

Multimodal Physical Activity Participation Rates in Middle-Aged and Older Adults

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Abstract

Aims

To determine the type and amount of structured physical activity (PA) that middle-aged (50-64yrs) and older adults (65-90yrs) in Laois engage in and use this data to inform the design and delivery of community-based PA interventions run by Laois Sports Partnership over the next 5 years.

Methods

Participants (n=353) completed a questionnaire, which examined their participation in PA (minutes, type), injuries/medical conditions that limit participation, and barriers to taking part in PA.

Results

The majority of participants (75.7%, n=255) took part in structured PA each week. Only 51.6% (n=182) of all participants achieved 150 minutes per week, predominantly through aerobic activities. Few participants met the guidelines for resistance (14.4%, n=51), flexibility (6.2%, n=22) or balance (0.0%, n=0) training. Barriers to PA participation were pain in joints or muscles (44.9%, n=111), unaware of available opportunities (35.9%, n=84), unfavourable weather (33.4%, n=80) and no time (32.6%, n=75). Injuries (24.5%, n=78) or medical conditions (12.9%, n=40) prevented participants from being physically active.

Conclusion

Participants predominantly undertook sufficient aerobic activities to improve health. However, most did not meet the guidelines for resistance, balance or flexibility training, which may contribute to increased frailty and falls and reduced independent living, well-being and quality of life in later years. Thus, educating middle-aged and older adults on the benefits of multimodal PA and providing enjoyable opportunities for both populations within the community that focus on social inclusion is required.

Introduction

Ageing results in structural and functional decline in most physiological systems in the human body¹. There is a notable decline in cardiovascular fitness, muscle mass, strength and power, bone mass, metabolic and cardiovascular health¹. These unfavourable adaptations place older adults at increased risk of developing a host of clinical conditions including obesity, type 2 diabetes, cardiovascular disease and certain cancers along with degenerative musculoskeletal conditions like sarcopenia, osteoporosis and arthritis and musculoskeletal injuries². Ultimately, these negative physiological adaptations increase frailty, increase risk of falls, reduce ability to perform activities of daily living, reduce psychological health and well-being and contribute to loss of independence and poor quality of life².

Physical activity (PA) can ameliorate these adaptations and promote a longer life span, health span and functional independent living¹. Aerobic training improves body composition, the functioning of the cardiovascular system, the cardiovascular lipid profile and insulin sensitivity³. Importantly, aerobic training increases aerobic fitness ($VO_2\text{max}$)³, which is an independent predictor of health and protects against a range of chronic conditions including type 2 diabetes and cardiovascular disease⁴. Resistance training increases total muscle mass, muscle strength and power, neuromuscular firing rate⁵ and recruitment and functioning of the fast twitch type 2 fibers which deteriorate with age⁶. Resistance training also increases bone density⁷. These adaptations are crucial to maintaining muscle function, strength and power, preventing frailty and falls and promoting functional independent living in older age². Flexibility training improves mobility and range of motion in all joints and is linked to independent living in later years⁸. Balance training improves stability and when combined with strength training reduces the likelihood of falls in older adults⁹. Thus, for optimal health benefit, it is important that older adults engage in multimodal PA weekly incorporating aerobic, resistance, flexibility and balance training². The same is true for middle-aged adults since baseline levels of strength and fitness in this population predict frailty and health in older years¹⁰. This study aimed to determine the type and amount of structured PA that middle-aged and older adults in Laois take part in and use this data to inform the design and delivery of community-based PA interventions run by Laois Sports Partnership over the next 5 years.

Methods

An anonymous questionnaire based on previous literature¹¹⁻¹³ was developed to examine PA participation in middle-aged and older adults in Laois and identify potential barriers to PA. Fourteen questions were included that examined their demographics, participation in structured PA (minutes, type, location, reasons for taking part in particular type of PA), interest in taking part in more PA, any personal, social or environmental barriers to taking part in PA, and any injuries or medical conditions that limit their PA participation (supplementary material 1). Eligible participants were aged between 50-90 years and must have been resident in Laois. Ethical approval was granted by Dublin City University's Research Ethics Committee and informed consent was required prior to completion. Hard copy and online versions of the questionnaire were available and were distributed by Laois Sports Partnership and True Fitness via their social media channels. Laois Sports Partnership also contacted their extensive database of age appropriate clubs and societies to distribute the questionnaire in addition to attending age appropriate social events in Laois. Three hundred and fifty-three participants completed the questionnaire which took approximately 10 minutes to complete.

Results

The majority of participants took part in structured PA (75.7%, n=255), with a similar percentage of those aged <65 and ≥65 years partaking in PA (Table 1). Participants undertook an average of 248.8±171.0 (range from 0-1,080) minutes of PA per week. Those aged <65 demonstrated a higher average minutes of PA per week than those ≥65 years (Table 1). Just over half of all participants (51.6%, n=182) completed at least 150 minutes of PA per week. Aerobic activities, mainly walking (58.6%, n=207) and swimming (11.3%, n=40) were the most frequent activities undertaken (Table 2). Outdoors and local area was the most common area PA was conducted in (39.4%, n=139), followed by local park/woods/canal/lake (18.7%, n=66), gym or studio (16.4%, n=58), at home (13.0%, n=46), community centre (9.6%, n=34), other town centre (8.2%, n=29), swimming pool (6.2%, n=22), local sporting clubs (4.5%, n=16) and at work (0.6%, n=2).

Table 1. PA participation in those aged <65 and ≥65 years.

Age	PA participation		Mean mins of PA per week	Participates in 150 mins PA per week	
	% (n)	Yes % (n)	Mean±SD	Full sample* Yes % (n)	Participate in PA** Yes % (n)
<65	56.8 (196)	75.8 (144)	280.47±168.21	56.6 (111)	81.0 (111)
≥65	43.2 (149)	75.7 (106)	209.87±166.18	45.6 (68)	60.2 (68)

PA; Physical activity. SD; Standard deviation. N; number. Mins; minutes.

*This data refers to the full sample of participants surveyed, which includes participants who take part in PA and also those who do not take part in PA.

**This data refers only to the participants who do take part in PA within the full sample. It assesses how many of those physically active participants meet the recommended guidelines of 150 minutes per week.

Table 2. Percentage and number of participants that take part in individual activities.

Activity	All participants Yes % (n)	<65 years Yes % (n)	≥65 years Yes % (n)
Aerobic	69.1% (244)	68.9% (135)	69.8% (104)
Resistance	14.4% (51)	17.3% (34)	11.4% (17)
Flexibility	6.2% (22)	6.6% (13)	6.0% (9)
Balance	0.0% (0)	0.0% (0)	0.0% (0)

The majority of participants agreed and strongly agreed that PA improves their mental health (91.9%, n=217), helps them feel less stressed (90.0%, n=212), improves their heart health (90.0%, n=212) and they enjoy it (90.5%, n=217) (Table 3). Twenty-two percent of participants (n=45) did not believe there were convenient PA opportunities close to them.

Table 3. Why participants take part in PA.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I enjoy it	6.3% (15)	0.4% (1)	2.9% (7)	33.8% (81)	56.7% (136)
It improves my mental health	5.9% (14)	1.3% (3)	0.8% (2)	37.7% (89)	54.2% (128)
It helps me to feel less stressed	5.6% (13)	0.9% (2)	2.6% (6)	36.5% (85)	54.5% (127)
It improves my heart health	5.6% (13)	0.4% (1)	3.0% (7)	34.8% (81)	56.2% (131)
It increases my muscle strength	6.3% (14)	2.3% (5)	4.5% (10)	38.9% (86)	48.0% (106)
It helps me to have contact with friends and people I enjoy being with	7.0% (16)	7.4% (17)	6.1% (14)	33.2% (76)	46.3% (106)
I feel great after exercise	6.3% (15)	1.7% (4)	4.2% (10)	34.3% (82)	53.6% (128)
It helps me to live independently	7.6% (16)	6.2% (13)	10.0% (21)	38.9% (82)	37.4% (79)
I exercise to control my weight	7.3% (16)	8.6% (19)	5.5% (12)	44.5% (98)	34.1% (75)
There are convenient physical activity opportunities close to me	9.8% (20)	12.2% (25)	14.6% (30)	39.0% (80)	24.4% (50)

Participants predominantly would like to take part in more PA (77.5%, n=248). Barriers to completing PA are presented in Table 4. The most common barriers to completing PA that participants agreed on were pain in joints or muscles (44.9%, n=111), unaware of available opportunities (35.9%, n=84), weather impacting their ability to be physically active (33.4%, n=80) and no time (32.6%, n=75). The majority of participants strongly disagreed that they were too old to do PA (90.2%, n=192).

Participants reported that an injury (24.5%, n=78) or medical condition (12.9%, n=40) prevented them from being physically active. Of those that reported the location of injury, 53.0% (n=35) occurred in the lower limb, 22.7% (n=15) at the trunk and back and 12.1% (n=8) at the head and neck and upper limb respectively. Pain and chronic pain (34.2%, n=25), joint pain or arthritis (32.9%, n=24) and disk injuries (8.2%, n=6) were the most frequently reported injuries that prevented participants from being physically active.

Table 4. Barriers to PA.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
<i>Personal barriers to exercise</i>					
I do not have any motivation to do physical activity	26.1% (61)	35.0% (82)	15.4% (36)	17.5% (41)	6.0% (14)
I do not have time	20.9% (48)	37.4% (86)	9.1% (21)	21.3% (49)	11.3% (26)
Physical activity is too hard for me	32.5% (74)	40.8% (93)	11.4% (26)	10.1% (23)	5.3% (12)
It costs too much to be physically active	31.0% (70)	36.7% (83)	13.3% (30)	13.3% (30)	5.8% (13)
I have pain in joints or muscles	19.4% (48)	24.7% (61)	10.9% (27)	29.1% (72)	15.8% (39)
I have too many family responsibilities	27.7% (62)	43.1% (93)	10.2% (22)	12.5% (27)	5.6% (12)
I am too tired	26.4% (57)	45.8% (99)	9.3% (20)	13.9% (30)	4.6% (10)
My family are not interested in physical activity	32.2% (69)	42.5% (91)	7.5% (16)	13.1% (28)	4.7% (10)
I am too self-conscious / embarrassed to be physical active	38.4% (84)	43.8% (96)	5.9% (13)	8.2% (18)	3.7% (8)
I do not know what to do	28.6% (61)	38.5% (82)	11.7% (25)	17.8% (38)	3.3% (7)
I have no interest in physical activity	40.8% (89)	6.0% (13)	5.5% (12)	2.3% (5)	0.5% (1)
I am too old to do physical activity	46.5% (99)	43.7% (93)	6.1% (13)	2.3% (5)	1.4% (3)
<i>Social barriers to exercise</i>					
I do not have anyone to bring me to a physical activity programme	49.4% (115)	36.9% (86)	3.9% (9)	7.3% (17)	2.6% (6)
I do not have any family or friends to be physically active with	42.0% (100)	37.8% (90)	4.6% (11)	10.1% (24)	5.5% (13)
<i>Environmental barriers to physical activity</i>					
There are no facilities near me	29.7% (71)	34.3% (82)	7.9% (19)	15.9% (38)	12.1% (29)
There are no physical activity programmes available near me	27.9% (65)	32.6% (76)	12.4% (29)	18.5% (43)	8.6% (20)
The weather impacts my ability to be physically active	25.5% (61)	30.1% (72)	10.9% (26)	25.5% (61)	7.9% (19)
Facilities do not have convenient schedules for me	23.6% (54)	31.4% (72)	17.5% (40)	23.6% (54)	3.9% (9)
Physical activity programmes near me do not have convenient schedules for me	23.2% (53)	32.9% (75)	18.4% (42)	21.1% (48)	4.4% (10)
I do not know what opportunities are available near me	25.6% (60)	29.1% (68)	9.4% (22)	28.2% (66)	7.7% (18)
The physical activity programmes I know of are too far away	29.6% (67)	36.3% (82)	12.8% (29)	16.4% (37)	4.9% (11)
I do not have any form of transport to go to any physical activities	45.0% (104)	39.8% (92)	1.7% (4)	8.2% (19)	5.2% (12)

Discussion

It is recommended that adults undertake 30 minutes of moderate intensity PA at least 5 times per week for health or 150 minutes each week². This study found 51.6% (n=182) of all participants, 56.6% (n=111) of middle-aged and 45.6% (n=68) of older adults achieved this recommendation. The average weekly reported PA was 280 and 210 minutes for middle-aged and older adults, respectively. This is in line with previous research in Ireland where 52% of participants over 50 years met the guidelines and participation decreased with increasing age (58% of 50-64year olds vs 55% 65-74year olds vs 37% \geq 75year olds)¹⁴. Worryingly, 43.4% (n=85) and 54.4% (n=81) of middle-aged and older adults respectively did not meet the guidelines. The cost associated with physical inactivity in Ireland is estimated to be €1.5 billion per year¹⁵. Previous Australian research reported that if their population increased their PA to meet recommended guidelines, they could save AUS\$1.5 billion a year in costs linked to cardiovascular disease, stroke, type 2 diabetes, breast cancer, colon cancer, depression and falls¹⁶. Thus, increasing PA in middle-aged and older adults should be encouraged and would be of substantial benefit to their morbidity, mortality, our health care system and economy.

The type of PA undertaken is also important as different modes of training stimulate different physiological adaptations that collectively ameliorate the ageing process². Aerobic activities were predominant in this study, with middle-aged and older adults engaging in 68.9% (n=135) and 69.8% (n=104) on a weekly basis, mostly by walking (58.6%, n=207), swimming (11.3%, n=40), aqua aerobics (8.8%, n=31) and cycling (5.9%, n=21). Compared to their aged matched sedentary counterparts, aerobically trained individuals exhibit a more favourable body composition, greater cardiovascular fitness, enhanced cardiovascular and metabolic health³ and slower development of disability in old age¹⁷. Thus, providing opportunities and encouraging all middle-aged and older adults to partake in aerobic activities weekly that they enjoy is important within our communities.

Adults are recommended to perform resistance training at least twice a week to maintain their muscle mass, strength and power and avoid frailty in later years². Frailty and pre-frailty are prevalent in Irish middle-aged (8.7%, 31.2%) and older adults (14.9%, 44.4% for 65-74yrs, 39.1%, 43.7% for >75years)¹⁴. Frailty is a risk factor for fear of falling, single and recurrent falls and disability among adults aged \geq 50 and contributes disability, hospitalisation, admission to nursing home and death¹⁸. Just 17.3% (n=34) and 11.4% (n=17) of middle-aged and older adults in Laois, respectively, reported that they engage in resistance training. National data on resistance training participation in these populations is lacking and as the older adult population is expected to double by 2040¹⁹ designing interventions to address this is warranted. Balance training is strongly recommended for falls prevention, particularly for individuals with frailty². In Ireland, one in three older adults fall every year with two thirds of them falling again within 6 months²⁰. The cost of treating falls and associated injuries and disabilities in Ireland is expected to rise to €1587-2043 million by 2030²⁰. No participants in the current study engaged in specific balance training, however balance training may have been incorporated into some of their aerobic (walking over uneven terrain) and strength activities. Specific balance training should be encouraged in this population to reduce their falls risk. Just 6.6% (n=13) and 6.0% (n=9) of middle-aged and older adults took part in flexibility activities, which have been associated with functional independent living in older adults⁸. Thus, access to and regular participation in multimodal PA sessions is crucial for a long health span in adults over 50 years.

Regular participation in PA can also improve psychological health and well-being²¹, cognitive functioning²² and quality of life²³. Participants in the current study reported that taking part in PA improved their mental health (91.9%, n=217), helps them feel less stressed (90.0%, n=212), and they enjoy it (90.5%, n=212). Additionally, participants predominantly wanted to take part in more PA (77.5%, n=248). However, barriers to PA can reduce participation. Common barriers reported in this

study was pain in joints or muscles (44.9%, n=111), unaware of opportunities available to them (35.9%, n=84), weather impacting their ability to be PA (33.4%, n=80) and no time (32.6%, n=75). An injury (24.5%, n=78) or a medical condition (12.9%, n=40) were also mentioned as factors that prevented them being active, with pain/chronic pain a commonly reported injury (34.2%, n=25). Pain, comorbidities and access to opportunities have been frequently identified as barriers internationally²⁴ and ageing and physical inactivity may cause or exacerbate many of the injuries and conditions noted in this study²⁵. Thus, regular participation in multimodal PA programmes can manage and treat these injuries and conditions² and education is needed to inform middle-aged and older Irish adults of the benefits of PA in both life stages.

While the intensity of structured PA that participants engage in and gender differences in PA participation were not measured as part of this study, both are important to inform the design of community PA programmes and should be measured in future research. Response bias may have occurred, as those more interested in PA may have completed the questionnaire. The database of clubs and societies contacted by Laois Sports Partnership to complete the questionnaire may include adults who are more likely to take part in PA, so the results may not be representative of the entire population. Participant's recall may affect the validity of the findings in this study and future research utilising objective measures is required.

This study aimed to inform the design and delivery of community-based PA programmes in Laois over the next 5 years by Laois Sports Partnership. The key findings show that just over half of participants are meeting the PA guidelines for health, predominantly through aerobic activities. In addition, the guidelines for resistance, balance or flexibility training are not frequently met which has implications for frailty, falls, morbidity, loss of independence and quality of life in later years. While the majority of participants would like to be more active, injuries, medical conditions and pain were identified as key barriers to PA participation even though multimodal PA can prevent, treat and manage same. Educating middle-aged and older adults on the importance and benefits of multimodal PA for both stages of life is required and providing free or cost limited opportunities for both populations within the community that focus on enjoyment and social inclusion is an important step.

Declaration of Conflicts of Interest:

There are no conflicts of interest to declare.

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