Research Briefing paper
This research briefing paper represents the findings from a project funded under CARDI’s 2013 data-mining funding programme. The paper includes key findings by the funded research team and additional information collated by CARDI. The full report can be downloaded from www.CARDI.ie

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May 2014
Depression is a growing problem in older adults (Chapman & Perry, 2008), and it is exacerbated by under-diagnosis and ineffective treatment options (Lebowitz, et al., 1997). Physical activity has been shown to be an effective, yet underused, treatment for depression in older adults. However, as people age their levels of regular physical activity decrease while their experience of routine or chronic pain increases. The influence of pain on the relationship between physical activity and depression has not previously been researched in either the Republic of Ireland (ROI) or Northern Ireland (NI).

As part of its data-mining 2013 programme, CARDI funded a research project led by Dr. Frank Doyle of the Royal College of Surgeons in Ireland which addressed the question of whether or not pain mediates or moderates the relationship between physical activity and depressive symptoms (Kelleher et al., 2014).

Key Findings

- Pain has been shown to be associated with increased risk for depressive symptoms in older people (Bair et al., 2003) and is also a potential reason for non-engagement in physical activity (Mossey et al., 2000).

- A 2013 study of a pain management service in ROI found a cost of approximately €17,650 per patient per year (Gannon et al., 2013).

- In ROI, 33% of adults over 50 engage in none or only low levels of physical activity, 33% engage in moderate levels and 34% engage in high levels (TILDA, 2011). In NI, 55% engage in low or no levels of physical activity, 25% in moderate levels and 20% in high levels (DHSSPS, 2011).

- In ROI, approximately three quarters of older adults (74%) reported none or only mild pain in the past week compared to 45% of older adults in NI. 17% of older adults in ROI reported experiencing moderate pain compared to 44% of NI respondents. Severe pain or discomfort was reported by 9% of ROI older adults and 11% of NI older adults (TILDA, 2011) (DHSSPS, 2011).

- Higher levels of physical activity were found to be independently associated with lower depressive symptoms while higher levels of pain significantly increased the likelihood of depressive symptoms (Kelleher et al., 2014).

- Kelleher et al. (2014) found no mediating or moderating effects of pain on the association between physical activity and depressive symptoms. This suggests that higher levels of physical activity are protective against depressive symptoms, irrespective of the levels of pain in older adults.

- Overall the findings suggest that clinicians and health professionals can consider and promote physical activity for the treatment of depressive symptoms and mental well-being, irrespective of pain levels (assuming that pain is not directly preventing physical activity) (Kelleher et al., 2014).
Pain, physical activity and depressive symptoms in older people

Health surveys in Ireland

Understanding the interactions between physical activity and potential barriers like pain and depressive symptoms can provide important insights into how the physical and mental health of older people across the island of Ireland may be improved. The aim of the Kelleher et al. (2014) study was to investigate whether pain mediates or moderates the association between physical activity and depression/psychological distress in adults across the island of Ireland aged 50 years or more. The study used national data from three surveys:

1. HARP: The Healthy Ageing Research Project (2005) (N=2053, ROI and NI participants aged 65 years and older);
2. TILDA: The Irish Longitudinal Study on Ageing (2011) (n=8163, ROI participants aged 50 years and older only);
3. NIHS: The Northern Ireland Health Survey 2010/11 (2010/11) (n=2020, NI participants aged 50 years and older only).

This research brief focuses on the findings from the two most recent studies, TILDA and NIHS. A full analysis of all three surveys including HARP is available in the full report (Kelleher et al., 2014).

Pain has been shown to be associated with increased risk for depressive symptoms in older people (Bair et al., 2003) and is also a potential reason for non-engagement in physical activity (Mossey, Gallagher & Tirumalasetti, 2000). It could therefore interact with the association between depressive symptoms and physical activity.

Understanding the relationship between variables

Mediation analysis explains the mechanism of how a variable operates via another. For example, it might be possible that the positive association between pain and depressive symptoms is explained by physical activity – higher pain leads to lower physical activity, which leads to higher depressive symptoms. In this case, physical activity would mediate the effect of pain on depressive symptoms (Kelleher et al., 2014).

A moderation effect is where the strength of the effect of one variable on the outcome varies with levels of another variable. For example, pain may not have an impact on depressive symptoms in those with high levels of physical activity, but it might for those with low or moderate levels of physical activity, above and beyond the effects seen for each variable alone (Kelleher et al., 2014).

1. Unlike HARP and TILDA, the NIHS asked about “recent psychological distress” as opposed to depression so caution is advised when comparing across datasets.
The HARP mediation analysis showed that physical activity was a predictor of depressive symptoms. Older adults who engaged in mild to low moderate physical activity in the past week were half as likely to be depressed as those who engaged in no physical activity. Older adults who engaged in moderate to vigorous physical activity were approximately 76% less likely to be depressed than older adults who did not engage in any physical activity. Pain was also a significant independent predictor of depressive symptoms. Older adults who reported experiencing severe pain over the last week were more than twice as likely to be depressed as those with none or only mild pain.

In analysing the HARP data, Kelleher et al. (2014) included pain in the model with physical activity. However, the findings suggest that pain does not mediate the relationship between physical activity and depressive symptoms. Similar analyses were conducted on the TILDA dataset, showing that both level of physical activity and experience of pain independently predicted the likelihood of current depressive symptoms. However, pain did not appear to mediate the relationship between physical activity and depressive symptoms. In NIHS also, respondents who reported moderate levels of physical activity were 70% less likely to have current distress symptoms than those engaging in only low levels of physical activity. Moderate and severe pain significantly increased the likelihood of current distress compared to those with no or only mild pain. Again, pain did not appear to mediate the relationship when both predictors were entered into the model together.

The results of the HARP moderation analysis indicate that increasing levels of physical activity were independently and significantly associated with reduced depressive symptoms while only severe pain, not moderate pain, was associated with an increased likelihood of depressive symptoms. Overall, however, the analysis found that pain did not have a moderating role in the relationship between physical activity and depressive symptoms. The moderation analysis was repeated on the TILDA and NIHS datasets. All levels of physical activity and pain in TILDA were independently predictive of the presence or absence of depressive symptoms / distress whereas in NIHS, just pain was significantly associated with recent psychological distress. Similar to HARP, analysis showed that pain does not have a moderating role in the association between physical activity, either in ROI or NI. Being depressed and higher levels of pain were also found to significantly increase healthcare utilisation.
Levels of depressive symptoms, pain and physical activity

Physical activity

Several countries have developed national policies that recommend minimum levels of physical activity for older adults. In ROI and NI, older adults are recommended to engage in 30 minutes of activity of moderate intensity for at least five days each week (Department of Health and Children / Health Service Executive, 2009) (Health Promotion Agency, 1996). In ROI, Morgan et al. (2011) reported 45% of older people were achieving moderate physical activity levels, with just 18% engaged in high levels of regular physical activity (Morgan et al., 2011). Among adults over 50 years of age in NI, 30% are meeting the recommended levels of physical activity (DHSSPS, 2011). The levels of physical activity in the TILDA and NIHS study are shown in Figure 1 below.

Figure 1: Levels of physical activity in TILDA / NIHS

Depressive symptoms

Future cohorts of older adults are likely to display higher levels of depressive disorders than their predecessors, given the rising rates of depression in the general population and the ageing of the global population (Heo et al., 2008). As a result, the need for effective and evidence-based interventions for depression has never been more pressing.

In the HARP study, 11% of the sample were depressed and this proportion was higher among NI participants (14%) compared to those in ROI (9%). The vast majority of TILDA (91%) and NIHS (82%) participants were not depressed or psychologically distressed. Current depressive symptoms were recorded in 9% of the TILDA sample while twice the levels of high psychological distress were recorded in 18% of the NIHS sample.
Pain

Three out of every four older adults in the HARP survey reported none or only mild pain in the past week (76%). 15.2% reported moderate pain and 9.3% reported severe pain. A higher number of older adults in NI reported moderate or severe pain compared to participants from ROI.

In TILDA, approximately three quarters of older adults reported none or only mild pain in the past week (74%) compared to 45% of older adults in NIHS. 17% of TILDA respondents reported experiencing moderate pain compared to 44% of NIHS respondents. 9% reported experiencing severe pain or discomfort compared to 11% in the NIHS study.

Figure 2: Levels of pain in TILDA / NIHS
Policy implications

This section examines the current policy in NI and ROI with regard to promoting physical activity as a means of improving physical and mental well-being, as well as some implications of the current research.

Policy in NI

The first NI Physical Activity Strategy Be Active – Be Healthy was published in March 1996 (Health Promotion Agency, 1996) with the aim of increasing overall levels of physical activity, particularly among those who exercised least. Investing for Health, the cross-departmental public health strategy published in 2002 identified physical activity as a key determinant of good health (DHSSPS, 2002). A NI Assembly paper in 2010 addressed the issue of barriers to participation in physical activity as they affect particular groups, one of which was older people. Practical barriers for older people included a lack of specifically-designed activities, access to transport, safety concerns, time and cost. Fear of falling was also considered a significant barrier to physical activity (NI Assembly, 2010).

Fit & Well – Changing Lives is a new public health strategy framework for NI. The consultation period ended in late 2012 and the final strategy is due for publication in 2014. The policy aim for people aged 65 and over is “to enable people in later years to have a satisfying and active life”. The availability of integrated health promotion activities of specific benefit to older people, “tailored where necessary to reflect diversity, lifestyles, individual identified needs and choice” is a major objective. The action plan aims to improve awareness among primary care professionals of conditions common among older people, including depressive symptoms. Promoting healthy active ageing, including in nursing and care settings, is also a goal (DHSSPS, 2012).

Policy in ROI

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 five days a week. The TILDA report on first results from the project notes 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).

As part of Healthy Ireland, the ROI government’s framework for improved health and well-being launched in 2013, a plan to promote increased physical activity levels across the population is to be developed (Department of Health, 2013). Further to the National Guidelines on Physical Activity published in 2009, Go for Life was established, a national programme for promoting physical activity among older adults. It is operated by Age & Opportunity, funded by the Irish Sports Council and run in co-operation with the Health Service Executive. A major part of the programme is the National Grant Scheme for Sport and Physical Activity for Older People. This scheme funds over 1,000 local clubs and organisations each year who want to implement initiatives targeted at older people (Citizens Information, 2014).
Implications

The analysis found no mediating or moderating effects of pain on the association between physical activity and depressive symptoms. This means that higher levels of physical activity are protective against depressive symptoms/distress, irrespective of the levels of pain in older adults. While incremental associations were seen between physical activity and pain and depressive symptoms, the combination of physical activity and pain did not provide any multiplicative effects over and beyond each variable alone.

Overall, the findings suggest that physical activity can be recommended for mental well-being, irrespective of an individual’s pain levels (assuming that pain is not directly preventing physical activity) (Kelleher et al., 2014). As both physical activity and pain are independent predictors of depressive symptoms among older people, efforts should be made to boost physical activity and manage pain levels. Treatment plans or interventions need to consider both of these factors independently. However, physical activity can still be promoted to older adults who suffer from pain. It is a public health challenge to increase levels of physical activity among groups with very low levels of activity. If activity is tailored to the needs and requirements of individual older people, measures to increase levels of physical activity could help to reduce depressive symptoms among the older population.

One estimate from the US placed the cost to health services of chronic pain at between $261 billion to $300 billion each year (Gaskin & Richard, 2011). A 2013 study of a pain management service in ROI found a cost of approximately €17,650 per patient per year (Gannon et al., 2013). It has been shown that pain often remains poorly treated in older people, and this is true across health care settings (i.e. emergency, acute, outpatient and long-term care) (Gibson & Lussier, 2012). People suffering with chronic pain use health services more frequently than those with moderate or no pain (Blyth et al., 2004). Age-appropriate pain management services are necessary to effectively manage pain in older adults, easing the demand on health services and adequately relieving unnecessary suffering among older people (Kelleher et al., 2014).

Conclusion

With an ageing population, depression and pain are growing public health challenges across the island of Ireland. Physical activity is a key element of reducing depressive symptoms among older adults. Kelleher et al. (2014) show that physical activity can be recommended for mental well-being, irrespective of the level of pain an older person is experiencing (assuming that pain is not directly preventing physical activity). As level of pain and level of physical activity are independent predictors of depressive symptoms in older adults, treatment plans, interventions and public health initiatives should tackle these two factors independently.
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