



IPTOP Webinar May 2022 - Physical Activity for People with Dementia

Wed, 5/11 8:09AM • 39:24

SUMMARY KEYWORDS

physical activity, dementia, people, study, carers, question, research, aged care, cognitive impairment, physical activity levels, area, interventions, residential aged care, person, activity, accelerometers, support, community, program, tonight

SPEAKERS

Riona McArdle, Mel Farlie

Mel Farlie 01:41

Okay, so it looks like we've got most people in from the waiting room now. We are just one-minute past we'll just give one more minute just watching the numbers often the left. Okay, I think everyone that was here at seven has got into the room. So, I would like to welcome you all to our very first IP top webinar series evening. And we're very, very excited to have Rihanna McArdle presenting to us tonight from Newcastle University in the UK. And Riona will be talking about physical activity for people with dementia. And Riona is leading researcher in this field. And we're very pleased to have her sharing her expertise with the world physiotherapy community tonight.

As a way of introduction, I'd just like to welcome you all to this session, which has been brought to you by the IP top education committee. And on the line tonight, we've got Professor Hans Hobbelen, who is the president of IPTOP and chairs the education subcommittee, and Associate Professor David Beckwée. And myself, Dr. Melanie Farlie. So, we've got that representation from various parts of the world. And so, we appreciate the time zone flexibility for everyone joining us tonight.

Just a quick note about the technology in tonight's session. So, you will hopefully see on the bottom of your screen a Q&A button. So that button is where if you have questions that you would like, pose to return it at the end of her talk tonight. If you put those questions into the Q&A button box, and if you see a question there that you really like and you would like to vote for that question as well just use the thumbs up symbol, and that will vote up the question and we'll know that that many people want that question asked and we'll prioritize asking that question at the end. There is also a chat button but if you can just avoid using that button to post questions because we won't be using those that chat button for



questions for the speaker. However, we will put our evaluation survey in the chat box at the end of the evening. And we will have this session recorded and up on the YouTube channel but give us seven to 10 days to get that up.

For tonight's program we will have our main presentation which will go for 20 minutes, then we'll have a 10-minute period Have a question and answer time. And then we'll also ask you to fill in an evaluation survey either using the link that will go into the chat later on in the session, or it'll also be in the follow up email that will come out to you within a day of the webinar as well. So, I'm going to hand over now to Ray who's going to give our main presentation tonight. And thank you so much for doing this for our first tip top webinar.

Riona McArdle 05:33

Thank you very much now, hopefully everyone can see my screen now. Great. So thank you very much for coming today. So as Mel said, I'm going to talk about my current fellowship research program, which is aiming to understand why people with dementia do or don't stay physically active following their diagnosis. And today, I just want to address the three questions I had when I was designing this research. So, the first question is staying physically active important for health-related outcomes in people with cognitive impairment? And do people who are affected by dementia consider that to be a priority to what do we currently know about everyday physical activity participation and people with cognitive impairment in the community and in care? And three, what do we know about the barriers and facilitators of everyday physical activity for people with cognitive impairment?

Riona McArdle 06:29

Now this is a relatively new area of research for me because most of my research to date has been looking at the use of digital technology to support dementia diagnosis. And there is plenty of research that is bringing us closer to earlier more accurate diagnosis of dementia, such as establishing the best cognitive tests, blood markers and neuro imaging correlates to detect the disease. But what happens to the people who are diagnosed dementia? Care can be very variable and dependent on the resources and cultural expectations of the country that you're living in. And current dementia care pathways may not prioritize the desires of people with dementia, which according to a Delphi consensus in 2020 include the ability to remain independent for as long as possible, with a good quality of life and a reduced risk of falls.

So, I propose that supporting people with dementia to maintain their habitual physical activity might be a mediating factor to maintaining independence and wellbeing and reducing force. Now, when I say habitual physical activity, I don't necessarily mean structured forms of activity such as exercise, I just mean any movement that your body makes, which expends energy such as doing the housework or doing your gardening, I aim to develop strategies to keep people with dementia physically active for longer following their diagnosis in order to decelerate this decline to dependency and disability.

But why habitual physical activity? Well, most of the research primarily focuses on exercise-based interventions for people with dementia. But these kinds of strenuous activities may not be feasible for



people with frailty or chronic health conditions, or who live in areas that may not have access to these resources such as rural communities, lower socio-economic areas or marginalized backgrounds. Maintaining or improving habitual physical activity following dementia diagnosis could be an inexpensive and inclusive way of maintaining independence and slowing progression to disability. It's also associated with better cognition, function, health, physical condition and social participation. But unfortunately, even in the early stages of dementia, we know people are less physically active.

Before my fellowship, I carried out participatory workshops and interviews to develop these research aims and my research study with people with dementia, carers and dementia care professionals. And they described the experience of people with dementia becoming slowly less active following their diagnosis. So, there was a number of common themes that crops up in these interviews, including the feeling of loss of independence and increased feeling of burden, a greater falls risk and frailty, fear and aggression and loss of confidence and worsening mental health, all linked to this loss of physical activity. And my contributors agreed that participating in physical activity, particularly habitual physical activity, is crucial to keep people going after their diagnosis.

But of course, dementia doesn't just affect the person living with the condition. It also affects the families and friends and it has major consequences on the health and psychosocial well-being of informal carers. Carer burden increases across the course of dementia and associated with lower wellbeing and life satisfaction in both the carer and the person living with dementia. Loss of functional independence in people with dementia is a significant predictor of caregiver burden and placement in aged care, but participating in regular physical activity may have benefits to help people maintain their functional independence and cognition and reduce some of the difficult behavioral symptoms they may experience and this in turn might relieve carer burden.

So therefore, it could be really important for carers to help people with dementia to stay physically active in order to decelerate their transition to informal care and help the person with dementia to maintain their independence for longer. Now, my contributors again felt like carer focused investigations should be a priority for dementia research. And they describe the carers as key facilitators for physical activity, suggesting that support for the carer to facilitate physical activity is vital. They provided anecdotal evidence of improved health and wellbeing and slower progression to dementia when people with dementia remain engaged with physical activity, saying things like the more active the person with dementia is, the better it is for everyone.

Riona McArdle 10:55

So, we know that habitual physical activity is important for health-related outcomes in people with dementia. And we also know that it's something that people who are affected by dementia do consider a priority for research. But what do we actually know about physical activity participation in people with cognitive impairments in both the community and in aged care settings? Well, I first address this in my PhD project, which was called the GaitDem study. And in this study, I recruited 108 people, 26 controls 36 people with Alzheimer's, 30 people with dementia with Lewy bodies and 16 people with Parkinson's



disease dementia. So as looking at differences in dementia subtypes, I asked them all to wear a wearable sensor on their lower back for seven days. And from that sensor, I could look at their physical activity. Now this sensor captures multiple domains of habitual physical activity, including volume, so the time that you spend participating in an activity such as your steps per day or the minutes spent walking per day, pattern of physical activity, which is the distribution of activity over a day or a week, for example, and variability of physical activity, which is the changes in physical activity over time, so how regular or irregular your physical activity might be.

Now, I'm going to explain my key results here using Box plots. So just to explain what these are, the grey boxes are controls, red is Alzheimer's, blue is dementia with Lewy bodies, and green is Parkinson's disease dementia. The line in the middle is the median value and the whiskers are the range of physical activity people carry out. So, I'm just going to show you one variable from each domain I described and then show you what the differences were between the groups. So here we can see steps per day. And we can see that people with dementia with Lewy bodies in Parkinson's disease dementia were taking significantly less steps per day in comparison to our normal age controls. They also had different patterns of physical activity as seen by their shorter walking bout lengths on average. And these differences were also found in comparison to Alzheimer's, or dementia subtypes showed less variability of walking bout length in comparison to controls so these results are showing that people with dementia do have different volumes, patterns and variability compared to normal ageing, and the different physical activity metrics may be affected by the type of dementia a person has got. I also compared the GaitDem dataset to the Staying Upright study which used the same physical activity assessment method but this time in aged care facilities in New Zealand.

So here we can see that community dwellers with cognitive impairment have a lower volume of physical activity compared to controls, but they're still much more active than residents in aged care. Similarly, we can see differences in pattern between all three groups. But interestingly, there was no differences in variability of walking bouts between community dwellers with dementia and aged care residents. So now I've got some idea of what physical activity looks like across the spectrum of cognition and care from my own research. And in both cases, people with cognitive impairments are less physically active with different patterns and variability compared to normal ageing.

But is this what the main body of research is telling us? So, to answer that question, I carried out two systematic reviews, one looking at physical activity and people with mild cognitive impairment or MCI for short, and people with dementia who live in the community and one looking at physical activity and aged care residents. From the results of the community dwellers review, I found a huge range of physical activity volume in different study cohorts. So, there was mean values in one study from 1509 steps a day, all the way up to 13,268 steps per day in a different study. I also looked to physical activity intensity this time so this refers to the rate or the magnitude in which physical activity is performed, basically how strenuous activity is, and I found that people with mild cognitive impairment and dementia mainly participate in low intensity physical activity. Moderate to vigorous physical activity could range between nine to 32 minutes per day across different studies. And overall people with dementia show



lower volumes and intensity of activity compared to normal ageing. But these results were much more inconsistent in the MCI group. So, I couldn't conclude that for sure.

Riona McArdle 15:21

I also found that both people with dementia and MCI showed different daytime patterns of physical activity, and they also show shorter walking bout lengths in comparison to normal ageing. But not many studies actually looked at metrics relating to pattern of physical activity. People with dementia also show significantly different volumes of physical activity across different days. So, they have a lot of variability in their activity, with differences of 17% in average movement time from day one to day seven in one study. Although people with cognitive impairments are less variable and things like bout length compared to normal ageing, they're much more inconsistent in their physical activity over time based on the results from this review. In aged care, we found very low volumes of physical activity across all care levels.

So, from assisted living all the way to nursing homes. And perhaps unsurprisingly, we find that residents spend almost all their time in very low intensity physical activity, with the majority of studies suggesting that people spend much less than 10 minutes in moderate to vigorous physical activity per day. Unlike Community dwellers, residents didn't actually show any particular variation in their physical activity participation. So that means that their day to day life looks very, very similar. So, based on these systematic reviews, I would make some recommendations on assessing physical activity across the spectrum of cognition and care. And I also could highlight some gaps in the research. So firstly, choosing the right tool to assess physical activity. Well, the majority of these studies used accelerometers to collect data. But you must be sure that when you use these methods that they're valid, they use standardized criteria to characterize physical activity. And they also have appropriate technical specifications to capture very low levels of physical activity that might be carried out by people with dementia.

So, for example, you don't want to capture any activity just over 60 seconds, you should be thinking about things like anything over three steps. Beyond technology, a number of self-report measures were identified across these reviews. But you must really consider who's going to answer those questionnaires because they haven't been validated in people with dementia. And they might suffer from recall bias. So perhaps carers or aged care staff might be more appropriate as interviewees in that case. Secondly, what is the right physical activity outcome? Well, there's a huge range of different physical activity outcomes, and many of these outcomes are only studied in one study. So, I would suggest that measuring Total Physical Activity volume, such as things like step count is a useful primary outcome. But we should also consider secondary outcomes such as pattern and variability metrics as useful endpoints for interventions. So, for example, we might see changes in ambulatory bout length, or in the variation in walking bout lengths that might reflect if someone is incorporating physical activity into their daily routine. Thirdly, I would advise to measure physical activity over a prolonged time period, so that the majority of these studies assessed physical activity for seven days.



And that allows for structural differences that might impact participation, such as being more active on a weekend in comparison to a weekday,

Finally, choosing a representative population. So, this hasn't been done that well in the literature so far. In my review, based on community dwellers with cognitive impairment, only three studies actually reported ethnicity of people with dementia, with over 85% of participants reported as white in those studies. In the review on aged care, eight out of 30 studies excluded people with cognitive impairment, with only five studies actually reporting specific measures of physical activity in people with cognitive impairment, even though people with dementia encompass roughly 65% of people living in aged care facilities. In both reviews, only two studies look specifically at dementia subtypes other than Alzheimer's disease. So that means we have a really limited understanding on how different ethnicities and cultures and levels of cognitive impairment and dementia subtypes might impact physical activity participation. And that makes it very difficult for us to develop interventions or guidelines that are inclusive to everybody.

Riona McArdle 19:47

So, one of the things that really stood out to me across these reviews is the vast range of physical activity. So that report of 1500 steps per day all the way to 13,000 steps per day on Average depending on the study. This made me question what are the facilitators and barriers of physical activity for people with cognitive impairment in the community and in aged care? Well, most of the research in this area focuses on the relationship between disease related features and physical activity. So, things like cognitive impairment or the neuropathology. But the reasons that people do or don't participate in physical activity is very complex and multi layered. So, you can see here this is a representation of the socio ecological model, which is commonly used as a framework to think about what influences physical activity in many different populations. This framework is useful for understanding the dynamic relationship between a person and their environment and the context within which they exist.

Right at the heart of this model is the individual. So, in dementia, a person's physical health, such as the movement problems or fatigue, and their mental health, such as our cognition or the anxiety around activity, are reported as barriers in a systematic review based on qualitative research studies. Similarly, their beliefs around exercise have been cited as either a barrier or facilitator depending on the importance they placed on it and on their understanding of its benefits.

Next is the interpersonal level which focuses on the social environment and support that people have. So, within that same review, carers are cited as a key facilitator or barrier for physical activity participation in people with dementia. They often serve as both transport and emotional support for participation. But high participant burden, a lack of belief in physical activity benefits or concerns over the safety of the care recipient can really limit physical activity for the person with dementia. In my own research in collaboration with the ICICLE GAIT study, I also find significant associations between poor carer self-care and decline in physical activity and people with dementia and people with Parkinson's disease as similarly neurodegenerative conditions so that suggests that the carers mental health and



quality of life can also impact the person with dementia's physical activity levels. These individual and interpersonal experiences are centered in the environment in which a person lives and moves. So, people may be restricted in their movements because they live in busy and complex areas that leads difficulties for them to find their way home. Or they might not have readily available facilities to walk to like a local shop, or they may only want to walk in well-known areas. In aged care facilities, the limited living space and the lack of designated areas for movement can act as barriers for physical activity. While things like dim lighting and lack of seating corridors can prevent people with visual problems navigating the environment safely and stop residents from taking much needed care very much needed rest breaks.

Organizational factors are also part of the socio ecological model. So, a person with dementia's physical activity participation may be dictated by their access to activities that are dementia suitable in their area, their ability to obtain transport to attend those activities outside of the home, and the coordination of clinical services to promote physical activity as a post diagnostic support element. In aged care, funding limitations and staffing constraints make it difficult to promote physical activity due to concerns that staff may have with the person's safety. This may also stop them from prioritize and physical activity, and strict routines within aged care can also interfere here. There can also be a range of functional and cognitive abilities in aged care, and that makes it very difficult to cater to everyone's needs.

Finally, all of these factors are influenced by the policy around physical activity for people with dementia. And at the moment, there isn't very much. So "some is better than none" is the current UK National Physical Activity Guidelines as an example for people with dementia. And that makes it difficult for organisations and healthcare to socially prescribe activity. And in turn, that means that individuals on their social network don't realize how important it might be for people with dementia.

Riona McArdle 24:19

So, based on the research I've spoken about, there is a clear lack of quantitative longitudinal research mapping changes in physical activity and people with dementia in aged care and in the community. Although we know that people with cognitive impairments in community and care are less physically active than normal ageing. We don't know when that change happens, or which physical activity metrics are best to detect clinically meaningful change. We also don't know which socio ecological factors are the best predictors of physical activity loss, or which are the best at supportive physical activity maintenance after diagnosis, nor do we know how physical activity loss may reflect decline to dependence the disability. So, my fellowship is intending to address these gaps with the active dome study, which aims to identify psychosocial characteristics and people with dementia and carers which predict physical activity change over time and dementia, as well as understanding how social support and healthcare utilization impacts physical activity over time and dementia.

I will also examine how decline in physical activity may reflect decline in functional independence in dementia. So, to do this, I am collaborating with the DETERMIND study a large UK based ESRC and



NIHR funded program of research into inequalities and inequities in care and outcomes for people with dementia. I'm going to ask 300 People with dementia to carry out a physical activity assessment a baseline and one year follow up so I can measure the change. And I'm going to use the multitude of psychosocial questionnaires that determined are already employing to answer my research aims. So, this cohort will aim to recruit a large diverse national sample in police of underserved groups such as LGBTQ+ populations and ethnic minorities. And I also then hope to compare my data to the staying operate study, which is again an aged care study looking at physical activity in New Zealand.

Identifying the psychosocial characteristics of physical activity will help me choose key interventional components to support people with dementia to maintain their functional independence through habitual physical activity participation. And following my data analysis, I intend to work with people with dementia and carers and dementia care professionals to co design and interventional design based on the evidence base and theory that I've acquired during the study. And then I hope to pilot that post fellowship. So, a research fellowship is not an island, there is a lot of supervisors and collaborators involved in this study that I would just like to quickly acknowledge, as well as my funders, my participants and the research groups that I work within. I'm happy to take any questions, but you can also contact me on my email or on my Twitter.

Thank you very much.

Mel Farlie 27:13

Thank you so much Riona. fantastic presentation and so much interesting information about both your research and the other research that's been done in this area. And really exciting to see your plan for the research ahead that you have mapped out. We're looking forward to seeing the outcomes of that research. We have had a few questions come in while you've been speaking. And if anyone in the audience has other questions that come to mind now please put them in the Q&A box. So, one of the first questions to come in was a question about remote or tele rehabilitation for people with dementia, whether or not there's any particular specific research about whether or not remote or tele rehabilitation interventions help promote physical activity for this population?

Riona McArdle 28:13

So, I think that's I think it is a really good question. It's not an area I'm very, very familiar with. I've got a say. So, I'm a bit reluctant to give any, any particular answer on that. But I'd be really interested to see, especially around what's coming up during COVID-19, as I know, a lot of exercise programs change to being online. And I know from some researchers, that anecdotally that they've had quite a good response with people with Parkinson's disease, for example, but again, not quite my area of research,

Mel Farlie 28:40

can you talk a little bit about the technology that you will be looking at in your research?

Riona McArdle 28:47



Yeah, so I'm going to be using an Inertial Measurement Unit within my research. So that is an accelerometer mixed with a gyroscope. And it's placed on the lower back and they people find it very acceptable to wear for about seven days attached with like a patch. So that will give me information on the physical activity outcomes I spoke about, but it will also give quite a lot of information on things like the quality of walking, so gait speed, gait variability, and there's kind of new ways of looking at it now where you can look at things like turning behaviour as well. So, we'll be able to look quite nicely at their physical abilities and how that might impact the physical activity also.

Mel Farlie 29:27

And is that going to be community residential aged care or across care settings?

Riona McArdle 29:34

So, my specific study that accident study is based in community and we use the placement into aged care as one of our kind of endpoints for the study to see if there's any kind of predictors for that. And but it will also be hopefully collaborating with the staying abroad study which is in multiple aged care and facilities across New Zealand and is inclusive to Maori and Pacific Islander populations. as well, so I'm hoping to be able to see how my results stack up against that.

Mel Farlie 30:04

Yeah, great. Okay. So, one of the questions going back to the box and whisker plots, where you had the comparison of the healthier, or elder, old adults, the people with dementia, and then there were people in residential aged care, just the query was with people in aged care. Also, people with dementia, or is it the general aged care population?

Riona McArdle 30:31

It was the general aged care population, but there was a high percentage with low Montreal cognitive assessment scores. So, they weren't assessed specifically for dementia, but they were assessed for if their mocha was under 24. I think it is. And there was quite a high percentage of that I don't know the percentage off the top of my head, but it was over 50%.

Mel Farlie 30:53

One question with a couple of votes is of whether or not there's any tools specific for people in residential aged care. So, I'm wondering if that's about tools for monitoring physical activity levels in residential aged care.

Riona McArdle 31:06

Yeah, so again, probably can't name them off the top of my head. But there was definitely a questionnaire for long term care, which is like it did my systematic review, which was published last year and aged research reviews. And there has been pretty good evidence that the digital tools that we use, like the accelerometers are acceptable for people in aged care as well. So that's all cited in that review, with quite high levels of compliance, I would say, there was certain caveats. And so, I think, for



example, the wrist worn accelerometers could have quite a poor uptake with aged care residents who have got moderate or severe stages of dementia, they want to tear them off. And so, there is some caveats around what stage of dementia someone has and how acceptable they find the technology. But again, unfortunately, those limited research are taking moderate to severe people with dementia into these kinds of studies.

Mel Farlie 31:58

Another question that got a few votes in the list states firstly, thanks for your amazing presentation. But also, do you have any ideas about how physical activity interventions can be introduced in the early days posed to dementia diagnosis?

Riona McArdle 32:16

Yeah, so that's, that's what I'm hoping to find definitely after definitely, I guess, and that will be my aim. And I think one of the things that I am seeing from the public patient involvement work that I did, and from kind of sitting in this area now working in this is that those interventions probably need to include both the family members and the person with dementia, rather than acting as a kind of isolated event, because both of those people need to be working in tandem together. And I also think that they probably need to have a psychological component to them as well as a physical component. So, you know, we can do interventions that can really strengthen people's muscles or really get people moving. But we have to make sure that they have the motivation to do that, and that they're mentally in the in the right place to do that. So, I think that's something that's really important and needs to be looked at more, right from the get go, because obviously, a diagnosis of dementia could be very traumatic for some people. And I'm hoping to look at that. That's one of the variables that I'll be looking at in my study.

Mel Farlie 33:17

So, one [question], which is asking about the UK, what happens in the UK? So, after someone receives a diagnosis of dementia in the UK, is there a funding model or pathway for people to access specialist physiotherapist or other type of exercise professional to help them to maintain or increase their physical activity? So, do you have targeted services in the UK?

Riona McArdle 33:43

So, I think there's a couple of variations in that. So, my understanding from, again, my public patient involvement work, and also work from things like the PriDem study, which look at these post diagnostic care models is that it can really vary on the region that you are living in. And so, my PPI contributors really referred to it as a postcode lottery about what services you got. What is important to note, though, is that in the NICE guidelines, which is like our national guidelines for Clinical Excellence for post diagnostic care for dementia, this isn't really an area that's mentioned in it, it's mostly around psychosocial interventions. So, the kind of physical bit isn't mentioned as much. So, I would say that it would vary depending on the type of dementia you've got. If you've got something like dementia with Lewy bodies or Parkinson's disease, dementia, and you're already been seen by movement disorders



clinic, you will you will most likely be referred but it again just completely depends on where you're living in the UK and what services are available in the area.

Mel Farlie 34:45

Another popular question is whether or not you've got any insight as to whether there's a preferred choice of physical activity talk amongst dementia, people with dementia that you've identified.

Riona McArdle 34:57

I think that's a really good question and I haven't got the answer for that necessarily. I think that it depends on people's preferences. The review that I was speaking about there has been often by in 2016.. So, she goes through the, the different kinds of preferences and how that might impact people. And I also know, you know, from speaking to my PPI contributors, again, some people just never did any physical activity in their life, and they're not particularly interested, whereas other people diagnosed it and still wanted to maintain walking and walking groups and things like that as well. So, I think it depends on a person's personal preferences as well, one size doesn't fit all for dementia.

Mel Farlie 35:41

We've got a few questions left, we probably don't have time to answer them all. So, I'll just scan down for a couple more. And we can maybe provide some answers to the other questions offline, just in the interests of time. But one of the questions, which probably relates to your research methodology, is whether or not there's an in sort of some element of subjective bias that might come into the monitoring of those physical activity levels. Is there any way that the research monitoring might not be a true measure of their physical activity levels? I guess, is another way to put that question.

Riona McArdle 36:25

I guess that's a I guess, that's quite a tough question. I think the kind of aim of youth in the digital technology is to make it as objective as possible. So, the kind of method that we use, for example, takes everything over three steps. And the reason for that is that we spend most of our walking in under 10 seconds of physical activity. And that's particularly the case for people with cognitive impairment. So, we do try to capture everything. Obviously, the algorithms are always being refined, and you know, better validated. And at the moment, there is a huge validation trial going on to make sure that the measures that we are detecting are, are exactly off the gold standard. And so, I guess, in that sense, we are still working on it. And it's a work in progress. But I think that it actually limits the subject of bias, as opposed to introduces new subjects of bias.

Mel Farlie 37:17

As a final question, there was a bit of interest in that point that you made about the mental health and wellbeing of the carer having an impact on the physical activity levels for the person with dementia. Are you investigating? Or are you aware of anybody investigating interventions for the carers of people with dementia to have an impact on physical activity?



Riona McArdle 37:44

So, the from my understanding of it, but I could be I could be wrong. In theory, I think that there are interventions that are looking at carers, but it's more specific to getting the carer to be more physically active themselves as opposed to interventions, there is a lot of interventions for carers on other things, though, so psychosocial interventions, just to support the carer and in the role of the carer and those things may have like a really positive impact on physical activity. But I don't know if that's a primary outcome of those particular studies.

Mel Farlie 38:17

There is a query about having your contact details. So, for the people that are checking out the screen in the zoom window is Riona's email address which is the email that you can contact in the future.

Mel Farlie 38:39

So, I think we'll draw our session to a close. David's posted the evaluation survey link in the chat. Thank you very much. So, we would really love your feedback on tonight's webinar.

Mel Farlie 38:54

On behalf of the IPTOP community, I want to thank you so much Riona, for sharing your time and your expertise and your knowledge on this really important topic. And we hope that it's given our worldwide audience and some ideas about how to promote physical activity for people with dementia into the future. So, thank you very much, and we'll sign off there. Thank you