Dimensions of the diet-exercise relationship in later life: A qualitative study

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Abstract

Objective: Diet and physical activity are two lifestyle behaviours that are critical for healthy ageing. The aim of this study was to explore how older adults negotiate dietary and physical activity decisions to identify areas of intersection between these two behaviours and inform health promotion interventions targeting both diet and exercise.

Methods: This exploratory study utilised a novel data collection approach that involved lay interviewers recruiting their peers to (i) participate in two interviews over a period of six months and (ii) make notes on their thoughts relating to diet and physical activity. Participants were 75 adults aged 60+ years in Western Australia (n = 64 females).

Results: Three primary themes were identified: (i) the importance but difficulty of achieving energy balance; (ii) issues relating to managing food intake before, during, and after physical activity; and (iii) reciprocal opportunities for eating and physical activity.

Conclusions: Diet and physical activity are linked in complex ways, highlighting the need for multi-factorial interventions.

Implications for public health: When developing communications strategies designed to encourage older people to both improve their diets and increase their physical activity, consideration could be given to leveraging existing perceived alignments between healthy eating and being active.

Keywords: diet, physical activity, older people, qualitative

Introduction

Two key behaviours that influence individuals' ability to experience healthy ageing are dietary intake and physical activity.[1] For example, heart disease is a major contributor to disease burden among older people,[2] and important risk factors for cardiovascular disease are poor diet and inadequate physical activity.[3] Similarly, the prevalence of excess weight, particularly abdominal obesity, generally increases across the lifespan.[4] Diet and physical activity are key determinants of weight status, which in turn is associated with numerous adverse health conditions, including type 2 diabetes, cardiovascular disease, musculoskeletal disorders, and some cancers.[5] Diet and physical activity are also both associated with mental health in later life.[1] Despite the importance of diet and physical activity, many older Australians fail to meet relevant guidelines. For example, fewer than one in ten consume the recommended daily intakes of fruit (2 serves) and vegetables (5 serves)[6] and around half achieve the minimum of 30 minutes of moderate to vigourous activity at least five days per week.[7]

The process of ageing often requires individuals to modify their lifestyle behaviours to adapt to changing health needs.[1] In terms of diet, changes in the way the gut processes food in later life can result in impaired nutrient absorption, resulting in a greater need to focus on nutrient density to meet dietary requirements.[1] In terms of exercise, age-related decline can adversely impact mobility and therefore the types and levels of physical activity in which older people can engage,[8] as reflected in physical activity recommendations for this group.[9]

In the context of rapid population ageing globally,[10] it is important to develop and implement prevention interventions focussing on encourageing older people to have healthy lifestyles that include recommended levels of nutrition and physical activity.[1,9,11,12] Previous research focussing on other age groups has demonstrated that these

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behaviours are interlinked cognitively and behaviourally.[13–16] However, a limiting factor in the development of interventions including both diet and physical activity is that research to date across age groups has typically focused on one of these behaviours in isolation, and little is known about the way these two types of health-related behaviours intersect for the purposes of combined messaging. Such intersection could involve trade-offs between the two types of behaviours and/or benefits obtained from joint enactment. Understanding intersection processes and the implications for intervention preferences is necessary to ensure any efforts are considered acceptable and realistic to optimise adherence, and this may be especially the case for older people who can be more likely to hold health beliefs that are unsupportive of recommended behaviours.[17]

To assist in addressing knowledge deficits relating to intersections in how older people do or do not achieve a healthy diet and incorporate adequate physical activity into their lives, the aim of the present study was to explore how older Australian adults negotiate diet and exercise decisions and to identify areas of interaction. These insights can assist health practitioners and intervention developers in implementing strategies that leverage favourable intersections and address tensions arising from unfavourable intersections.

Methods

Data were collected from 60+ year olds residing in their own homes (i.e., independent living) in Western Australia. A novel data collection method, known as the sensitisation approach,[18] was adopted. This involved lay interviewers interviewing members of their peer groups twice over a six-month period. This level of involvement of the study participants is aligned with calls for greater partnering with community members in health-related research.[19] As per the way the sensitisation approach has been used in other health domains such as child obesity and youth alcohol consumption,[18,20] the multiple engagement process was designed to provide deeper insights resulting from the greater contemplation time available to the study participants.

Initially, eight lay interviewers were recruited through multiple strategies, including community newspaper and radio advertisements and flyers located in areas frequented by older people. They then accessed their extended social networks to recruit other independently living older adults aged 60+ years. These networks included individuals identified through friends and acquaintances and then outwards via word-of-mouth. The resulting total sample (n = 75) was sourced from across metropolitan and regional areas. The recruitment of the lay interviewers occurred incrementally over a period of nine months, which, in combination with the repeat contact methods, served to minimise seasonality effects.

To assist them in their roles, the lay interviewers received the following: a broad interview guide that featured a list of discussion topics (e.g., usual diet, usual exercise behaviours, favourite foods); a one-to-one training session on interview techniques with accompanying written guidance; and a set of notebooks for interviewees to document any thoughts about diet and physical activity they had over the time period between the two interviews (the discussion topic list and training notes are included in the Supplementary Materials). The same set of topics was discussed in both the first and second interviews, with the elapsed time providing an opportunity for participants to reflect more deeply on the topics and facilitating discussions about seasonal differences in diet and exercise. The lay interviewers were encouraged to take an inductive approach that involved asking open-ended questions wherever possible, prompting participants to expand on comments to probe for more detailed information where relevant, and following up in the second round of interviews on comments made by individual interviewees in the first round. This process was modelled by a member of the research team interviewing the lay interviewers at both time points using the provided interview guides, and copies of the interview audio files were left behind as an additional resource. These demonstration interviews formed part of the final data set for the study.

The lay interviewers and all other members of the sample were given a study information letter and a consent form that was completed prior to interview commencement. To record the interviews, the lay interviewers were provided with a smart phone, which they were able to retain at the conclusion of the study (value of approximately $AU80). All interviewees, including the lay interviewers, received $AU100 for participating in the two interviews and providing notes about their thoughts on diet and physical activity.

The average interview length across the first and second rounds of interviews was 34 minutes (range 12-82 minutes). The audio recordings were transcribed by an ISO-accredited transcription service (Pacific Transcription). The transcriptions of the audio recordings and handwritten notes from the interviewees were imported into NVivo (Version 12, QSR International) for coding and analysis. An inductive coding process was employed that focused on topics observed in the data rather than attempting to apply pre-existing theories or frameworks.[21] This involved commencing with codes reflecting the contents of the interview guide and progressively building the coding hierarchy through the addition of codes representing new concepts emerging from the interview data. For example, a 'parent' code called 'physical activity' was initially created, with sub-codes 'shopping as exercise' and 'weather' included in the coding hierarchy as they arose. NVivo's text and matrix search functions were used to explore the large data set to facilitate thematic analysis. As per Glaser and Strauss' recommended approach, themes were identified through a process of line-by-line, selective, and open coding and the use of the constant comparative method (e.g., comparing emerging concepts within and between transcripts).[21] The use of an inductive process necessitated a single coder, which is an appropriate technique for exploratory analyses.[22] The present study reports the subset of findings relating to interviewees' discussions about the complex relationship between food and exercise in later life.

Results

Due to the convenience sampling approach, most interviewees were female (n = 64), and the average age was 74 years (range 60-101 years). Reflecting the independent living status of the study interviewees, most described themselves as being in fair to good health. Among the 71 interviewees who reported their living situation, 34 lived alone and 33 had a spouse/partner. A further two lived with both spouse/partner and child, one with a child, and one with a grandchild.

The study participants discussed at length the roles of diet and physical activity in their lives, both in their interviews and their handwritten notes. There was an acknowledged virtuous circle whereby having a healthy diet and engaging in regular physical activity could enhance overall well-being, which in turn was conducive to continuing healthy lifestyle behaviours. Diet was typically perceived to be the dominant lifestyle factor contributing to healthy ageing, with physical activity also important but typically a secondary consideration. While knowledge of current diet and physical activity guidelines was not explicitly asked, some interviewees spontaneously cited nutrition recommendations (e.g., eating two serves of fruit and five serves of vegetables per day), but this was not the case for physical activity guidelines.

> Obviously, the surest path to good health is sticking to fresh produce, so the daily five vegetables, two fruits slogan is the way to go, and "everything in moderation", plus exercise (Female (F), 78 (years), notes).

The dominance of diet as a primary perceived determinant of health seemed to stem at least partly from the belief that exercise was made difficult by a suboptimal diet. By comparison, there did not appear to be a view that inadequate physical activity would prevent the intake of a healthy diet.

> When I am eating well, I feel invigorated, motivated, I exercise, and have a positive outlook most days. When I am not eating well, I feel tired and just want to sleep all the time; I have no motivation; wild horses couldn't make me go for a walk or pop out in the garden; and I feel quite depressed and anxious (F, 61, notes).

Three multi-dimensional themes were derived from the interview data (depicted in Table 1): (i) achieving energy balance; (ii) managing dietary intake before, during, and after physical activity; and (iii) reciprocal opportunities for eating and physical activity.

Theme 1: Achieving energy balance

Overall, there appeared to be a clear understanding that balancing energy inputs and outputs is critical to achieving a healthy weight and, therefore, to optimising general health. For many participants, reaching an appropriate balance between the intake of energy through diet and the expending of energy through intentional physical activity was considered difficult and something they were yet to master. For some, excess food intake was deemed to be the primary issue behind their weight management difficulties.

> Portion sizes are obviously a major factor in relation to you burning them up with your exercise. That's why we're on Lite n' Easy (Male (M), 65 years, Time 1 interview (T1)).

> I probably don't exercise enough. I think that helps, but it doesn't help as much as the diet (F, 71, T1).

Interviewees often mentioned that the eating habits they had developed earlier in their lives were no longer fit for purpose in later life due to changes in technology and modern lifestyles. This disjuncture appeared to relate to the changing nature of the relationship between diet and physical activity over the course of their lives.

> I probably have always erred on the side of too much food and I think that that was from my family of origin. My mother always served big meals. Of course, in those days, we walked to school, and we walked to the shops every day to get things to bring home because we didn't have a fridge until quite late in the piece. We also used bicycles. So looking at the photos of me and my brothers when we were living at home, we were all fairly thin. But, of course, the world has moved on since then. I think it becomes a bit of a challenge to adjust your ideas when you're catering (F, 75, T1).

For some, inadequate physical activity was considered the main reason for their difficulties in achieving energy balance.

> I don't feel that I eat a lot of junk food. Maybe my problem is that I don't exercise enough, which I have a problem with. Yeah, it's hard. Easy to put on, really, really hard to take off (F, 68, T2).

> I probably don't eat any more, but I definitely exercise less. Even though you're running around all the time, it's a different sort of exercise. I used to play sports every day. I don't play sports anymore. I garden, I do stretch exercises, I ride a bike, and I walk. It's nowhere near the same as playing sports every day. It just isn't enough. So I think my input/output balance is incorrect. It needs a lot more output (F, 72, T1).

The reasons provided for inadequate physical activity were numerous and compounding. One set of nominated factors related to the process of ageing and associated health and mobility constraints.

> I got older, and I'm not as active. And that's causing me a lot of anguish because I can't do all the things I wanted to do. But I think that's generally the case when you're ageing. At the moment, it's very, very frustrating because I can't walk the distances I want to walk. So that's why I'm trying to cut down on all the meals and trying to do the right thing there, but it's hard, hard to balance (F, 78, T2).

> My waistline's probably gained an inch or two just recently because of my inactivity, which I have to be very careful of now because I'm not as mobile as I was. I don't feel I overeat, so there's not much more I can cut back on to maintain my weight if I can't be physically fit and active. So, that's a challenge for me (F, 62, T2).

Table 1: Food-exercise relationship themes derived from the interview data.

Theme	Dimensions
1. Achieving energy balance through a healthy diet and appropriate levels of physical activity	• Food versus exercise focus in aiming for energy balance • Thwarted by illness/injury and weather • Lifestyle versus ad hoc strategies
2. Organising food intake around exercising to optimise experiences	• Perceiving food as either fuel or load in the context of physical activity • Fitting eating and exercise into one's life schedule
3. Reciprocal opportunities: combining activities relating to diet and physical activity	• Food procurement as a walking opportunity • Physical activity sessions with food sharing • Shopping for unhealthy food after exercise due to proximity

Mentioned reasons for inadequate physical activity related to changes in routines that were attributed to ceasing formal sport participation or withdrawing from the workplace and losing the associated incidental activity.

> I would say I've added probably 10 kilogrammes in the last 20 years. It went up when I stopped playing competitive sports (F, 75, T1).

> When I worked, I used to do a lot of walking, used to do a lot more walking around because you have to walk from the station to the office, walk to go and get your lunch. Whereas now, if I don't go out and go for a walk, I think you know I could just sit here all day and not do anything (M, 60, T2).

Finally, seasonal changes and inclement weather were other factors nominated as frequently interfering with intentions to engage in regular physical activity.

> I've stopped swimming in the morning because it's too cold and too rough. My exercise is slowing down, so probably that's why I've taken more weight on (F, 65, T2).

Efforts to achieve energy balance involved compensatory actions relating to either diet, physical activity, or both. Such efforts were typically characterised as either (i) a lifestyle habit that was consistently applied across contexts to achieve a generalised effect or (ii) a strategy implemented for specific situations where the aim was to achieve energy balance within a limited timeframe, sometimes isolated to a specific event or situation. Lifestyle habits involved making a conscious decision to build a healthy diet and/or regular exercise into their schedules.

> That's why I go walking so often, because I can eat more (F, 68, T1).

By comparison, ad hoc efforts involved situations that ranged from individual events lasting hours to holiday travel lasting weeks.

> Every Friday night (*at dancing*), we have a cake night … we said, "We're going to dance it off; let's eat!" (F, 82, T1).

> I'm going on a trip to Europe next week for three weeks and really want to enjoy some different types of food without putting on too much weight. So I will have to maintain the walking and keep moving. Hopefully I won't come back much heavier (F, 71, notes).

Theme 2: Organising food intake around exercising

Separate from considerations of energy balance were concerns about the role of food as a form of fuel to sustain physical activity and/or a load that makes exercise uncomfortable. When discussing food as fuel to be consumed before or during exercise, the interviewees often nominated types of foods and beverages that were perceived to be appropriate for particular types of activity.

> I might have a glass of fruit juice, especially if I'm outside working. I find that it makes a nice snack if you're gardening and you get tired. Rather than just having a glass of water, I have a glass of fruit juice, which gives you a bit of sugar intake. It keeps up your energy levels (F, 64, T1).

> On Friday, I had porridge and a piece of toast. I need a bit more energy for dance class (F, 67, notes).

> If I've gone exercising in the morning, I will probably have a protein shake with some fruit in it and mix that up (M, 68, T1).

When food was discussed in terms of a load to be managed, there was similar variation in terms of whether solid or liquid items were considered most suitable.

> If I'm going to the gym, which is three mornings a week, I'll whizz up half an apple, a banana, a pear, maybe some celery or carrot, and a spoonful of yoghurt, and some psyllium, some bran, and that will be my breakfast... If I'm not going to the gym, I'll generally have muesli with some yoghurt (M, age data unavailable, T1).

> Because I go to yoga tonight, it's not a good idea to eat a lot of vegetables. Because if you get into a lot of exercises, it's better off just to eat something that's not going to move... Monday night, going to yoga is like a steak sandwich because it just sits and gives you enough energy (F, 72, T1).

A further aspect of this theme was the scheduling of eating and exercise around each other. Without the routine of work or childcare, some of the interviewees had established regular behavioural patterns around the relative timing of their snacks/meals and physical activity sessions.

> I normally eat my fruit when I come back from my swim, about the middle of the morning. I get up at half past four and go walking, and then I come back and do my watering and all that stuff, and a few domestics. Then I go swimming at eight, but I have breakfast before that (F, 72, T1).

Theme 3: Reciprocal opportunities

Interviewees described several ways in which eating and exercising interact in their lives to form opportunities for one behaviour to facilitate the other. For those with lower levels of activity, food shopping was valued as a means of accruing more steps in their days, and some intentionally shopped more frequently to access the exercise opportunity.

> I shop little and often, because if you buy enough for a week, you end up throwing half of it out, so I go often to the shops to buy what I need. Again, for the excuse of walking too, which is good for me (F, 81, T1).

> I actually go shopping every day, or at least most days, but not over the weekend; most weekdays because I like the walk (F, 86, T1).

A second opportunity was where food sharing occurred at the end of physical activity sessions as a means of enhancing the social aspects of exercise. This was most often mentioned in the context of dancing classes.

> They bring some really nice stuff to the dance, which is all very fattening, but we all love it (F, 82, T2).

> Had a party at dancing today, so I indulged in some noodles, a custard tart, cake, and slices (F, 67, notes).

The third intersection type was shopping for unhealthy food when returning from exercise. This was described as occurring either due to the time constraints involved with incorporating exercise into the day or because of the opportunity associated with being in locations where both exercise facilities and food stores are present.

> The only time we ever have fast food is if I decide I'll go watch my *husband* play hockey and it's a late game, which means we don't get home until about 6:30 at night (F, 72, T1).

My only real indulgence would be (*brand name*) beef and mushroom pie. I love that, so after I've been to Prime Movers (*a type of exercise class for older adults*), sometimes I go and buy four pies and put them in the freezer, and sometimes I'll have a pie (F, 69, T1).

Discussion

By far the strongest theme in interviewees' accounts of their diet and exercise behaviours was an ongoing attempt to achieve energy balance–sometimes described as successful but more often not. This focus on achieving energy balance is aligned with the demonstrated inverse relationship between positive energy balance (i.e., excessive energy intake compared to energy expenditure) and successful ageing.[23] It is therefore favourable that most of the sample members were aware of and motivated to work towards energy balance. However, the present findings, along with obesity prevalence data[24], suggest many are likely to require greater assistance than they are currently receiving to be successful in this endeavour.

A major barrier to achieving energy balance seemed to be the opposing views on food intake versus physical activity. Eating was perceived to be an enjoyable part of life that was constantly required to be curtailed to limit energy intake, while physical activity was more likely to be perceived to be an obligation that should be undertaken in greater quantities than considered desirable or feasible. This finding is consistent with previous US research conducted with younger populations that has identified food to be more likely to be perceived in favourable terms (e.g., a reward) while exercise is more likely to be viewed negatively (e.g., as a chore or penalty).[15,25] This has been attributed to the shorter-term sensory benefits experienced through food consumption compared to the longer-term health benefits of physical activity.[26] This phenomenon also relates to the concept of time discounting, whereby people disproportionately value immediate (e.g., sensory benefits of food) compared to delayed (e.g., health and fitness) outcomes.[27]

The results of the present study highlight a range of potentially useful strategies to encourage and facilitate lifestyles characterised by both a healthy diet and regular physical activity. The suggestions described below relate to possible communication approaches that could be adopted, ranging from the provision of information about associated benefits, particularly those that occur in the immediate to mid-term, to specific practices that could assist with successfully incorporating a healthy diet and exercise behaviours into everyday life.

First, the interview data suggest there is the potential to inform older people about the many benefits other than weight management that can accrue from a healthy diet and active lifestyle (e.g., the diabetes prevention value of muscle mass due to the effects on insulin response and the mental health benefits of hormones released during exercise[28,29]). Although physical health and fitness remain strong motivators for older Australians to participate in physical activity, more immediate benefits such as fun and enjoyment, social connection, being in nature, and mental health are increasingly being cited as motivating factors and hence could be incorporated into social marketing campaigns implemented by governments or other health agencies.[30] Similarly, highlighting the sensory appeal of nutritious foods is another potential avenue to change intake patterns within the existing frame of food as a reward.[31] A greater appreciation of these benefits may go some way towards motivating lifestyle changes.

Second, the numerous mentions of needing to cut back on food intake suggest a focus on the quantity rather than the quality of foods consumed. Selecting foods that are high in nutrient density but low in energy density could assist in ensuring appropriate nutrition is obtained while preventing feelings of deprivation by enabling the volume of food intake to remain stable.[32,33] Similarly, the desire for 'special' foods for social gatherings could be accommodated with information about healthier options of 'treat' foods.[34] This information could be provided by various means, including consultations with nutrition-qualified health practitioners.

Third, the popularity of walking as a preferred form of physical activity and the associated constraints of inclement weather highlight the need for readily available indoor alternatives. Mall walking is becoming increasingly available in Australia and may therefore constitute an acceptable option for some older people, especially those who reported already relying on shopping for their weekly exercise. The delivery by governments and health agencies of community-based exercise programmes targeting older adults presents another promising alternative, with some interviewees citing regular participation in these types of programmes (e.g., Prime Movers). Finally, older people with limitations resulting from injuries and chronic illnesses could benefit from specific guidance from their health practitioners about available modes of activity that are appropriate for their abilities.[9]

Finally, there may be the opportunity to use a testimonial-style approach whereby older spokespersons outline how they successfully integrate healthy eating and physical activity into their daily schedule, along with the benefits they experience. Older adults are substantially under-represented in the media, and there is a recognised need for increased messaging showing members of this age group modelling healthy lifestyle behaviours.[35] By demonstrating how daily schedules can be arranged in later life to accommodate healthy food preparation/consumption and physical activity, this approach could take advantage of the social learning benefits of observing someone similar to themselves engaging in an aspirational behaviour.[36] Part of this process could be depicting older people engaging in various forms of activity that they are clearly enjoying.[35] An added benefit of this approach is that if people consider physical activity to be enjoyable, they are less likely to indulge in unhealthy foods after participating as a form of self-licence.[25]

Study strengths and limitations

This study is among the few to explore the intersection between the lived experience of dietary and physical activity behaviours,[16] especially in the context of later life.[37] By involving older people as participants and data collectors in this study, detailed insights were obtained into the everyday lives of older Australians and how they negotiate the dual demands of healthy eating and physical activity. A sizeable qualitative sample was accessed that involved multiple interactions with each participant, potentially identifying a broader and more interconnected range of influencing factors than would otherwise have emerged. The primary limitations were the use of an exploratory approach and the confinement of data collection to one state within one country (Western Australia), both of which serve to preclude assumptions of generalisability. In addition, the use of lay interviewers who recruited participants from their peer networks meant limited demographic data were captured and various forms

of bias could have been introduced, such as selection and social desirability bias. Future research is needed in other geographical contexts to assess the extent to which the findings may be relevant elsewhere. In addition, other sampling methods could be used to access a broader range of study participants, including those residing in care facilities.

Conclusion

The findings of the present study indicate the importance of highlighting the benefits of healthy lifestyles in later life, which include a nutritious diet and regular physical activity. When developing communications strategies, consideration should be given to leveraging existing perceived alignments between healthy eating and being active and contextualising information to the interests and needs of older people.

Ethics

Ethics approval was obtained from the University Human Research Ethics Committee.

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Data availability

Due to the qualitative nature of the data and the type of institutional ethics clearance obtained, the data cannot be shared. The authors had full access to the data set.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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Appendix A Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.anzjph.2023.100090.