened risk of developing chronic, degenerative diseases such as cardiovascular disease, cancer, respiratory diseases and diabetes (WHO, 2010). These non-communicable diseases (NCDs) are said to account for almost two thirds of deaths globally (WHO, 2010). Given that there is a booming elderly population globally (estimated to be two billion worldwide by 2050) (UN DESA, 2013) the World Health Organisation (WHO) has now said the challenge of NCDs has reached epidemic proportions (WHO, 2010). Considering this global growth of an ageing population, it is imperative that action be taken to reduce the burden of NCDs and consider not only life span but health span.

Lifelong, sustained physical activity (PA) is well recognised as a significant factor in maintaining good health and preventing NCDs (Chodzko-Zajko et al., 2009; Bull and the Expert Working Groups, 2010). Guidelines for older people stipulate 150 min, accumulated in bouts of 10 min or more, of moderate-intensity exercise per week to maintain good health (Bull and the Expert Working Groups, 2010). Yet there is a trend for people to become less physically active as they age (Baert et al., 2011). Sustained involvement in physical activity programmes is more likely if individuals are provided with the opportunity to exercise with others in social or group situations rather than alone (Dishman and Buckworth, 1996).

Community based group exercise programmes (CBGEP) utilise motivators, such as social support and have been shown to be one means of increasing PA levels for older people (Belza et al., 2006; Hughes et al., 2009). However, in order to acquire the health and wellbeing gains associated with PA there is a need for sustained engagement over an extended period of time. Well documented literature states that approximately half of participants who commence an exercise programme will drop out within the first six months (Dishman, 1982, 2001). Group based exercise programmes for older people (mean age 61.4 years) have shown mean long-term (≥ 1 year) adherence rates of 75% (van Der Bij et al., 2002). This shows potential for the role of CBGEP in supporting older people in sustained adherence to PA.

This review sought to gain a deeper understanding of the promising role which CBGEP may play in older people's sustained adherence to a PA lifestyle. It has done this by carrying out three syntheses. The first synthesis was carried out using qualitative studies to understand the views of older people regarding their adherence to CBGEP. This is important because to date reviews in relation to determinants of physical activity have largely been quantitative (Bauman et al., 2012). Meanwhile no qualitative reviews have been identified which focus specifically on why older people attending CBGEP show sustained adherence. The second synthesis sought to update the work of van der Bij et al. (2002) in identifying the long-term adherence rates of community dwelling, free living older people to CBGEP. The third synthesis sought to go deeper in understanding adherence by identifying the degree to which the interventions described in the quantitative studies overtly considered the factors highlight from the qualitative review.

This knowledge is important because it will add to our understanding of what factors contribute to sustain PA for older people thus influencing a key lifestyle behaviour in the prevention of NCDs.

2. Methods

2.1. Search strategy

A search was carried out in eight online scientific databases (MEDLINE, CINAHL, ScienceDirect, SocINDEX, Scopus, AMED, BNI and Web of Science) from January 1995 to May 2014 to identify relevant primary studies. Reference lists of key articles were hand searched and study authors were contacted to snowball references. After personal

Table 1

Search terms applied and sample strategy.

	Alternatives	
<i>Element</i>		
1) Adhere*/initiat*	Maint* Sustain* Attend* Compliance Comply	Complied Adopt* Commence* Instigat* Begin*
2) Community based	Community dwelling Free living Community living	
3) Exercis*	Physical activit* Resistance training Strength training Tai chi Pilates Multimodal exercise*/training Multicomponent exercise*/training Aerobic training/exercise Balance exercise*/training	
4) Older people	Older person* Old* adult* Elderly Over 65* Over sixty-five	Geriatric* Senior* Aged Ag*ing
<i>Sample search strategy</i>	1 (Adhere* or maint* or sustain* or attend* or compliance or comply or complied or adopt* or instigat* or begin*). Title 2 (Community based or community dwelling or free living or community living). Text 3 (Exercise* or physical activit* or resistance training or strength training or tai chi or pilates or multimodal exercise* or multimodal training or multicomponent exercise* or multicomponent training or aerobic training or aerobic exercise* or balance exercise* or balance training). Text 4 (Older people or older person* or old* adult* or elderly or over 65* or over sixty-five or geriatric* or senior* or aged or ag*ing). Text 5 (1 AND 2 AND 3 AND 4) Limit 5 to (English language and year = "January 1995–Current")	

* (asterisk) Represents any string of characters used in truncation.

contact with one of the study authors it was suggested that a manual search be made of the previous six volumes of *Journal of Aging and Physical Activity* and *Age and Ageing* (being relevant to the study area) for further studies. Using a Boolean search strategy, key concepts (e.g. 'adherence', 'community based', 'exercise', 'older people') and their alternative medical subject headings were entered into the databases (see [Table 1](#)).

Studies were included from 1995 to onwards since it was at this point that significant understanding was made in the need for regular, sustained physical activity in order to achieve long-term health gains ([Pate et al., 1995](#)).

Adherence can be an ambiguous term within studies with multiple methods of measurement ([Hughes et al., 2006](#); [Picorelli et al., 2014](#)). For the purpose of this review, the most common measures of adherence are used to denote the longer-term engagement based on the percentage of sessions attended or the percentage of participants completing the programme ≥ 6 months without recidivism ([Picorelli et al., 2014](#)).

2.2. Inclusion criteria

Two types of research were sought: quantitative studies that included adherence rates to CBGEP and qualitative studies that considered the views of older people who take part in CBGEP. Included papers were published in English, from January 1995 onwards. Six months was selected as the minimum study duration since this is often referred to as the timespan from which maintenance occurs; whereas a timeframe of ≤ 6 months commonly relates to PA initiation ([Dishman, 1982](#); [Laitakari et al., 1996](#); [van Stralen et al., 2009](#)).

Papers were reviewed using the inclusion and exclusion criteria ([Table 2](#)). The first author (CF) screened articles for eligibility based on their title and abstracts. Potentially relevant articles then underwent a full text screen by a second independent reviewer (FT).

2.3. Data extraction and synthesis

Data extraction was performed by the first author (CF) using customised data extraction forms. These included information regarding aims, study design, sample characteristics, data collection instruments, data analysis, ethics, intervention and outcomes.

The framework for this review followed the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) method of integrating qualitative research with trials in systematic reviews ([Thomas et al., 2004](#)). Data was synthesised in three ways ([Fig. 1](#)). Firstly, the qualitative data underwent thematic synthesis. The findings sections of each qualitative study were copied verbatim and imported into QSR International's NVivo 10 qualitative data analysis software ([QSR International, 2012](#)). The guidelines for thematic analysis of textual data in primary research studies were then followed with open, descriptive and analytical coding ([Thomas et al., 2004](#)). The aim of this analysis was to understand the views of older people regarding their adherence to CBGEP. Secondly, adherence data from the quantitative studies was analysed descriptively. A meta-analysis of the quantitative data was

not possible due to heterogeneity in intervention type and outcomes. The aim of this analysis was to identify the long-term adherence rates of older people to CBGEP. Thirdly, a matrix was constructed to juxtapose the qualitative and quantitative data. This was used to assess the extent to which the quantitative interventions incorporated the analytic themes identified in the qualitative synthesis ([Thomas et al., 2004](#)). Three reviewers were involved (CF, FT, CC) in each data synthesis to ensure that the data was sufficiently challenged and tested for robustness.

2.4. Quality assessment

Quality was assessed using the relevant Critical Appraisal Skills Programme (CASP, 2014) checklist. A numerical assignment of 0, 1 or 2 was awarded according to how well the study answered the screening questions (0 = no, 1 = partly, 2 = yes). Consequently, a maximum score of 22 could be attained for the quantitative studies and 20 for the qualitative. Study quality was assessed by three reviewers (CF, CC, FT) and there was no disagreement on the grading of studies. No study was excluded on the basis of quality.

3. Results

3.1. Included studies

A total of 2958 studies were identified and screened against the inclusion/exclusion criteria. Ten studies met the inclusion criteria: five quantitative, three qualitative and two mixed-methods study designs. Qualitative and quantitative data were included from one mixed-methods study ([Fox et al., 2007](#)) and qualitative data only from the other study since it lacked appropriate adherence data ([Garmendia et al., 2013](#)). See [Fig. 2](#) for a flow chart of study selection as adapted from Preferred Reporting Items for Systematic Reviews and Meta-Analyses ([Liberati et al., 2009](#)).

3.2. Quality of included studies

The quantitative studies all scored ≥ 16 points on the quality appraisal assessment. The main limitations were poor reporting of blinding of study personnel and participants and lack of reported effect sizes. Four of the qualitative studies scored ≥ 17 points. The main quality limitations were poor reporting of the recruitment strategy and researcher/participant interaction. The fifth qualitative study ([Garmendia et al., 2013](#)) scored lowest with 15 points; however, when considering qualitative research, a study with a slightly lower quality may still yield valuable insights and for this reason was included in the synthesis ([Noyes et al., 2008](#)).

3.3. Qualitative synthesis

The qualitative studies utilised a range of approaches to data collection including semi-structured interviews, focus groups and participant observation. Analysis consisted of content analysis, interpretive phenomenological analysis or thematic analysis.

Table 2
Inclusion/exclusion criteria for the selection of articles for this review.

Inclusion	Exclusion
<ul style="list-style-type: none"> Community dwelling, free living participants >60 years (for qualitative studies) and >65 years (for quantitative studies).^a Studies involving community based group physical activity programmes/interventions^b of ≥ 6 month's duration. Qualitative studies had to include the views of those who participate in group exercise programmes. Quantitative studies had to include participation rates (adherence data). Adherence based on % of sessions attended or % of people completing the programme. 	<ul style="list-style-type: none"> Participants in residential care. Home based exercise programmes. Studies with a highly clinical/therapeutic intervention. Reports published in conferences, books, thesis, policy documents, reviews or pilot studies.

^a Inclusion age for qualitative studies was lowered due to the low yield of studies.

^b Defined as programmes taking place in a local community setting (i.e. not a hospital or clinic) and attended by community dwelling older adults ([King et al., 1998](#); [McLeroy et al., 2003](#)).

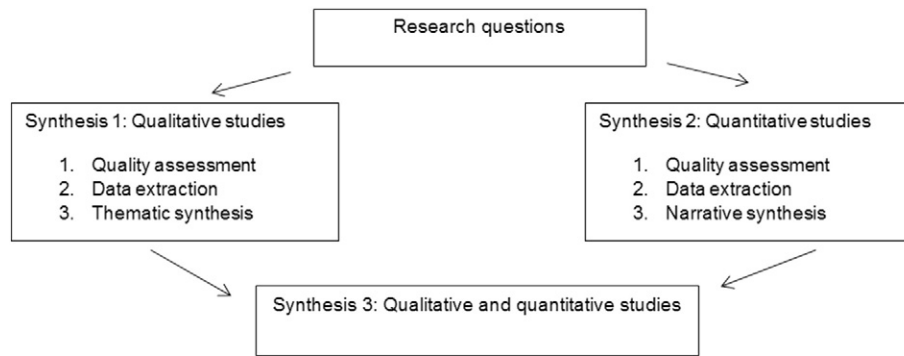


Fig. 1. Stages of the review process (based on Thomas et al., 2004).

Sample size ranged from eight to fifty-two and all participants were ≥ 60 years of age. Four studies reported on mean age (Fox et al., 2007; Chiang et al., 2008; Dunlop and Beauchamp, 2013; Garmendia et al., 2013) with an overall mean of 73.7 years. Kirby and Kluge (2013) reported age as a range of 65–76 years. Three studies included male and female participants (Fox et al., 2007; Chiang et al., 2008; Garmendia et al., 2013), one focused on men only (Dunlop and Beauchamp, 2013) and the remainder on women only (Kirby and Kluge, 2013). Participants had been attending these exercise programmes for between one and five years. Three of these were on-going programmes (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Kirby and Kluge, 2013), whereas the other two were for a

time-limited period of one–two years (Fox et al., 2007; Garmendia et al., 2013).

Geographically, three studies were located in North America (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Kirby and Kluge, 2013), one in South America (Garmendia et al., 2013) and one in Europe (Fox et al., 2007). One of the studies in North America (Chiang et al., 2008) had participants from ethnically diverse backgrounds with 40% being Chinese, 35% African American, 19% Caucasian and 6% Japanese. Ethnicity was not explicitly stated in three of the studies (Fox et al., 2007; Garmendia et al., 2013; Kirby and Kluge, 2013). Dunlop and Beauchamp (2013) reported a relatively ethnically homogenous group with the vast majority being of European descent.

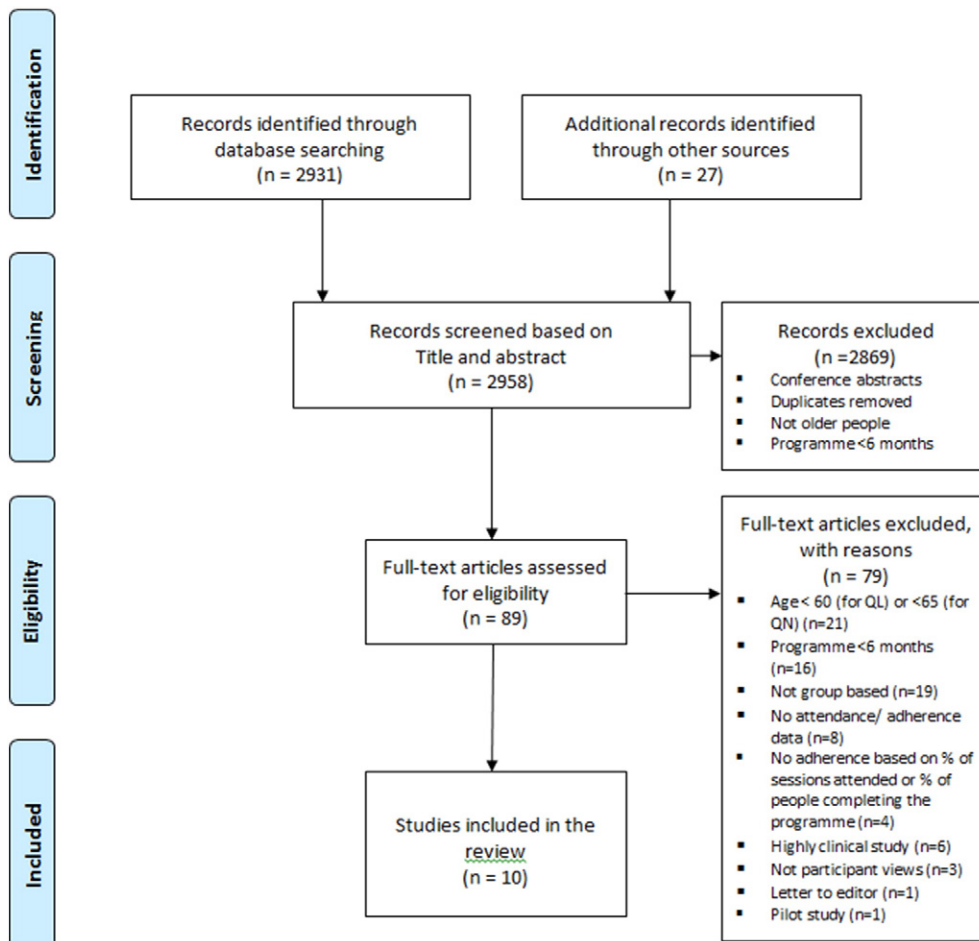


Fig. 2. Flow chart of paper selection.

Table 3
Study characteristics of included qualitative studies.

Study	Aims	Study quality	Design	Population	Intervention
Fox et al. (2007)	To assess the impact of a structured exercise programme on mental wellbeing in the older elderly.	18/20	Mixed-methods study	<i>Sample selection:</i> Purposive sample of programme participants 24 semi-structured interviews <i>Mean age:</i> 75.6 years (Standard deviation, SD 3.9 years) <i>Gender:</i> Male and female <i>Setting:</i> The UK based study centres <i>Socioeconomic status:</i> Not included <i>Ethnicity:</i> Not included	Standardised exercise programme for 60–90' including warm up, aerobic exercise, strength training, Tai Chi and flexibility. 2 × group based sessions/week and 1 home based 12 month exercise intervention
Chiang et al. (2008)	To examine how physical environment, social environment, and individual biology and behaviour influence adherence to exercise for ethnic older adults participating in Enhance Fitness (EF).	17/20	Qualitative design using focus groups	<i>Sample selection:</i> Purposive sample of participants of the Enhance Fitness (EF) exercise programme 6 focus groups carried out with 52 participants <i>Mean age:</i> 76 years (SD 7.4 years) <i>Gender:</i> Male and female <i>Setting:</i> Seattle, USA <i>Socioeconomic status:</i> Not explicitly mentioned, all from urban areas <i>Ethnicity:</i> Chinese (40%), African American (35%), White (19%), Japanese (6%)	An evidence-based community exercise programme for older adults. 1 h sessions 3 ×/week.
Dunlop and Beauchamp (2013)	To identify the elements of the programme (Lively Lads) responsible for its appeal.	18/20	Case study (using field notes, semi-structured interview).	<i>Sample selection:</i> Purposive sample of programme participants 19 semi-structured interviews <i>Mean age:</i> 77.1 (SD 8.2 years) <i>Gender:</i> All male programme <i>Setting:</i> Western Canada <i>Socioeconomic status:</i> Moderately affluent municipality <i>Ethnicity:</i> Relatively ethnically homogeneous, majority of European descent	A programme of stationary aerobic and strength training activities which has been running since the mid-1990s. The classes themselves ranged in size from approximately 30–70 people and were 50–60 min in length.
Garmendia et al. (2013)	To identify factors associated to adherence to a physical activity intervention in older adults from a post-transitional middle income country.	15/20	Mixed-methods study	<i>Sample selection:</i> Convenience sample from the participants 36 semi-structured interviews carried out. <i>Mean age:</i> 66.1 years at baseline. <i>Gender:</i> Male and female <i>Setting:</i> Santiago, Chile <i>Socioeconomic status:</i> Low-medium. <i>Ethnicity:</i> Not explicitly mentioned	A progressive resistance exercise protocol with one-hour classes twice a week 2 year intervention
Kirby and Kluge (2013)	To examine the formation of a women's 65+ volleyball team at a university	20/20	Intrinsic case study (using focus group, individual interviews, individual written reflections and participant observation)	<i>Sample selection:</i> Purposive sample of 8 of the team players. <i>Age range:</i> 65–76 years. <i>Gender:</i> All female programme <i>Setting:</i> Colorado, USA <i>Socioeconomic status:</i> Not stated <i>Ethnicity:</i> Not stated	A newly formed volley ball team 1 year study Weekly practices of 1.5 h/week which increased to 5 h/week prior to competitions

Table 4
Study characteristics of included quantitative studies.

Study	Aims	Study quality	Design	Population	Intervention	Comparative intervention	Outcome
King et al. (2000)	To evaluate the effects of two different community-based physical activity regimens on physical performance outcomes and perceived functioning and well-being.	19/22	Randomised clinical trial	Sample selection: Population based recruitment via random digit telephone selection supplemented with citywide promotion. N = 103 Age: >65 years (mean age 70 SD 4 years) Community dwelling, sedentary women and men 65% women Setting: California, USA	'Fit and Firm' (endurance and strengthening exercises) and 'Stretch and Flex' (stretching and flexibility exercises). Classes 2×/week and home exercise encouraged 2×/week 1 year intervention	2 types of exercise class were compared	Adherence based on number of sessions attended. Exercise adherence to the class exercises: Fit and Firm: 65 (SD 27%) Stretch and Flex: 68 (SD 29%) Exercise adherence assessment: Based on exercise logs on daily basis to track type, frequency and duration of ex sessions.
Englund et al. (2005)	To determine if a combined weight training programme would be beneficial to Bone Mineral Density and neuromuscular function.	16/22	12 month prospective Randomised Control Trial	Sample selection: Volunteers recruited via a lecture at the University of the Elderly or via study invitation to women who had participated in a previous study N = 48. Intervention n = 24, control n = 24 Mean age 73 (SD 4, range 66–87 years) All female participants Setting: Umea, Sweden	50 min community based exercise programme with strength, aerobic, balance and coordination exercise 1 year intervention	Control asked not to increase their normal PA. Interviewed at 6 and 12 months to monitor any changes in ex habits	Adherence based on number of sessions attended. Mean % of sessions attended for the exercise group was 67% (range 23–95%)
Cyarto et al. (2006)	To assess and compare retention and adherence rates, and compliance with, a twice weekly resistance training programme provided either individually at home or in a group format.	18/20 (Scored out of 20 since one screening question was not relevant to the study design)	Quasi-randomised trial	Sample selection: Independent living retirement village residents sent letter of invitation to on-site info sessions describing the research project. N = 119. Mean age 80.1 (SD 6 years). Home programme: 82% female Group programme: 75% female Setting: Brisbane, Australia	Both interventions included strength and balance exercises. 2 × 1 h sessions/week. Same programme except one is at home and one at a centre. 44 week study period.	Home or group format compared	Adherence based on number of sessions attended. Group based adherence rate: 66% Home based adherence rate 63%. No statistically significance difference.

Fox et al. (2007)	To assess the impact of a structured exercise programme on mental wellbeing in the older elderly.	18/22	Mixed methods study	Sample selection: Volunteers were participants in the exercise programme and invited through local advertising N = 176 with full accelerometry and questionnaire data. Exercise group n = 112, control = 64 Age >70 years (mean age 75.6, SD 3.9 years) Setting: 3 different European countries Italy, France and England	Standardised exercise programme for 60–90' including warm up, aerobic exercise, strength training, Tai Chi and flexibility. 2× group based sessions/week and 1 home based 12 month intervention	Control group did not take part in the exercise programme. Completed baseline questionnaires	Adherence based on number of sessions attended. 93% attendance rate for group sessions and 85% for home based sessions.
Jancey et al. (2007)	To investigate the issue of minimising attrition in exercise programmes by identifying factors associated with non-adherence in a neighbourhood-based physical activity intervention.	17/22	Stratified quasi-random sampling frame	Sample selection: Participants randomly selected from federal electoral role and postcards sent to invite with follow up phone call. Intervention group: N = 248 (From 30 different suburbs) Control group: N = 313 (From a different 30 suburbs) Mean age 69 years (range 65–74 years) 66% of intervention group female. 67% Australian born, 33% non-Australian born Setting: Perth, Australia	Group based walking intervention 2x/week 6 month intervention	Control group completed questionnaires only	Adherence based on number of people who completed the programme. 65.3% of participants completed the programme. At least half of the walking sessions were attended by 93% of participants, and more than 85% of participants attended 70% of the walking sessions over the 6-month period.
Tak et al. (2012)	To determine the level of participation, adherence and maintenance of the exercise programmes in older adults with mild cognitive impairment (MCI) during the 12-month trial and 6 months after its end.	21/22	Randomised placebo-controlled trial (RCT)	Sample selection: All community dwelling adults aged 70–80 years were sent an invitation letter N = 179 Intervention: n = 86 Control: n = 93 Age: 70–80 years 41% female Setting: medium sized town in The Netherlands	Intervention: a moderate intensity group walking programme (>3 Metabolic equivalent, MET). Control: a low intensity activity programme (<3METS) 12 month trial with 6 month follow-up	Low intensity activity programme was used as a placebo exercise class	Adherence based on number of sessions attended. Mean exercise adherence during trial: 53% 6-months after trial ended: 25% of participants continued the programme.

Table 5
The presence of participant views identified in the quantitative studies.

Implied recommendations based on the qualitative themes identified from participant views	King et al., 2000	Englund et al., 2005	Cyarto et al., 2006	Fox et al., 2007	Jancey et al., 2007	Tak et al., 2012
Are the practical aspects of <i>programme design</i> evident?						
• Location	✓		✓		✓	✓
• Affordability			✓		✓	✓
• Individual/adaptable content	✓	✓	✓	✓	✓	✓
Is the role of <i>instructor behaviour</i> accounted for?					✓	✓
Are there opportunities for participants to <i>connect socially</i> ?	✓	✓	✓	✓	✓	✓
Are <i>participant perceived benefits</i> considered?	✓			✓	✓	
Is there evidence of the interventions <i>empowering and energising effects</i> ?				✓		
Did the intervention consider the role of <i>individual behaviour</i> ?	✓			✓		
Summary score of included participant views (out of the total of 8)	5	2	4	5	6	4
Adherence rate (%)	66.6%	67%	66%	93%	65.3% ^a	53%

✓ indicates theme addressed by intervention.

^a Adherence in this study based on the % of people who completed the programme.

The exercise programmes were similar in nature. Four were multi-component, consisting of aerobic, strengthening, flexibility, balance and coordination exercises (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013). The fifth study was a ladies volley ball team (Kirby and Kluge, 2013). Table 3 summarises the characteristics and main findings of the included studies.

Six key themes emerged as influencing adherence: social connectedness, participant perceived benefits, instructor behaviour, programme design, empowering/energising effects and individual behaviour.

3.3.1. Social connectedness

All five studies included threads of belongingness, demographic homogeneity, socialising and support. Collectively, these aspects, under the umbrella theme of *social connectedness* seemed to be a key determinant of adherence.

Being together with peers of similar interests and needs helped forge feelings of belonging. This sense of belonging was evident in the exercise groups and for some this rich *social connection* was their chief social channel and brought a valid sense of community and new identity: “It’s our exercise family” (Chiang et al., 2008, p. 4). As these relationships developed, they were seen as being “the most powerful enablers for the Stars [the volleyball team] to both begin and continue engagement...” (Kirby and Kluge, 2013, p. 301).

The demographic homogeneity of the group seemed to be a key factor in underpinning the sense of *connectedness* that group members had. For some it was because they had a shared language and religion (Chiang et al., 2008), for others it was the fact that it was an all-male environment which made them feel more at ease with one another and so less embarrassed if they made a mistake (Dunlop and Beauchamp, 2013). Being peers of a similar age, interests and needs meant they could understand “aches and pains of the older person” (Dunlop and Beauchamp, 2013, p. 227). As one participant stated “This group allowed me to get together with people of my own age” (Garmendia et al., 2013, p. 470).

Socialising and support were further compelling features which influenced adherence. Support was noted in the general sense from family members or healthcare providers such as the family doctor encouraging attendance (Chiang et al., 2008). In other instances support came from programme staff in the form of their positive, supportive interactions (Kirby and Kluge, 2013) or by calling to check on participants if they were absent (Chiang et al., 2008). To some degree this provided a level of accountability which helped stimulate on-going engagement.

The social aspect to the group enabled new social networks to be formed. This allowed them to connect with individuals in their neighbourhood whom they’d never met before (Garmendia et al.,

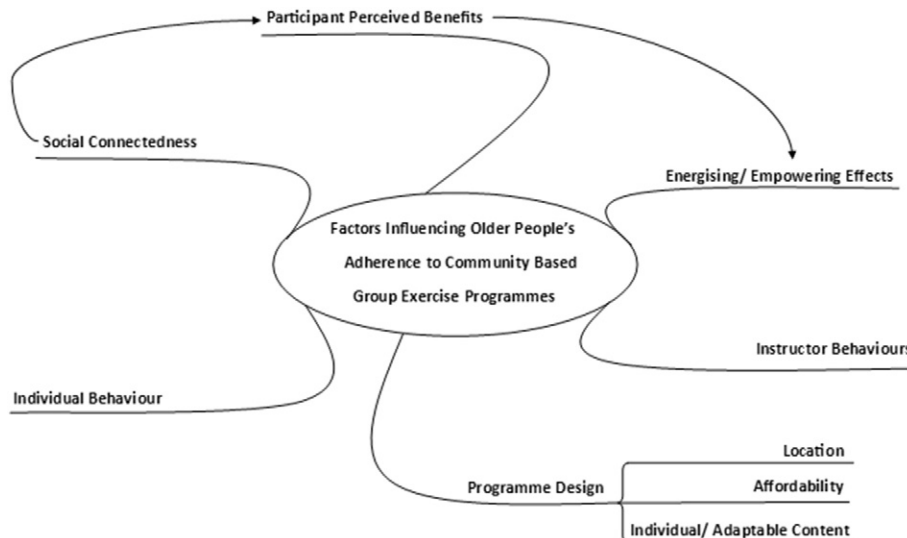


Fig. 3. Thematic schema illustrating the conceptual interactions between the themes generated from the qualitative synthesis.

2013) and opened up a whole new group of people to connect with (Kirby and Kluge, 2013). These networks led to very practical support such as car sharing, telephone support and caring for one another (Chiang et al., 2008).

3.3.2. Participants perceived benefits

Four out of the five studies talked about the physical gains they experienced from being part of the classes. These perceived health benefits included enhancements in muscle strength, balance, weight loss and sleep as well as improvements in diseases such as hypertension, diabetes, and heart disease (although these were not verified objectively) (Chiang et al., 2008). Others reported mobility and agility gains (Garmendia et al., 2013) and noted that no matter what their present ability was, the class served to maintain or improve their health (Dunlop and Beauchamp, 2013).

Many participants understood that attending the class produced mental, cognitive and social benefits which were considered as important as the physical gains (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013; Kirby and Kluge, 2013).

The underlying motivation for a number of participants was the goal of maintaining their independence (Chiang et al., 2008; Fox et al., 2007; Garmendia et al., 2013). This resulted in perceived functional improvements in everyday activities such as getting out of bed, doing chores and walking (Chiang et al., 2008; Fox et al., 2007; Garmendia et al., 2013).

3.3.3. Instructor behaviours

The influence positive *instructor behaviour* was evident in all five studies. There was a commonality of characteristics among the leaders. Most noticeably, being enthusiastic, motivating, an ability to make exercise fun, enjoying working with older people and treating individuals with respect (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007). The instructors were a principal reason for participants to continue attending the classes (Chiang et al., 2008). The quality of being able to communicate well meant that for one group the instructors also served as social co-ordinators as well as directing individuals to appropriate support within the group (Dunlop and Beauchamp, 2013).

Instructors were seen as being knowledgeable and skilful which served to promote self-confidence and trust in participants (Dunlop and Beauchamp, 2013; Fox et al., 2007; Kirby and Kluge, 2013). The support offered in the initial sessions (which were seen as the most difficult), helped participants grow in confidence and fitness (Fox et al., 2007). Feedback provided by the instructors helped participants to gauge their personal progress and served as a further motivator (Chiang et al., 2008; Dunlop and Beauchamp, 2013).

3.3.4. Programme design

Programme design was revealed as being significant in aiding adherence in all five studies. This theme tended to feature the more practical aspects of the programmes. Specifically, it considered the geographical convenience of the location and ease of access, affordability, the structure and content of the class being relevant for each individual (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013; Kirby and Kluge, 2013). Intensive one-on-one support and individually adapted content was what helped participants increase their self-confidence and physical ability with exercise (Dunlop and Beauchamp, 2013; Fox et al., 2007).

3.3.5. Empowerment and energising effects

The *empowering and energising effects* of being part of these groups were evident in all five studies. This manifested itself in greater motivation and a desire to “go for gusto” (Kirby and Kluge, 2013 p. 299). The source of these *energising and empowering effects* stemmed from the social atmosphere, fun and banter between the group members, or the incentive of leaving the house (Chiang et al., 2008; Dunlop and

Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013; Kirby and Kluge, 2013).

3.3.6. Individual behaviour

Whilst not consistent in every study, there was an element of the influence of *individual behaviour* impacting on adherence. Those who had a past experience of being physically active felt that was a factor related to their participation (Chiang et al., 2008). Other personal characteristics were important, such as: being competitive; having a positive attitude; perseverance and the desire to try something new and continue learning (Chiang et al., 2008, Kirby and Kluge, 2013). The studies which identified this as a theme both used the socio-ecological model to frame their study design (Chiang et al., 2008, Kirby and Kluge, 2013).

3.4. Quantitative synthesis

The six quantitative studies included three randomised controlled trials; two quasi-randomised trials and one mixed-method (relevant quantitative data extracted). Sample size ranged from 48 to 248 with a total of 873 participants. Participants were ≥ 65 years of age (mean of 73.8 years). Except for one study that involved women only (Englund et al., 2005), all trials included male and female participants. Three of the studies were located in Europe (Englund et al., 2005; Fox et al., 2007; Tak et al., 2012), one in North America (King et al., 2000), and two in Australia (Cyarto et al., 2006; Jancey et al., 2007). Table 4 summarises the characteristics and outcomes of the included studies.

Study duration varied from six months to one year. All interventions consisted of community based group exercise programmes. The majority of these were multicomponent exercise classes using aerobic, balance, coordination and stretching exercises (Cyarto et al., 2006; Englund et al., 2005; Fox et al., 2007; King et al., 2000). Two of the programmes were group based walking activities (Jancey et al., 2007; Tak et al., 2012).

Adherence to the programmes was a primary outcome for three studies (Cyarto et al., 2006; Jancey et al., 2007; Tak et al., 2012). The remaining studies reported on it as a secondary outcome with primary outcomes of health related quality of life (King et al., 2000), bone mineral density (Englund et al., 2005), well-being gains (Fox et al., 2007).

Adherence was reported descriptively in two ways: as a percentage of the total number of sessions attended (mean 69.1%, SD 14.6%) (Cyarto et al., 2006; Englund et al., 2005; Fox et al., 2007; King et al., 2000; Tak et al., 2012) or the percentage of participants completing the programme (65.3%) (Jancey et al., 2007).

3.5. Synthesis of qualitative and quantitative studies

To assess the extent to which the quantitative interventions incorporated the analytic themes identified in the qualitative synthesis a matrix was devised. This juxtaposed the implied recommendations based on the qualitative themes against the actual interventions that had been implemented (Table 5). This synthesis was seeking to answer how well the quantitative studies matched the qualitative themes and whether these can be used to explain heterogeneity of the adherence data.

Programme design was broken down into three separate aspects (location, affordability and content). Having an individual and adaptable content to the programmes appeared to be an embedded part of all six quantitative interventions. Consideration of location was noted in four studies and affordability in three studies. *Participant perceived benefits* were considered in three studies where measures were not purely in terms of physical gains but also in the broader aspects of wellbeing or quality of life. The group nature of the programmes implied opportunities for participants to *connect socially* in all quantitative studies; although only one study used it as a planned component to enhance group cohesiveness and adherence (Jancey et al., 2007). The remaining themes of *instructor behaviour*, *individual behaviour* or *empowering and*

energising effects were not as prevalent and were not frequently used as a structured part of the study design.

Four of the papers report adherence rates around 65–67%, with one paper reporting 53%. However, one paper stands out with an adherence rate of 93%. The views held by participants in this study (Fox et al., 2007) were the only study to express an *empowering and energising effect*.

4. Discussion

It is understood that many different approaches will be necessary to engage older people in maintaining a PA lifestyle. These include brief interventions in primary care, walking and cycling schemes, exercise referral schemes, telephone interventions etc. (Grant, 2010; King, 2001; NICE, 2013). The aim of this review chose to focus on the role CBGEP play in older people's sustained adherence to exercise.

This study has four main contributions to make to the field of exercise adherence for older people. Firstly, the CBGEP with comparable measures of adherence indicated an overall mean adherence rate of 69.1%. This is far higher than the expected 50% adherence rate commonly cited in general exercise programmes (Dishman, 1982, 2001). However, this is slightly lower than an earlier review (van Der Bij et al., 2002) who noted a 75% adherence rate to CBGEP (mean age 61.4 years). Although it must be noted that mean age was higher in this current study (73.8 years). Thus the lower adherence rate may be a reflection of the fact that PA reduces with increasing age (van Stralen et al., 2009). However, it is suggested that for some older people, CBGEP could offer a valuable avenue for assisting in maintaining a PA lifestyle.

Secondly, this review offers a synthesis on the key themes from the perspective of older people which are important in helping them adhere to CBGEP. These findings are supported by others who equally found evidence of social support, perceived health benefits, feeling better and getting up, out and going and practical aspects of programme location, cost and individually adaptable content as being important factors for participants in CBGEP (Erickson et al., 2010; Biedenweg et al., 2014; Gillette et al., 2015).

Thirdly, a thematic schema is presented which may help illustrate conceptual interactions between the themes generated from the qualitative synthesis and add to understanding around sustained PA engagement (Fig. 3). This thematic schema shares some similarities and builds upon the work of Franco et al. (2015) which illustrated the inter-relationships between the themes. In this current review *individual behaviour* appeared to be a gateway by which individuals may enter a programme. For example, those with a past history of exercising will be more inclined to continue exercising as they age (Rhodes et al., 1999) and as such their *individual behaviour* may define in part their initiation of attendance (Chiang et al., 2008; Kirby and Kluge, 2013).

There was evidence that *programme design* must be structured in a way that facilitates an initial ease of attendance (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013; Kirby and Kluge, 2013). It is necessary for the practical aspects of location, affordability, and individual or adaptable content to be in place. Without the dynamics of good *instructor behaviours*, people could easily 'fall away', particularly in the early stages (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013; Hawley-Hague et al., 2013; Kirby and Kluge, 2013).

Once attending, it becomes apparent that the *social connectedness* is at the heart of the programme. It is this sense of support, belonging, social network and like-mindedness which flows over into many of the *perceived benefits* participants' experience, particularly in terms of wellbeing (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013; Kirby and Kluge, 2013). However, physical health gains are also necessary to hold people in a programme, which are recognised in the practical outworking of independence being maintained (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013; Kirby and Kluge, 2013).

As participants grow in physical and general wellbeing an *energising and empowering effect* takes place. This seems to afford them greater confidence and vision for the future (Chiang et al., 2008; Dunlop and Beauchamp, 2013; Fox et al., 2007; Garmendia et al., 2013; Kirby and Kluge, 2013). It might be suggested that an *energising and empowering effect* is what contributes most to adherence given the high adherence rate in the study which did show evidence of this theme (Fox et al., 2007). This could be because this feeling of empowerment enables a sense of physical purpose which increases energy and motivation leading to pleasure. This form of intrinsic pleasure may be described as hedonism. The focus of the term hedonism relates to the concepts of happiness, pleasure and enjoyment (Huta and Waterman, 2014). It is possible that this pleasure and enjoyment that people perceived from their interaction in physical activity was an important factor contributing to a high adherence rate. This has further been noted within the context of self-determination theory whereby intrinsic motivation has been shown to be more predictive of long-term exercise adherence (Teixeira et al., 2012).

It would be over-simplistic to assume that the thematic schema is exhaustive in accounting for sustained adherence. Humans are complex therefore their motivations, interactions and decision-making processes will be complex. However, the studies included in this review would suggest that having some or all of these elements included in this model present within a group, may aid on-going adherence.

Fourthly, some quantitative studies had evidence of the themes identified by participants which were important in helping them adhere. Of note the feature of programme design having an individual and adaptable content was consistent across all the interventions. Nevertheless, the studies which matched the qualitative themes more closely did not necessarily have higher adherence rates. This lack of congruity may have been influenced by a lack of clear reporting in the quantitative studies such that the qualitative theme may have been present in the study design but not clearly reported. However, an alternative explanation must also be considered. It may be that the qualitative themes were not significant in affecting adherence or some themes (such as programme design) may have been more influential than others. Further empirical studies investigating how the themes relate to adherence would be needed to verify findings.

It is clear when considering both quantitative and qualitative studies that PA behaviours are complex and have numerous determinants (Sallis and Hovell, 1990; Weinberg and Gould, 2011). The views of participants offer only one angle from which adherence may be studied. Literature also cites socio-demographic and biological determinants as well as behavioural and environmental determinants (van Stralen et al., 2009). Whilst it is recognised that adherence is multi-faceted, incorporating the views of older people into programme design may provide guidance for implementing innovative interventions.

4.1. Strengths and limitations

Over the last two decades several review articles have been published addressing factors and interventions associated with physical activity in older people (Allender et al., 2006; Baert et al., 2011; Franco et al., 2015; King et al., 1998; Martin and Sinden, 2001; Rhodes et al., 1999; van Stralen et al., 2009). Systematic reviews which focus on adherence have been limited to home exercise programmes (Simek et al., 2012) or have included short-term interventions (≤ 6 months) including home exercise programmes (Picorelli et al., 2014). Therefore, none of the above reviews have focused specifically on the role CBGEP play in sustained adherence to exercise programmes in older people.

Limitations of this study include the fact that the synthesis is based on a small number of studies (i.e. five quantitative, three qualitative and two mixed-methods). This is reflective of the limited literature available on longer-term adherence rates to CBGEP. The restricted information regarding study design, sampling, setting, methods, and findings is also noted. Of particular consideration is the fact that in order to

execute the third synthesis a conservatively critical method was employed to assess whether the quantitative studies had evidence of the qualitative themes. It is recognised that just because the theme was not reported explicitly does not necessarily mean it was not considered in the study design. This is noted as a weakness in this review and means that conclusions must be interpreted with caution. Furthermore, the philosophical underpinnings of the different qualitative data analysis methods may have impacted on the individual study findings. However, it is not possible to say how this may have affected this current study. Studies also varied by research goal with only three studies having adherence as their primary outcome (Cyarto et al., 2006, Jancey et al., 2007, Tak et al., 2012). Again, this highlights the lack of longer term studies focusing on adherence to CBGEP. Reviewed studies were limited to those published in English and grey literature was not included. Advice following personal contact with one of the study authors to manually search the previous six volumes of relevant journals should with hindsight have been expanded to include all volumes from 1995 on. This may have led to the exclusion of some relevant studies. In addition, a further limitation is noted in the discrepancy with the age criteria for participants in the quantitative and qualitative studies. Ideally, the authors should have also lowered the age range for the quantitative studies to 60 years to ensure consistency. This is recognised as a limitation; however in actuality the mean ages were similar across both types of studies.

5. Conclusions

This review sought to gain a deeper understanding of the promising role which CBGEP may play in older people's sustained adherence to a PA lifestyle. There is limited literature surrounding these programmes both in terms of long-term adherence and the views of those who attend. Based on the findings of this review there is some evidence to suggest that CBGEP have average adherence rates of almost 70%. As such health care practitioners should consider directing older people to these types of programmes as a possible means of increasing sustained PA.

Additionally, those involved in running CBGEP need to be aware of the views of older people and their reasons for adherence and incorporate these views into the programme design to stimulate adherence. Policy makers and commissioners should be aware of these findings to aid the development of services which would be effective in promoting attendance and adherence to PA, thus seeking to reduce the risk of developing NCDs.

More research is needed to ascertain which factors have the strongest influence on adherence. The importance of programme design should be further considered, especially since this was a common factor across all studies. Whilst this review focused on adherence as a measure of longer-term attendance, other aspects of total volume and intensity should be assessed as part of national recommended guidelines (Chodzko-Zajko et al., 2009). Furthermore, there is some merit in studying programmes in the real-world context which have been successful in maintaining participant adherence over an extended period of time to gain further depth of understanding.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

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