

C|A|R|D|I **GRANTS**
PROGRAMME

Research Brief

**Physical activity
and mental health
in ageing**

Ageing population - ROI

- At the 2006 census, there were 468,000 people aged 65+ (11% of the population).
- By 2041, there will be 1.4 million aged 65 and over (22% of the population).
- Life expectancy is 76.8 years for men and 81.6 years for women.
- 95% of men and women aged 70 and over rate their health as very good (19%), good (50%) or fair (26%).
- 9.1% of people aged 65 and over are still in employment (Q2 2009).

Ageing population - NI

- In 2008, there were 248,500 people aged 65+ (14% of the population).
- In 2041 the 65+ age group is projected to make up 24% of the population.
- Life expectancy is 76.3 years for men and 81.3 years for women.
- 66% of people aged 70 and over rate their health as good (25%) or fairly good (42%).
- 9% of men aged 65 and women aged 60+ are still in employment (Q2 2009).

Policy on physical activity – ROI

- In 2009, the Department for Health and Children and the Health Service Executive published *National Guidelines on Physical Activity for Ireland*, with recommendations for the 65 and over age group.
- A National Grant Scheme for Sport and Physical Activity for Older People encourages older members of the community to participate in sport and physical activity.
- *Go for Life* is an Age & Opportunity initiative, funded by the Irish Sports Council and run in co-operation with the Health Service Executive. It is a national programme for promoting physical activity in the older population.

Policy on physical activity - NI

- The first NI Physical Activity Strategy, “Be Active – Be Healthy” 1996- 2002, was published in March 1996. The overall aim of the strategy was to increase levels of health-related physical activity, particularly among those who exercise least.
- The cross-departmental public health strategy *Investing for Health*, was published in March 2002 and it identifies physical activity as a key determinant of good health.
- Age NI, in co-operation with the Big Lottery Fund and Sport Northern Ireland, promotes health and wellbeing in later life through the *Ageing Well* programme.

Introduction

The benefits of physical activity on physical well-being have been well-established by research [e.g. (Rooney, 1993)] and are promoted by governments and voluntary agencies working with older people¹. However, recent evidence has pointed to significant links between maintaining recommended levels of physical activity and positive effects on mental health and brain functioning. Higher levels of physical activity may alleviate stress levels, improve memory and help to avoid the development of depressive symptoms. This research brief examines these links as well as the public policy strategies in place to promote physical activity in the older population. It suggests that considering increasing evidence of links between physical activity and mental health, promoting exercise in the older population in Ireland, North and South, should highlight mental, as well as physical, benefits.

It is based on three CARDI-funded projects:

- *Physical activity and core depressive symptoms in the older Irish adult population*, led by Karen Morgan at the Royal College of Surgeons in Ireland.
- *Using aerobic exercise to promote brain plasticity*, conducted by Richard Carson at Queen's University, Belfast.
- *Leading dance for older people*, led by Sylvia O'Sullivan at the University of Limerick.

Key findings

- 36% of people over the age of 50 in ROI (Department of Health and Children, 2007) and 39% of people over the age of 50 in NI (DHSS&PS, 2006) report low levels of physical activity in their daily lives.
- Barriers to older age groups participating in physical activity include self-perception that they are not capable, safety concerns and lack of access to activities specifically designed for older people (NI Assembly, 2010).
- Research finds that higher levels of physical activity are linked with increased function in the parts of the brain connected to memory, stress and depression (Kempermann et al., 2010).
- People over 50 years of age who are engaged in moderate² to high levels of physical activity have a 50-56% reduction in the odds of having depressive symptoms (Morgan et al, 2011).
- Engaging in regular physical activity reduces the risk of cardiovascular disease, preserves functional ability and benefits psychological health in older people. However, people who have physical, psychological or mental health disorders are the group most likely to report inactivity (TILDA, 2011).
- Physical activity has the potential to promote brain plasticity in older people, which is relevant to the development of treatments for degenerative brain diseases such as Alzheimer's and helping with recovery from strokes (Carson, 2010).
- Older people are one of the groups with low levels of physical activity, yet can also benefit most from that activity. Policy initiatives should not only encourage innovative ways of healthy and active living for all older people but also address the barriers.

1 The World Health Organisation define physical activity as "all movements in everyday life, including work, recreation, exercise and sporting activities".

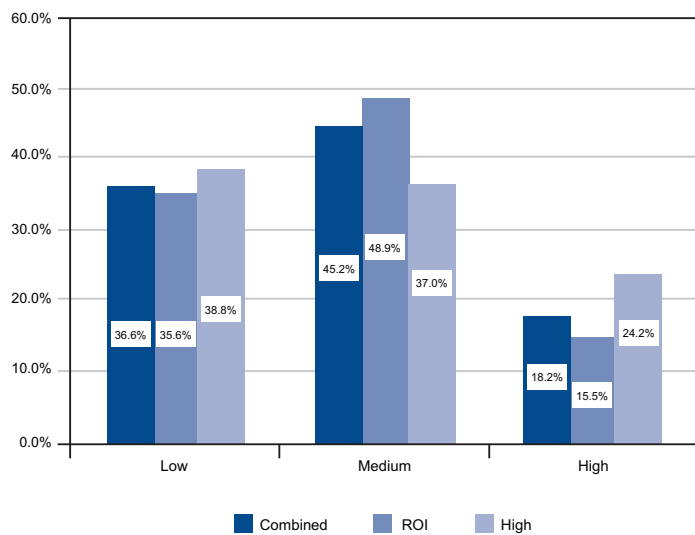
2 Moderate physical activity includes walking briskly, dancing, biking, swimming or gardening. Vigorous or higher-level activity includes jogging, sports or aerobic exercise. 150 minutes per week is the recommended moderate level for people aged 65 and over.

Levels of physical activity in the older population

The Health and Well-being Survey of 2005/2006 (DHSS&PS, 2006) recorded the levels of physical activity by age group amongst the population in NI. Similarly in ROI, the SLÁN 2007 survey of lifestyle and attitudes asked about levels of physical activity (Department of Health and Children, 2007).

Comparing the two reports shows that 36% of people over the age of 50 in ROI and 39% of people over the age of 50 in NI reported low levels of physical activity in their daily lives.

Figure 1: Overall physical activity levels of over 50s in ROI, NI and combined



Source: (Morgan et al, 2011)

The NI report defines someone as sedentary if they have not performed any activity of at least a moderate level, lasting 20 minutes, on at least one occasion in the last 7 days. 63% of people aged 75 and over were sedentary in comparison to only 10% of 16- 24 year olds (DHSS&PS, 2006).

In ROI, 44% of the over 65s were considered to have low levels of physical activity, double the levels of the 18-29 group (Department of Health and Children, 2007). Among the 65 and over age group in ROI, the biggest reason for inactivity was injury, disability or a medical condition, 44%, while 17% of respondents in this group said they were not interested in physical activity.

The first results from the Irish Longitudinal Study on Ageing (TILDA) note that three quarters of people aged 50 and over rate their health as excellent, very good or good. 33% of people in this age group report moderate levels of physical activity and 34% report high levels. This leaves 33% who report low levels. Similarly, half of all people aged 75 or over had

low levels of physical activity. Yet, 66% of those aged 75 and over reported their health as excellent, very good or good (TILDA, 2011). These results show that some older people in ROI are reporting good health even though they are not achieving the recommended level of physical exercise.

How does physical activity help the brain?

“A healthy mind in a healthy body” is a common place quote but in biological terms, the impact of a healthy body on mental health is poorly understood. Why and how physical activity is good for the brain is a question of fundamental importance for the mental health of our ageing society (Kempermann et al., 2010).

At present, no unifying theory exists about the function of adult brain neurogenesis (the birth of neurons). However, there is little doubt that new neurons contribute to the functionality of a part of the brain called the *dentate gyrus* (Kempermann et al., 2010). The *dentate gyrus* is thought to contribute to making new memories and other functions. An increase in neurogenesis in this part of the brain has also been linked to the treatment of stress and depression (Malberg et al., 2000).

Failing functionality of the hippocampus (the part of the brain which plays an important role in consolidating information from short-term to long-term memory) and the *dentate gyrus* has been linked to a number of disorders, most notably dementia, depression and schizophrenia. Clinical evidence suggests that the individual's level of overall activity, either physical or cognitive, at least partly counteracts this impaired functioning. For example, one study in mice showed that increased activity led to increased neurogenesis (Kempermann et al., 2010).

While a definitive causal link has not been established between physical activity and improved brain function, scientific indications are that parts of the brain linked to memory, stress and depression have increased function with higher levels of physical activity.

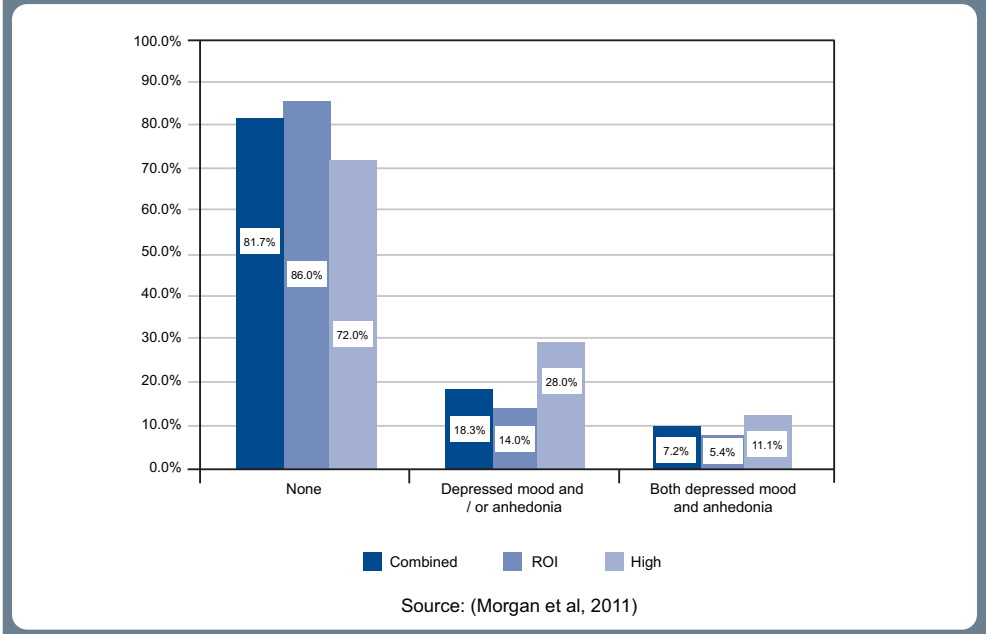
Physical activity benefits and depression

Research indicates that the prevalence of depression in society is increasing. Projections suggest that by 2020, depression will be second only to heart disease in its contribution to the global burden of disease³ (Chapman & Perry, 2008). Physical activity, even at a moderate level (see footnote 2), has been shown to be effective in treating depression. In addition, physically active individuals are less likely to develop depressive symptoms than those who are not active.

While depression is more common amongst younger age groups, research shows that in the Republic of Ireland (ROI), 10% of people aged 50 or more reported depressive symptoms (Department of Health and Children, 2007). In Northern Ireland (NI), 18% of the same age group reported depressive symptoms (DHSS&PS, 2006). Exploring the link between physical activity and the prevention and treatment of depression in older adults is an important challenge.

3 As measured by disability-adjusted life years.

Figure 2: Depressive symptoms of the over 50s in ROI, NI and combined



With this in mind, CARDI funded a research project on *Physical activity and core depressive symptoms in the older Irish adult population* as part of its data mining grants programme in 2010 (Morgan et al, 2011). The Principal Investigator was Dr. Karen Morgan of the Royal College of Surgeons in Ireland and the aim of the project was to profile the physical activity levels of older adults in Ireland, North and South, and to assess the association between activity levels and depression.

Analysing a sample of older people from both ROI and NI, the research revealed that depressive symptoms were more often reported by females (compared with males), younger “old” age groups compared to “older” old age groups and notably people who were less physically active. Overall, people over 50 years of age who were engaged in moderate to high levels of physical activity had a 50-56% reduction in the odds of having elevated depressive symptoms.

Physical activity benefits and brain plasticity

A great deal of research has demonstrated that the older adult brain can change and re-organise extensively. This capacity is referred to as *plasticity*. Brain plasticity aids the processes of learning, memory, and adaptation through experience. This has the potential to maintain and enhance the brain capacity of older adults.

Brain plasticity can be used in the treatment of brain damage and in the treatment of learning difficulties. It allows the brain's neurons to compensate for injury and disease and to adjust their activities in response to new situations or to changes in their environment. As well as being important to healthy ageing, in the longer term, studies of brain plasticity may be relevant to the development of treatments for degenerative brain diseases such as Alzheimer's and helping with recovery from strokes.

In 2009, CARDI funded a small-scale study, *Using aerobic exercise to promote brain plasticity*, conducted by Richard Carson at Queen's University, Belfast. It found that older people exhibit changes in plasticity in response to brain stimulation similar in character to those shown by young adults⁴. Promoting ways to increase brain plasticity in older people has the potential to increase healthy life expectancy and improve the quality of life of older people.

Case study 1: Leading dance for older people

As part of the examination into promoting physical activity for older people, CARDI funded a research network to explore the benefits of dancing as an important tool well-being in the older population. The work was led by Sylvia O'Sullivan in the University of Limerick.

The research network developed a series of seminars and complimentary events in the University of Limerick and Queen's University Belfast. These events involved the older community in promoting both the work of the network and the benefits of dance for older people. These benefits included physical exercise but also social benefits in terms of participating in community activities. The network highlighted the benefits of dance in terms of falls prevention and also the benefits of pattern recognition in dance for helping dementia sufferers (Chipperfield, 2011).

Age and Opportunity in ROI and Age NI in NI have dance activity programmes led by older people themselves with a sustainable focus through leadership training and mentoring.

⁴ It recommended further study to establish a definitive link between aerobic exercise and brain plasticity. Research is currently being conducted on behalf of the NI Chest, Heart and Stroke Foundation.

International approaches to older people and physical activity

Scotland

The Scottish strategy for physical activity says that promoting physical activity among older adults is effective in preventing and treating depression and mood disorders. 25% of suicides in Scotland happen in the over 65s, even though they account for just 15% of the population (Physical Activity Task Force, 2003). There is a significant problem with inactivity in the older population in Scotland – 92% of women and 86% of men between the ages of 65 and 74 are considered inactive.

The strategy recommends 30 minutes of moderate activity most days of the week. For frail older adults in particular, strength and balance exercises are recommended three times per week. Older people in deprived households are identified as in greatest need for staying active.

A study by Sports Scotland notes that there is a self-perception issue in encouraging older people to engage in physical activity. The belief among older people that they are incapable of getting the recommended amount of exercise as a result of medical conditions is a common barrier. However, there is a mismatch in distinguishing “*real medical barriers from perceived physical problems*” (Sports Scotland, 2005). A challenge in promoting physical activity in the older population is to overcome this barrier of self-perception.

Canada

The *Pan-Canadian Physical Activity Strategy* was developed in 2004 by a coalition of over 40 national organisations working with Health Canada, the federal department which oversees health issues (Coalition for Active Living, 2004). An important and innovative aspect of the strategy was in encouraging federal, provincial and municipal governments to work with the voluntary sector to deliver policies and legislation which fully supported a comprehensive, integrated, and sustained strategy. In order to promote inclusion for all Canadians, physical activity friendly communities were created which would remove barriers to participating in physical activity for all. Older people in Canada were one of the groups mentioned as needing to overcome barriers in taking part in physical activity.

To achieve the goals outlined in the strategy, five strategic directions were developed:

- Healthy Public Policy
- Community Physical Environments
- Supportive Social Environments
- Public Education
- Research Development and Knowledge Exchange

The strategy viewed promoting physical activity as a collaborative effort and importantly, put removing barriers to activity for key demographic groups, including the older population, as a key priority.

Public policy on physical exercise and the older population

Northern Ireland

The first NI Physical Activity Strategy, “Be Active – Be Healthy” 1996- 2002, was published in March 1996 (DHSS&PS, 1996). The overall aim of the strategy was to increase levels of health-related physical activity, particularly among those who exercise least. A Northern Ireland Physical Activity Implementation Group (NIPAIG) was established to oversee the implementation of the Strategy. An Action Plan (1998-2002) was published in 1998 and identified key activities across various sectors including health, education, environment, agriculture, voluntary and community.

The cross-departmental public health strategy *Investing for Health*, was published in March 2002 and it identifies physical activity as a key determinant of good health. A review of the strategy was published in 2010 which examined the restructuring of the health system.

Sport Northern Ireland produced an information leaflet on staying active for older adults, *Get-Active, Stay-Active* (Sport Northern Ireland, 2011). It details several community programmes for older people, including swimming for older men and intergenerational dance. Participation in the community programmes among the over 65s has risen from 296 in 2006/07 to 1,079 in 2009/10.

A NI Assembly paper in 2010 addressed the issue of barriers to participation in physical activity as they affect specific socio-cultural and socio-economic groups, one of which was older people (NI Assembly, 2010). Practical barriers were a lack of access to activities specifically designed for older people, access to transport, safety concerns, time and cost. The fear of falling is also considered a very prevalent barrier to physical activity. In terms of policy, the paper notes that providing positive role models is important, as is consideration of the role of the wider community, neighbourhoods and infrastructure.

Case study 2: Ageing Well in NI

Age NI⁵ has an *Ageing Well* programme which promotes health and wellbeing in later life. It was developed in co-operation with the Big Lottery Fund and Sport Northern Ireland. It focuses on healthy eating, good mental health and keeping physically active. Two of the programmes on physical activity are specially designed playgrounds for older people and dance for older people (Age NI).

Part of the programme is a community sport initiative which promotes physical activity among older adults in partnership with six local council areas. A resource for sports development teams and leisure centre with regard to promoting the participation of older people was also published (Age Concern NI, 2007).

5 The programme was established in 2007 by Age Concern NI which merged with Help the Aged to form Age NI.

Republic of Ireland

In 2009, the Department for Health and Children and the Health Service Executive published *National Guidelines on Physical Activity for Ireland* (Department of Health and Children, 2009). The guidelines advise people aged 65 and over to engage in at least 30 minutes per day of moderate intensity activity on five days a week, or 150 minutes a week. It is also recommended that the focus should be on aerobic activity, muscle-strengthening and balance.

A survey of attitudes to physical activity conducted as part of the *Go for Life* project (see Case Study 3) confirmed a strong relationship between social participation and activity. Older people most in need of opportunities to engage in physical activity may also lack access to social outlets which would encourage that activity (Ipsos MORI, 2009). The survey also showed that women, older age groups and lower-socio economic groups tend to have larger numbers of people who are not physically active.

Recommendations based on the findings included:

- Target older groups who are not currently physically active, particularly with promotional campaigns.
- Challenge misconceptions among older people that sport or physical activity might be bad for their health.
- Emphasise the long-term benefits of physical activity in old age.
- Engage with private sector sporting facilities to promote the participation of older people, in addition to working with community or local authority facilities.

The TILDA report on first results from the project finds that “engaging in regular physical activity reduces the risk of cardiovascular disease, preserves functional ability and benefits psychological health in older people, yet people who have physical, psychological or mental health disorders are the group most likely to report inactivity” (TILDA, 2011). Thus, it is important for public policy to challenge the traditional perception that older people cannot engage in physical activity and promote exercise among older age groups.

Case study 3: Go for Life in ROI

Go for Life is an Age & Opportunity initiative, funded by the Irish Sports Council and run in co-operation with the Health Service Executive. It is a national programme for sport and physical activity which aims to empower and enable older people by promoting physical activity with active retirement associations, senior citizens groups, day care and community centres around the country.

There is also a National Grant Scheme for Sport and Physical Activity for Older People. This is a government initiative aimed at encouraging older members of the community to participate in sport and physical activity.

Conclusion

The benefits of physical activity to our physical health as we age are well-established. However, research is building the evidence base that physical exercise is also beneficial to our mental health and brain function. CARDI-funded projects have shown that people engaged in even moderate physical activity have a much less chance of having depressive symptoms. Physical activity may also be linked to brain plasticity which aids with stroke rehabilitation, while there is emerging evidence of a link between increased physical activity and improve memory function.

From a public policy perspective, promoting physical activity among older adults is a major challenge. There are barriers in terms of self-perception, lack of access, time and cost for older adults. However, given that older people are one of the groups with low levels of physical activity, yet can also benefit most from that activity, policy initiatives must be prepared to meet these challenges and encourage healthy and active living for all older people.

Published by the **Centre for Ageing Research and Development in Ireland (CARDI)** © Centre for Ageing Research and Development in Ireland. CARDI has produced this publication as a resource for researchers, policy-makers, older people and others with an interest in ageing research. To find out more about CARDI's grants programme please visit www.cardi.ie

This research briefing is based on information collated by CARDI and findings from three research projects funded under CARDI's Grants Programme: Morgan (2011), Carson (2011) & O'Sullivan (2011).

It may be cited as Physical Activity & Mental Health in Ageing 2011. Dublin: Centre for Ageing Research and Development in Ireland.

This publication can be downloaded from www.cardi.ie Additional copies may be requested from:

Centre for Ageing Research and Development in Ireland
Forestview, Purdy's Lane,
Belfast BT87ZX
Tel: +44 (0) 28 9069 0066

Centre for Ageing Research and Development in Ireland
5th Floor Bishop's Square,
Redmond's Hill, Dublin 2
Tel: +353 (0) 1 478 6308

Email: info@cardi.ie

Our work has been made possible through funding by The Atlantic Philanthropies, augmented by grants from the Department of Health and Children in Dublin and the Health and Social Care Research Office, Public Health Agency, Northern Ireland. CARDI is hosted by the Institute of Public Health in Ireland.

Bibliography

Age Concern NI. (2007). *Promoting Physical Activity with Older People*.

Age NI. *Ageing Well programme*. Retrieved August 9, 2011, from AgeNI website.

Carson, R. (2010). *Using aerobic exercise to promote brain plasticity*.

Chapman, D., & Perry, G. (2008). Depression as a major component of public health for older adults. *Preventing Chronic Diseases* .

Coalition for Active Living. (2004). *Framework for a Pan-Canadian Physical Activity Strategy*.

Department of Health and Children. (2009). *National Guidelines on Physical Activity for Ireland*.

Department of Health and Children. (2007). *SLÁN 2007: Survey of Lifestyle, Attitudes and Nutrition in Ireland*.

DHSS&PS. (1996). *"Be Active - Be Healthy" Northern Ireland Physical | Activity Strategy*.

DHSS&PS. (2006). *Northern Ireland Health and Well-Being Survey 2005/06*.

Health Scotland. (2004). *Mental Health and Improvement: Evidence and Practice*.

Ipsos MORI. (2009). *Physical Activity & Sport: Participation & Attitudes of Older People in Ireland*.

Kempermann et al. (2010). *Why and How Physical Activity Promotes Experience-Induced Brain Plasticity*.

Malberg et al. (2000). *Chronic antidepressant treatment increases neurogenesis in adult rat hippocampus*.

Morgan, K., O'Farrell, J., Doyle, F. & McGee, H. (2011). *Physical activity and core depressive symptoms in the older Irish adult population*.

NI Assembly. (2010). *Barriers to Sports and Physical Activity Participation*.

NISRA. (2006). *Northern Ireland Health and Social Wellbeing Survey 2005/06*.

Physical Activity Task Force. (2003). *Let's make Scotland more active*.

Rooney, E. (1993). Exercise for older patients: why it's worth your effort. *Geriatrics*.

Sport Northern Ireland. (2011). *Get Active, Stay Active: Older Adults*.

Sports Scotland. (2005). *Older People, Sport and Physical Activity: A Review of Key Issues*.

TILDA. (2011). *Fifty Plus in Ireland 2011: First results from the Irish Longitudinal Study on Ageing*.