Inspired Villages

Health MOT Implementation within retirement villages: 2019 Pilot

UK active RESEARCH INSTITUTE

Inspired Villages

Tom Lord, COO, Inspired Villages

At Inspired Villages, we believe that later life can, and should, be the best years of your life. Holistic wellbeing sits at the core of this belief, which includes a focus on the physical, mental, and social wellbeing of the residents that live in our villages.

It became clear that if we truly believed in improving the wellbeing of our residents we would need to implement a measurement methodology that was robust and helped identify areas of focus for our activities programme and to help our residents to identify areas of focus for their own wellbeing.

To this end we engaged the ukactive Research Institute, as experts in the field, to develop an index that could measure the overall wellbeing of our residents. Having the ukactive Research Institute develop this measure ensured an independent overview, as well as allowing us to work with a great team of researchers to develop processes and procedures, ensuring significance in the methods implemented.

We also piloted this MOT process alongside a focus on increasing activities within the village, in order to understand the difference that could be made to individuals health and wellbeing. Overall we have been very pleased with the improvements that we have seen over the first six months of measurement.

Huw Edwards, CEO, ukactive

It is needless to say that with our fast ageing population comes a great pressure of health complications and associated cost of social care. We know now that the problems we often hear about – dementia, frailty, non-communicable disease - are not inevitable with old age and can be reduced, slowed or even prevented through a focus on health and wellbeing. One of our key priorities at ukactive is re-imagining ageing: put simply to re-imagine the way we age that best supports our physical, mental, and social wellbeing.

Part of this is the continued development of an evidence-base that supports the benefits that physical activity can have for older adults, which we know has a positive impact upon wider mental and social outcomes in addition to physical health. The ability to monitor and assess change in health and wellbeing over time is invaluable to this, providing us, as society, with data to inform decisions on how to best re-imagine ageing.

Equally importantly to consider is the continued re-vitalisation of our built environment. We are starting to explore how we can adapt our cities and living spaces to better support being physically active while we age. Monitoring, evaluation, and research should remain at the heart of understanding, adapting, and bettering these environments and their offerings for an ageing population. This includes ensuring places that we live in later life are designed to provide us with the opportunity to be physically active in a safe and fulfilling way.

There is a real opportunity to combine how we re-imagine ageing, through innovative environmental design, the incorporation of health and wellbeing support through the Wellbeing Navigators at Inspired Villages, and the development of research to advance the said evidence base. This collaboration between ukactive and Inspired Villages has done that and can challenge and change how older people can live for the better.

Executive Summary

The Pilot

Inspired Villages have been providing their residents with the opportunity to take part in a wide range of physical activities. Given the impact regular physical activity can have upon the mental, cognitive, physical, and functional health of older adults, these provisions are aimed to support resident's holistic health and happiness.

This approach was piloted throughout 2019 at one of their retirement villages, Millbrook Village, Exeter, where the role of Wellbeing Navigator was introduced to support residents holistic health and wellbeing.

To explore the association between this and the new programme of activities on residents, a battery of tests, termed a 'Health MOT', was developed by research partners the ukactive Research Institute. Piloted across 2019, the Health MOT consisted of 20 different measures including mental and social health, physical health (e.g. activity and falls), nutritional knowledge, and physiological health (e.g. blood pressure, BMI, flexibility, strength). An overall 'Wellbeing Score' was developed from the pilot data comparing to normative data.

Pilot Results

Presented here are the results from the pilot and Health MOTs, outlining the health and wellbeing residents during the delivery of the activity provision at Millbrook Village. The feasibility of implementing Health MOTs within a retirement village are also discussed.
Health MOT data was collected from 34 residents at baseline, and 29 at a 6-month follow up. The Wellbeing Score results showed a small but positive increase of 5% in overall wellbeing and health for residents from baseline (38%) to 6-months (43%). Key findings include:

- Residents bettered their risk of falls from baseline to 6-months, with 100% of residents at low fall risk at this point. This was the strongest metric of the wellbeing score. There was also an increase in the amount of walking and moderate activities participated in at 6-month, and improvements in grip strength scores, sit and reach flexibility scores, sit to stand mobility scores, and balance scores. Balance was one of the metrics of the wellbeing score that saw the most improvement from baseline to 6-months.
- Nutritional knowledge of residents increased by 3.1% from baseline to 6-months. This was the other metric of the wellbeing score which greatly improved from baseline to 6-months.
- In all areas, residents mental wellbeing improved by 6-months, particularly happiness, which is reflected in this metric of the wellbeing score.
- The proportion of residents assessed at normal cognitive function increased from baseline to 6-months (38.2% to 72.4%), remaining the second strongest metric of the wellbeing score.
- Other improvements over 6-months included improvements in social health, with residents reporting greater social trust and cohesion.
- Although improvements were seen from baseline to 6-months across flexibility and limb function these were a few of lowest metrics of the wellbeing score.
- Fewer residents were classified as low active (-6.8%), as obese (-7.8%), and as having high blood pressure (-11%) at 6-months. However, weight, blood pressure and body fat percentage were some of the lower scoring metrics of the wellbeing score indicating residents could be encouraged to engage in more moderate and vigorous level activities to aid reductions.
- Overwhelmingly positive feedback was provided by the residents about partaking in the MOTs and the new array of activities. Specifically they highlighted the social benefits gained from interacting more with others, and the mental health benefits of partaking in old much loved hobbies and discovering new interests.

Feasibility

The results of the pilot Health MOTs revealed the delivery was well received by residents and manageable for the Wellbeing Navigator. Delivery of the Health MOTs was feasible to measure and the data provided was seen as useful for the Wellbeing Navigator to support the wider health and wellbeing of residents.
This pilot points to the multitude of potential benefits of the new programme introduced by Inspired Villages, and importantly highlights areas for continued development. Recommendations for continued delivery, refinement, and potential scalability of the Health MOT approach are provided.

Introduction

Increasing regular physical activity has a substantial impact on the improvement of health care outcomes[1] including the prevention and management of over 20 chronic conditions[2]. Those who are most disadvantaged within society, such as older adults, are significantly more likely to be physically inactive[3].

Indeed currently, Sport England's Active Lives data suggests that 80% of over 55 year olds are classified as inactive[4]. Physical inactivity places a considerable financial burden on health services due to the treatment of long term conditions and associated acute events, an estimated £1.06 billion[1], as well as the cost of social care[1], which is estimated to cost close to £100 billion per year[5].

Therefore, improving the physical activity participation of older adults is crucial. Given this, the prevalence of physical inactivity amongst older people, and the wider benefits regular physical activity can have, Inspired Villages, providers of retirement villages, have been providing their residents with varied physical activity opportunities including Tai chi, Pilates, aqua aerobics, Zumba and cycling. Within their villages, they have the aim of putting the health and happiness of their residents first, whilst also recognising the importance this could have on wider economic and social factors.

In order to achieve this aim, throughout 2019, a pilot scheme has been operating at Millbrook Village, Exeter, in which a Wellbeing Navigator was appointed to support the health outcomes of residents. The Wellbeing Navigator has been responsible for encouraging residents to engage in new and existing physical and mental activities inside and outside of the village, in addition to organising new physical activity opportunities, and supporting residents with their nutritional choices and mental health.

As part of the role of the Wellness Navigator, the Inspired Villages were interested in understanding the association of the role and activity delivery on resident's health and wellbeing.

Amongst older people, 'Health MOTs' have been developed to promote regular physical activity, initiate health behaviour change discussions through motivational interviewing, and measure strength, flexibility and balance[6].

The initial feasibility of such approaches has been recently tested amongst 29 (out of 43 interested) physically inactive physiotherapy outpatients with musculoskeletal conditions aged 60 years and over[7]. The 'Functional Fitness MOT' was suggested to be feasible within this specific population from both a participants and professional perspective, however the effectiveness is yet to be determined[6].

Although the feasibility was suggested for this theory driven approach, the application of the Functional Fitness MOT was tested amongst a condition and age specific population. Furthermore, the protocol did not collect any data on non-physiological variables that might be combined to provide a more holistic view of a person's health and wellbeing.

With the ambition of measuring the health and wellbeing of Inspired Villages residents, a battery of tests, termed 'Health MOTs', was developed by research partners, the ukactive Research Institute. This report presents pilot results of the association of the activity provision delivered within Millbrook Village, and measurement of health and wellbeing using the Health MOTs. It then discusses the feasibility of implementing Health MOTs within a retirement

Methodology

Population

Residents of Millbrook Village, a retirement village operated by Inspired Villages in Exeter, Devon, were provided the opportunity to receive a Health MOT as part of the health and wellbeing offer provided within the village. Residents of the village were aged 55 and over. All participants were explained the project, had the opportunity to ask questions, and provided consent. Those who did not want to take part in the Health MOTs were not restricted in their participation in the health and wellbeing offering provided.

Data Collection

The Health MOTs were conducted by a trained Wellbeing Navigator working at Millbrook Village. Training was provided by the ukactive Research Institute in all data collection methods, reporting and data protection. The data collection and Health MOTs formed part of the Wellbeing Navigator role of health promotion.

The Health MOTs consisted of 20 measures collected through questionnaires and physiological tests. A range of measures were included to provide a holistic understanding of health and wellbeing, including physical, mental and social health, physiological abilities and nutritional knowledge.

Questionnaires

Personal Wellbeing

Office of National Statistics (ONS) four Personal Wellbeing validated measures of: life satisfaction, happiness, anxiety and worthwhileness[8].

Social outcomes

Measures of how much resident's feel they can trust others and how much they feel they belong to their community. Adapted from the European Social Survey questions for social wellbeing[9].

Self-efficacy to be physical active

A validated measure of resident's competence and confidence to engage in exercise in the future[10].

Confidence to be active without falling

A measure developed to capture resident's confidence to move and be active without falling, denoting fear of falling.

FROP-Com screen

The Fall Risk for Older People in the Community (FROP-Com) Screen includes 3-questions assessing risk of falls[11].

IPAQ-SF

The International physical activity questionnaire – short form (IPAQ-SF) is an international measure for physical activity, measuring vigorous and moderate activity, walking and sitting[12].

Loneliness

A single item measure adapted from the Center for Epidemiologic Studies Depression Scale (CES-D), and recommended for use by the Campaign to End Loneliness[13].

MOCA

The Montreal Cognitive assessment (MOCA) is a screening assessment for detecting cognitive impairment, assessing cognitive abilities like memory recall, visuospatial abilities, executive functioning and concentration [14].

GNKQ

The general nutrition knowledge questionnaire (GNKQ) measures nutritional knowledge across food groups, balanced eating and health problems relating to diet. This questionnaire is validated and tested in older adults in residential care[15].

Physiological Tests

Blood Pressure

A measure of the pressure of blood pushing through the blood vessels, and an indicator of risk of cardiovascular strain[16].

Blood Composition

As measure of the amount of fat and fat-free mass in the body and an indicator of health and fitness levels[17].

Falls

A measure of the number of falls that have occurred per resident in the last 30 days.

Hand Grip Strength

A reliable measure of overall strength which is related to and predictive of other health conditions[18].

Y-balance Test

A balance test including anterior, posteromedial and posterolateral movements and a indicator of balance, core stability and leg strength[19].

Chair sit and reach

A measure designed to test the flexibility of the lower body, specifically adapted to a seated position for older adults[20].

Sit to Stand

A measure of leg strength and overall endurance, whereby the resident has to complete as many full stands from a seated position (with no arms) as possible in 30 seconds[21].

Wellbeing Score

To provide a holistic overview of resident's health a 'Wellbeing Score' was developed from the test battery performed. Where representative normative data was available for components of the Health MOT, each outcome measure was transformed to a percentile score (0–100). Thus those with better scores received higher percentile scores and vice versa for each component. A percentile score of 50 for any component means that their score for that test match the population normative mean.

Where population values followed non-monotonic relationships with health outcomes (e.g. blood pressure, where having either too high, or too low, may be undesirable) percentile scores were calculated in either direction around the mean value from representative normative data and using the population standard deviations.

For these outcomes the closer a person's score was to the population mean the higher their percentile score, and the farther from the population mean (whether the score was higher or lower) the lower their percentile score. These transformations were made to ensure all measures where on the same 0–100 scale and then an overall 'Wellbeing Score' was calculated as the mean of these percentile scores.

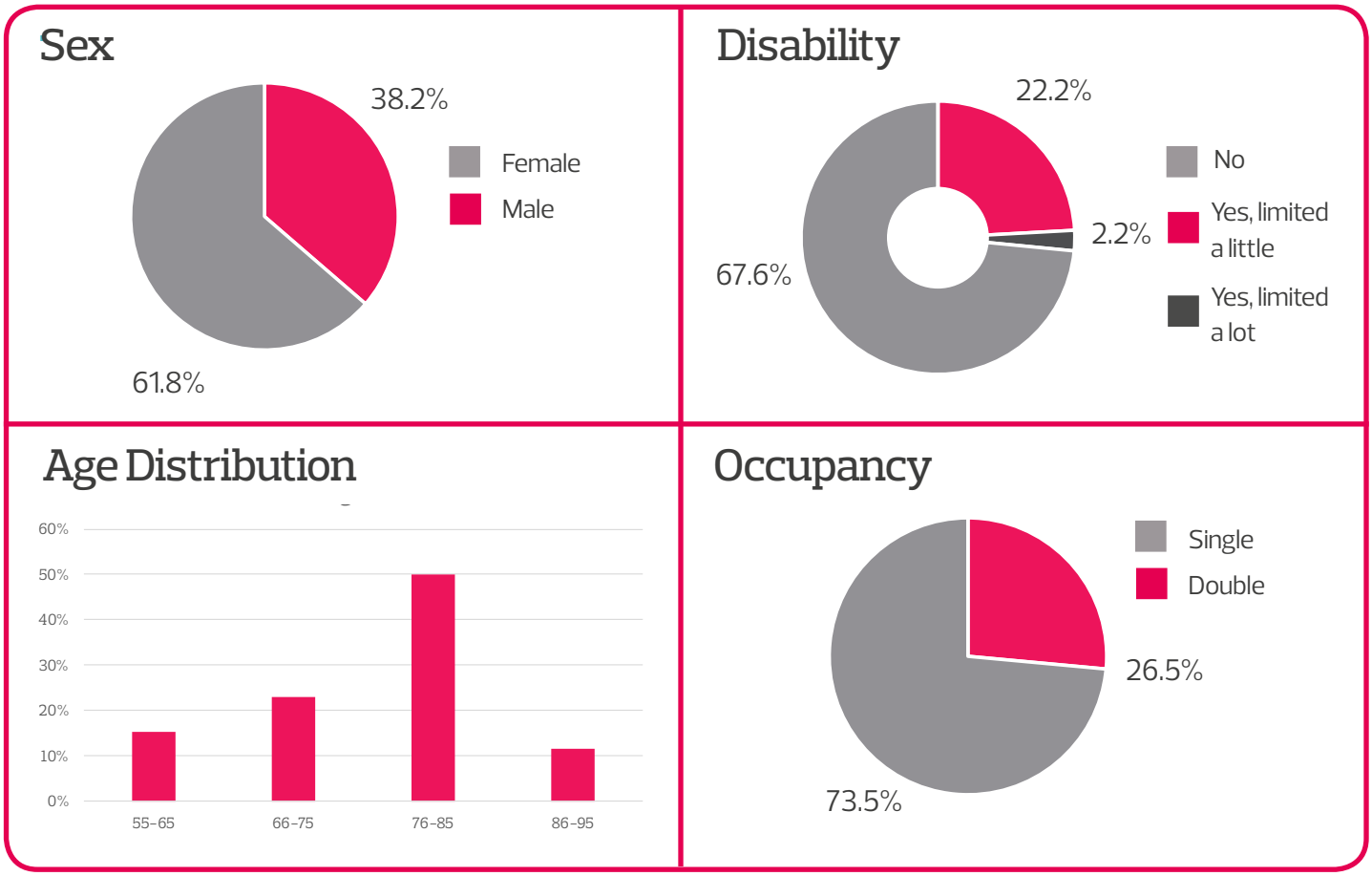
Change after 6-months

Data was collected at two time points; baseline, between January 23rd and April 23rd, and 6-months after this point, between June 23rd and September 23rd. A total of 34 residents were tested at baseline, and 29 at 6-months. Descriptive analysis conducted compares the baseline and 6-month testing groups as independent samples.

Demographics

On average residents were mostly female (61.8%), reported having no disability (67.6%) and where aged between 76 and 85 years (50.1%). Just over a 1/10 of the residents were aged between 86-95 years (11.5%), and 85% were aged 66 or over. A majority of residents were living in double occupancy at the time of data collection (73.5%), indicating that they were likely living with a partner.

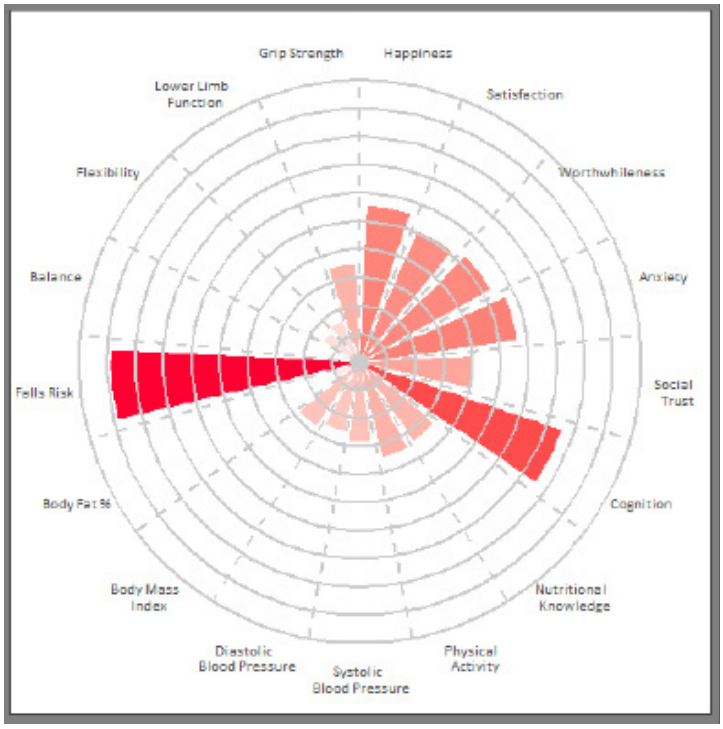
Baseline demographics of residents



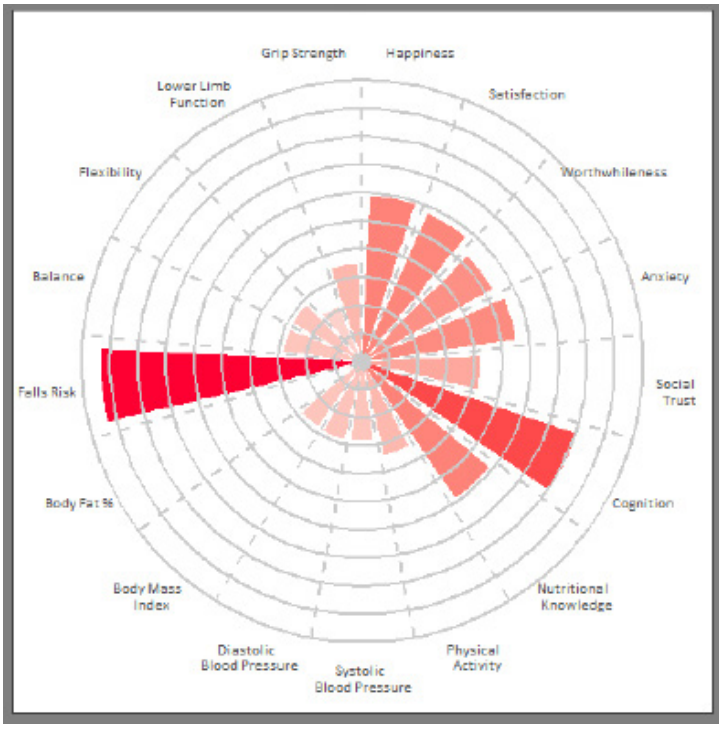
Wellbeing Score

Overall health and wellbeing, as indicated by the composite Wellbeing Score, is shown below for both baseline and 6-month testing. The scores are visually depicted using polar coordinate radar plots so it is possible to see clearly where residents tend to, on average, perform either better or worse than the population normative data. A percentile score of 50 for any component means that resident's scores for that particular component match the population normative mean. A score higher than 50 means they exceed their age matched peers in this area. Each segment radiating out represents the 0-100 percentile score for that component and the overall Wellbeing Score is shown each figure.

Baseline Wellbeing Score: 38%



6-months Wellbeing Score: 43%



Each circle indicates a percentile score of 10 (10%); 50% represents normative scores. Scores closer to the outside of the circle and ones darker in colour indicate the highest and most positive percentiles, including inverse measures of anxiety and fall risk.

The data show a slight increase in the Wellbeing Score for residents from baseline to 6 months (38% to 43%). On average, residents improved from baseline to 6 months across most components. Key findings include:

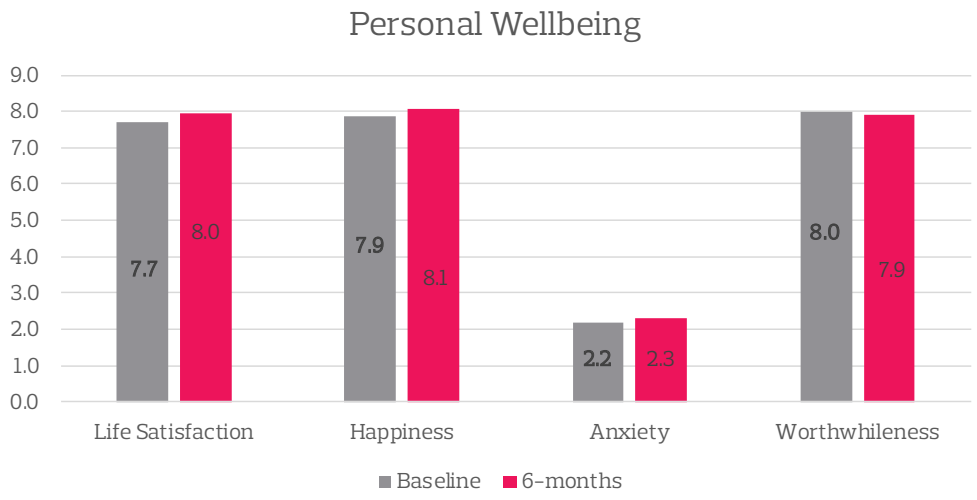
- **Risk of falls** – at both baseline and 6-months fall risk was one of the strongest metrics of the wellbeing score, indicating that fall risk is low.
- **Cognitive function** – this was roughly a 0.5 percentile higher at 6-months than at baseline, and the second strongest metric of the wellbeing score.
- **Nutritional knowledge** – this increased by roughly 2 percentiles from baseline to 6-months, making it one of the metrics that improved the most.
- **Personal wellbeing** – for all areas of personal wellbeing residents improved over 6-months, in particularly happiness and life satisfaction.
- **Balance** – this was one of the lowest scoring metrics, however it made one of the greatest improvements from baseline to 6-months, moving from below the 0.5 percentile to just below the 30th percentile.

The visual depictions above represents an approach that can help target interventions for residents, as supported by the Wellness Navigator, with the ability to easily identify areas of improvement that can be focused on in the future. Certain components of the Health MOT that may require more attention are areas of balance, lower limb function, BMI and blood pressure. Each individual component is explained in more detail.

Personal Wellbeing

Residents reported above average mental wellbeing scores at both baseline and 6-months compared to national data from Exeter and England. This was especially the case for happiness and anxiety, which were the areas of wellbeing that were the greatest for the surveyed residents.

Average personal wellbeing scores of residents and national data



A score of 10 is the highest. Anxiety is negatively scored – a lower score is better

When comparing baseline results to 6-months, all scores improved by 0.1 to 0.3 points, except worthwhileness which decreased by 0.1. It should be noted, however, that these changes are minimal and in general, wellbeing remained high and relatively stable.

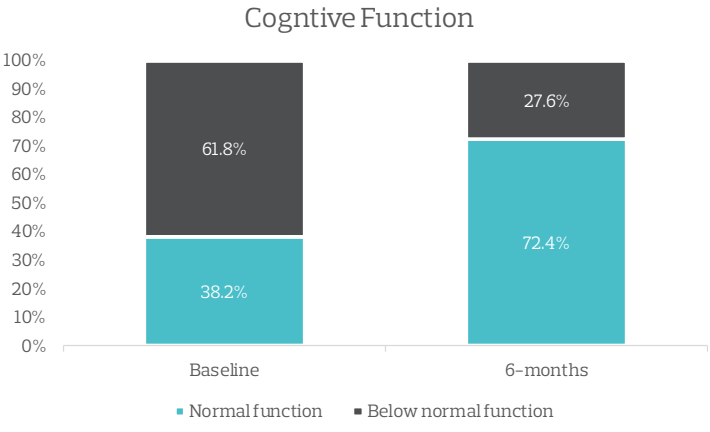
Cognitive Function

A greater proportion of residents scored normal function (≥26/30) in cognitive function at 6-months (72.4%) than at baseline (38.2%), indicating improvements in cognitive function abilities.

Residents were best at scoring correctly on questions around orientation and visuospatial awareness. In particular, they improved in areas of delayed memory recall, on average scoring higher at 6-months compared to baseline. They were also better at paying attention to detail and tasks involving abstraction and identifying similarities.

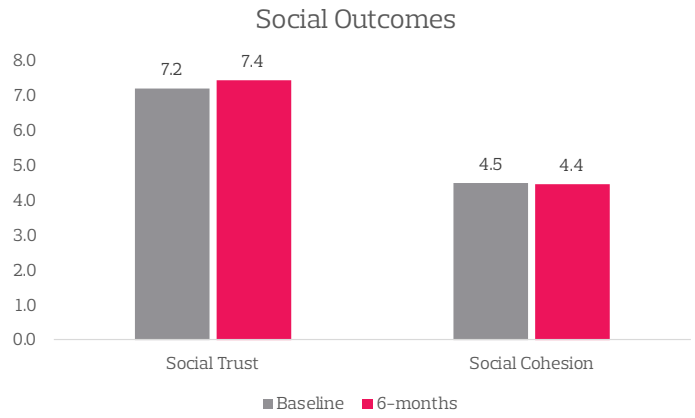
Cognitive function is important for maintaining an independent life style and engaging in daily activities[22], therefore **this positive result indicates residents have the ability to not only maintain but potentially improve their independence over time**. This can be enhanced by continued engagement in physical activities[23] and may be explained by residents being more active.

Average cognitive function scores of residents



Social Cohesion and Trust

Average personal social outcome scores of residents



Social trust is scored out of 10; Social cohesion is scored out of 5.

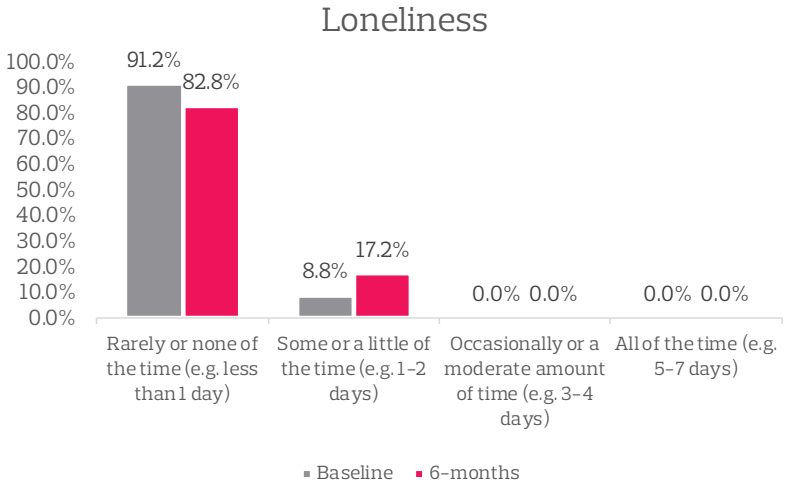
Residents scored highly in social trust, with an average score of 7.2 out of 10, implying that they felt individuals in their community were trustworthy (10 = completely trustworthy). This increased by 0.2 points 6-months later.

Social cohesion was also scored highly, with residents giving an average score of 4.5 out of 5 at baseline, and 4.4 at 6-months. This implies that at both time points **residents felt they very much belonged in their community**.

Loneliness

A majority of residents reported that they felt lonely rarely or none of the time at baseline (91.2%) and at 6-months (82.8%). The proportion decreased over 6-months; more individuals reported being lonely some or a little of the time at 6-months (17.2%) than at baseline (8.8%). However, it should be considered that this represents an increase of two residents. This change may be explained by a multitude of personal factors, not accounted for here; it does not necessarily reflect that residents are less socially engaged, although it is recommended that this should be monitored in case it changes further. No residents reported feeling lonely a moderate amount or all of the time, indicating that overall residents responded positively to this question.

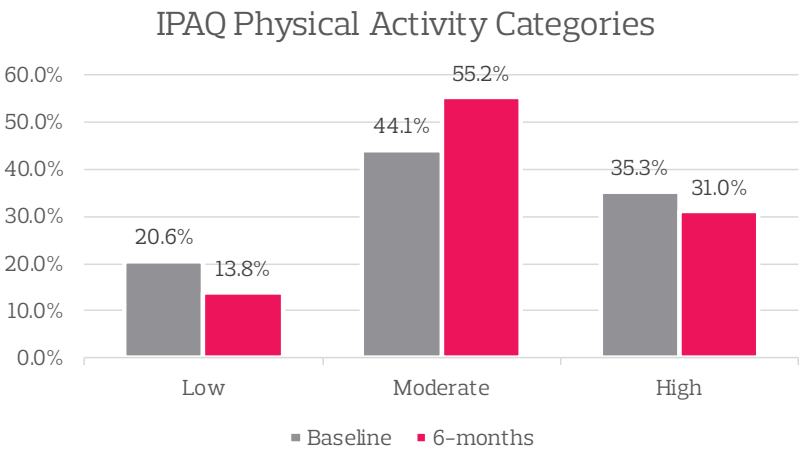
Average loneliness scores of residents



Physical Activity

Physical activity was measured by the IPAQ-SF. Total minutes spent completing vigorous and moderate activity, and walking were used to calculate resident's total Metabolic Equivalent (MET)-minutes and categorise them as being low, moderate or high for physical activity.

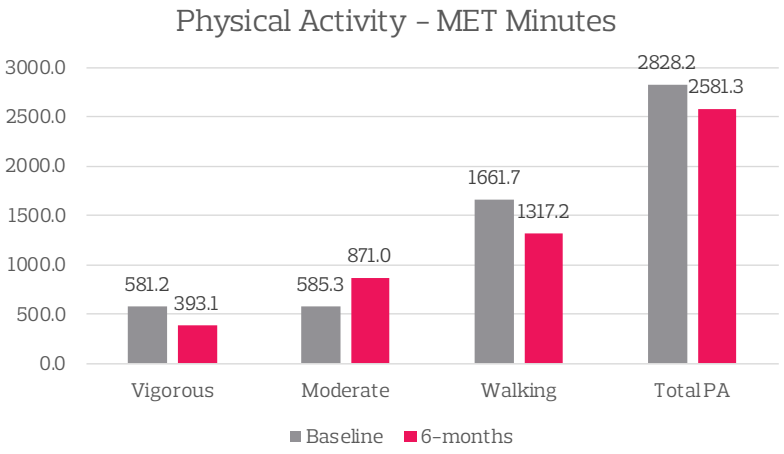
Proportion of residents in each IPAQ physical activity category



At both time points residents were most likely to be categorised as moderately active. At 6-months, both the low and high categories had a lower proportion of residents, suggesting they both moved into the moderately active category. **This indicates that 6.8% became more active, while only 4.3% became less active.**

Analysis of the intensity of physical activity reveals that the **MET-minutes for vigorous and walking reduced at 6-months, whereas moderate intensity increased**. This meant there was an overall reduction in total physical activity, potentially explained by the proportion of highly active residents becoming moderately active.

Amount of each type and intensity of IPAQ activity



Interestingly, at 6-months walking was reported as the type of activity the greatest number of residents took part in (48.0%), followed by swimming and Yoga/Pilates (14.0%) and gardening (10.0%). By comparison, no residents reported taking part in activities considered more vigorous in intensity, such as fast cycling (0.0%), jogging (0.0%) or aerobics (0.0%), also implying that these types of activities do not appeal to this sub-sample or perhaps age range of residents.

However, when compared to other metrics in the wellbeing score, it is clear there is room for improvement in the total number of MET-minutes that residents are achieving at both baseline and 6-months. However, this may be explained by residents not taking part in vigorous level activities because of their preference or age. In order to continue to encourage residents to improve their MET-minutes and maintain the 'high' physical activity category, they can be encouraged to do greater quantities of their moderate level activities, in addition to walking, instead of vigorous activity.

Self-efficacy to move

Self-efficacy to move is a measure of how competent an individual feels in their ability to move regularly over the next month. **Resident's reported high self-efficacy at baseline (8.0/10, where 10 = very sure) which increased at 6-months (8.4). This indicates that over time resident's confidence in their ability to move improved.**

Baseline and 6-month scores for fear self-efficacy and fear of falling

Measure of..	Baseline	6-months
Self-efficacy	8.0	8.4
Fear of Falling	8.4	7.7

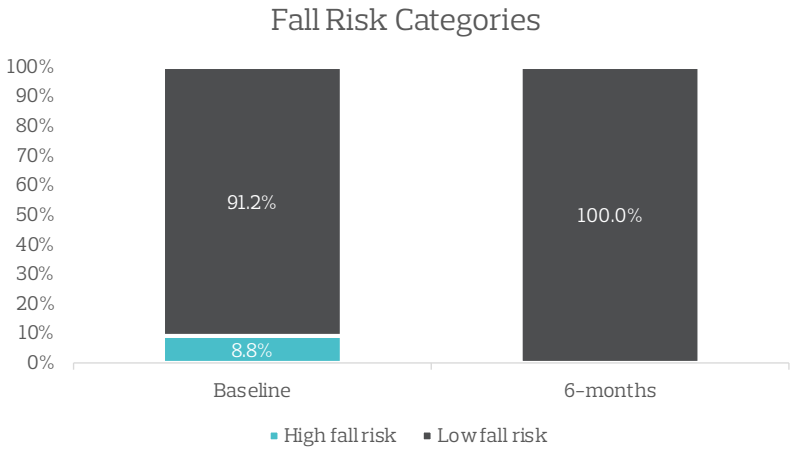
Fear of Falling when moving

Confidence to move around and take part in general activities without falling at baseline was high, with resident's reporting they were very confident (8.0/10, where 10 = completely confident) to move around. As confidence is high, this implies that their fear of falling was relatively slow. Confidence decreased slightly at 6-months to 7.7, although it remains positive.

Fall risk

Fall risk, measured through FROP-Com Screen, is calculated out of 9, with a score of 0-4 indicating low fall risk, and a score of 5-9 indicating high risk. In general, the majority of residents were assessed as low fall risk (91%) at baseline, and this was **seen to improve over 6-months, with 100% of resident's being assessed at low fall risk**. In particular, residents were observed to improve the most in their balance when walking and their ability to complete activities of daily living (e.g. cooking and housework) without assistance. This may be linked to the increased amount of walking residents were completing at 6-months (see physical activity, page 11).

Proportion of residents in each FROP-Com Screen fall risk category



For fall risk, this was consistently the highest scoring metric of the wellbeing score. This implies that residents should continue to be encouraged to stay mobile and engage in activities of daily living they are able to complete themselves in order to maintain their independence and keep their risk of falls low[13].

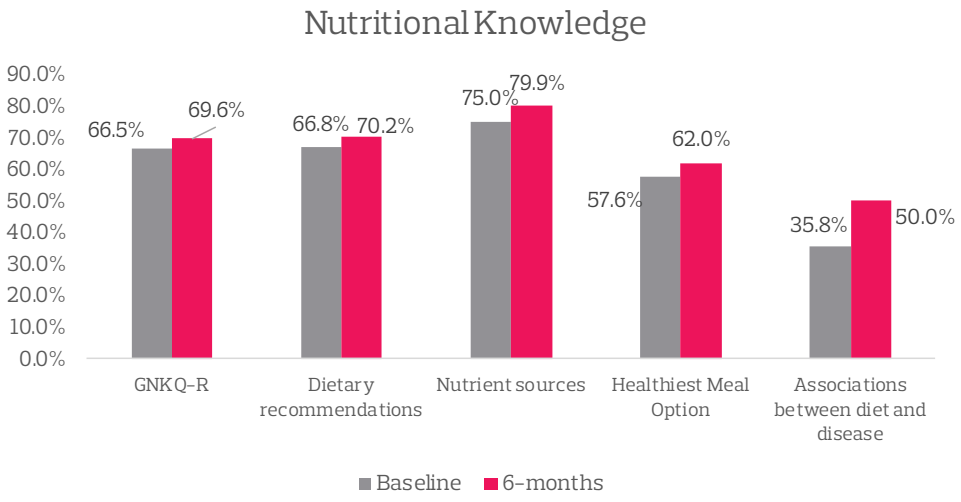
Nutritional Knowledge

The GNKQ-R measures four different types of nutritional knowledge, including dietary recommendations, nutrient sources, healthiest meal option, and associations between diet and disease. A breakdown of each of the four areas are explained in the table below.

Nutritional knowledge area	Description
Dietary recommendations	Knowledge of food groups and which foods are recommended to eat more and less of.
Nutrient sources	Knowledge of the nutrient sources (e.g. fish oils, fibre) found in common food types.
Healthiest meal option	Knowledge of appropriate meal option for maintaining a balanced weight and diet.
Associations between diet and disease	Knowledge of the link between diet (e.g. low fibre, high intake of sugar, fat and salt) and the associated diseases to each of these.

Overall, at baseline, nutritional knowledge of residents was equal to that of normative data. When comparing by the four types of nutritional knowledge residents scored equal or higher than the normative sample in all except association between diet and disease. **At 6-months, improvements were seen in all aspects. Not only did residents improve their scores across all aspects of nutritional knowledge from baseline, this was one of the metrics that improved the most from the wellbeing score.**

Residents scores on the general nutritional knowledge questionnaire



The association between diet and disease was the lowest scoring at both baseline and 6-months; although residents improved the most in this area over time by 14.2% points. Residents became more knowledgeable about the association between increased intake of salt and high blood pressure but were less knowledgeable about the negative consequences of consuming low amounts of fibre and bowel disease. Additionally, 17.0% of resident incorrectly associated an increased intake of fat with diabetes, instead of obesity. Residents scored the highest in the area of understanding nutrient sources (79.9%) at 6-months. In general, this indicates that residents are most aware of which foods to eat in order to obtain nutrient sources of fibre, and which fish are sources of healthy fats.

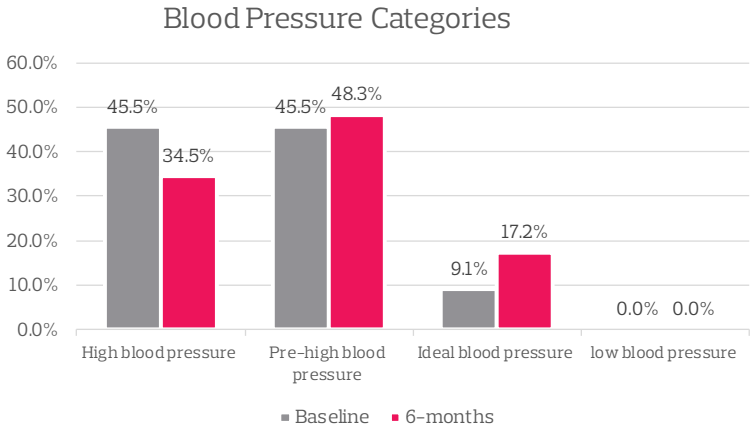
Blood Pressure

Blood pressure was categorised based on categories provided by Blood Pressure UK[16] and are shown below.

Blood Pressure Category	Blood Pressure Measurement
High blood pressure	140/91 – 190/100 mmHg
Pre-high blood pressure	120/80 – 140/90 mmHg
Ideal blood pressure	90/60 – 120/80 mmHg
Low blood pressure	Under 90/60 mmHg

The proportion of residents with high blood pressure decreased from baseline (45.5%) to 6-months (34.5%). These residents moved into categories of pre-high blood pressure, which increased by 2.7% points and into ideal blood pressure, which increased by 8.1% points. Although the number of residents at 6-months with pre-high blood pressure is greater than baseline, taken in context this is positive, as fewer have high blood pressure, indicating blood pressure has lowered.

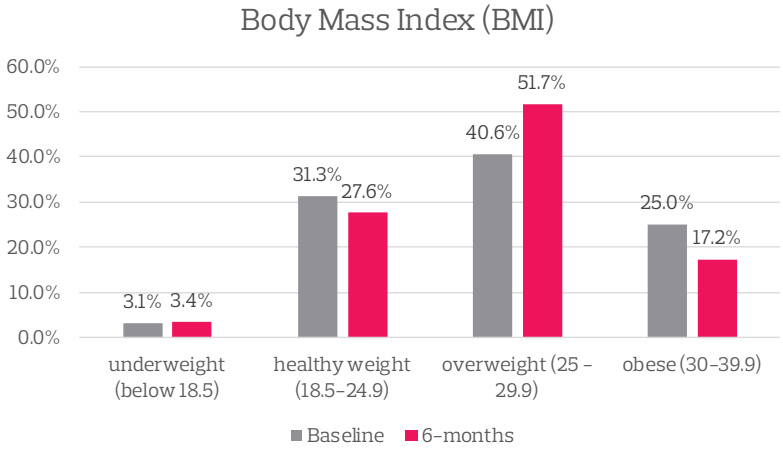
Proportion of residents in each blood pressure category



Body Mass Index and Body Composition

Body fat composition and body mass index (BMI) were measured an Omron bioelectrical impedance analyser, using height, weight, sex, and age.

Proportion of residents in each BMI category



A greater proportion of residents were considered overweight at 6-months than baseline (51.7% versus 40.6% respectively). This may be explained by a fewer number being considered obese at 6-months (by 7.8%) and potentially moving in a positive direction into the overweight category. **Nonetheless, as a lesser proportion were a healthy weight at 6-months, it also indicates some individuals have increased their BMI category.** While it is positive that individuals have moved from the obese category to overweight, over two thirds of residents still have an above healthy weight BMI rating (68.9%) and should be encouraged to engage in further physical activity and healthy eating to encourage this change.

Physiological Health

Body composition results are reported in the table below, spilt by sex, that fall into each of the four body fat categories [24]. **The proportion of males and females above the 'normal' body fat category at baseline is substantially high**, in both cases above three quarters of the sub-sample for each gender (81.3% for females, 84.6% for males).

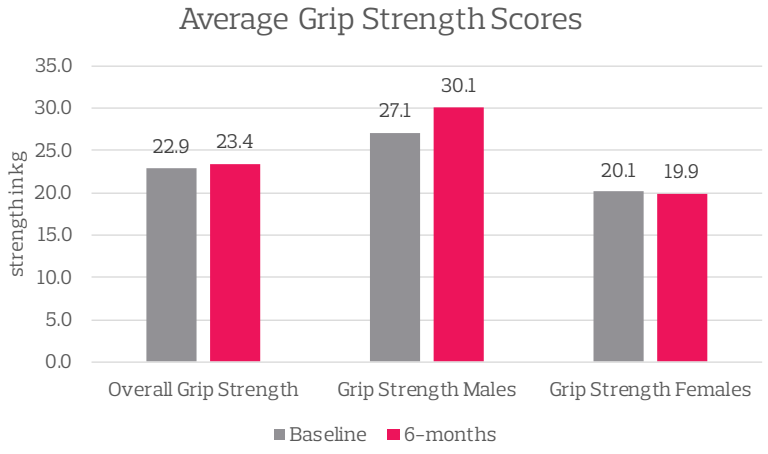
	Baseline		6-months	
Body composition category	Females (60+)	Males (60+)	Females (60+)	Males (60+)
Low	2 (12.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Normal	1 (6.3%)	2 (15.4%)	1 (5.3%)	1 (10.0%)
High	9 (56.3%)	4 (30.8%)	4 (21.1%)	3 (30.0%)
Very High	4 (25.0%)	7 (53.8%)	14 (73.7%)	6 (60.0%)
	16 (100.0%)	*17 (100.0%)*	*19 (100.0%)*	*10 (100.0%)*

The proportion increased to 90% and above at 6-months (94.7% for females, 90.0% for males), with the proportion of those in normal body fat categories decreasing. While it should be noted that these body fat comparisons are an estimation for upper body only and therefore for female readings it should be noted that these may be a slight over-estimate due to breast fat.

Hand Grip Strength

Overall hand-grip strength remained relatively constant from baseline to 6-months with slight increases overall and for males. Greater hand-grip strength can indicate greater strength and abilities to perform daily activities. It is also a strong predictor of all-cause and cardiovascular mortality improvements in grip strength also indicate a reduced likeliness of these[25].

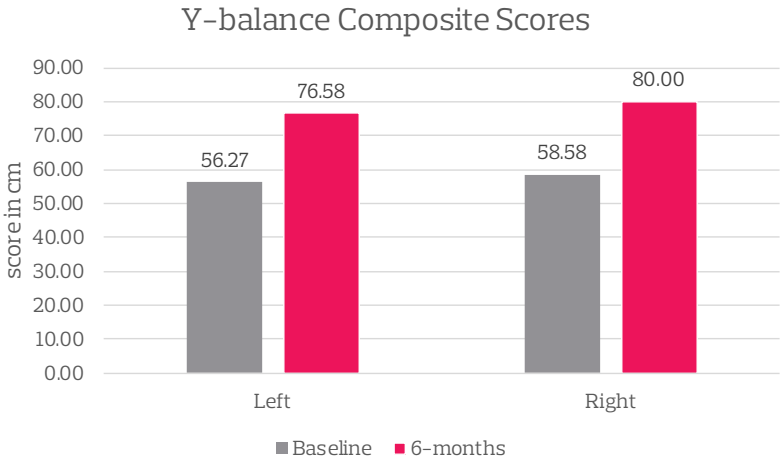
Average grip strength scores for residents, spilt by sex



The Wellbeing Score from hand grip strength reveals this component is one of the lower scoring metrics, which suggests that specific strengthening activities could be provided in order to build upon this.

Y-Balance

Residents average Y-Balance Composite score for each leg



Composite balance scores for each leg were calculated based on the 6-movements conducted as part of the Y-balance test. **The average composite balance scores for each leg at baseline and 6-months increased, which indicates that balance scores improved over time**. In particular, residents had better balance on their right side, although this could be explained by the fact that a majority of residents were dominant on their right leg.

At baseline, residents scored the highest in their anterior balance (movement of the leg out to the front). However, at 6-months, while this score improved, the greatest improvements were seen in resident's posterolateral balance (ability to move leg out to the side). On both occasions posteromedial balance was the lowest scoring (the movement of crossing the leg behind the other). Improvements in overall balance are positive, as balance is linked to a reduced risk of falls[26]. **Improvements in balance may be explained by greater participation in strength and balancing activities such as Yoga/Pilates and continued mobility and walking, indicating that these activities may have been a positive addition for residents and should be continued.**

Chair Sit and Reach

Chair sit and reach is a measure of lower body flexibility with the table below reporting the proportion of residents, spilt by sex, in each of the three sit and reach categories [21].

	Baseline		6-months	
Sit and Reach category	Females	Males	Females	Males
Below average	7 (35.0%)	3 (23.1%)	0 (0.0%)	0 (0.0%)
Average	9 (45.0%)	7 (53.8%)	9 (47.4%)	5 (50.0%)
Above average	4 (20.0%)	3 (23.1%)	10 (52.6%)	5 (50.0%)
	20 (100.0%)	*13 (100.0%)*	*19 (100.0%)*	*10 (100.0%)*

As the table indicates for both females (45.0%) and males (53.8%) at baseline, the largest proportion had an average flexibility reach score for their age and sex. After 6-months the number of females who had above average reach score increased (from 4 to 10, from 20.0% to 52.6%), as was the case for males (from 3 to 5, from 23.1% to 50.0%). **Encouragingly at 6-months no residents had below average flexibility scores. Overall, this demonstrates improvements in lower body flexibility and indicates that residents are staying flexible in a manner that is expected for their age and sex**. Improved flexibility ensures older adults are able to stay mobile and prevents reductions in engaging in daily activities[20].

Sit to Stand

As a measure of leg strength and endurance, the number of it to stands achieved in 30 seconds is relatively to the individual, and an increase over time could be associated with improvements in endurance. The sit to stand manoeuvre is considered a classical activity of mobility and one's ability to continue these manoeuvres can ensure mobility is maintained[27].

Number of Sit to Stands in 30 seconds	Baseline	6-months	Combined Normative Data
Males	12.7 (13)	15.5 (16)	14.2
Females	11.4 (11)	15.5 (16)	12.7
Overall	11.9 (12)	15.5 (16)	

Overall, the average number of sit to stands completed increased by four from baseline to 6-months, at 3.6% increase, indicating that residents are at least maintaining and possibly improving their mobility. Compared to combined normative data from 60-94 year olds for each sex[21], males and females were performing fewer sit to stands at baseline. **However, at 6-months both sexes were completing a greater number of sit to stands than normative data. This was especially the case for females, who showed a 4.1% increase in the number of sit to stands from baseline to 6-months**.




Qualitative Feedback

Feedback was obtained from the Wellbeing Navigator around the feasibility of delivering Health MOT's, alongside residents who had taken part in the Health MOTs. This qualitative data collection was important for understanding individual's experiences of the Health MOTs and was utilised, alongside the quantitative data, to provide recommendations for project evaluation going forward.

Feedback from Wellbeing Navigator

The Wellbeing Navigator was positive about delivering the Health MOT's and felt that with their previous experience, and the guidance, training and supporting resources provided, they were comfortable and able to accurately deliver all of the different MOT components. They enjoyed the delivery and felt it was a good opportunity spend time one-to-one time supporting residents. **Overall, they reported that the data helped them understand which areas of health resident's needed to focus on and how the support them with this.**

As feedback they stated that it was necessary to have a 'back up' plan of manual data recording, in case online data entry did not work. Finally they also requested further information on General Data Protection Regulations (GDPR) to aid residents understanding, confidence and comfortable around how their data was used.

Feedback from residents

A sub-sample of six resident's who took part in the Health MOTs took part in semi-structured interviews providing their perceptions and opinions of taking part in the MOTs, the wellbeing navigator and the new programme of activities introduced to the village.

Activities delivered

Residents praised the hard work ethic of the Wellbeing Navigator and spoke about how they have been provided with opportunities to do new activities regularly. In particular, they enjoyed new structured activities including the cardio wall sessions, stretch and tone, Pilates and Thera-band classes, and aqua aerobics. However, unstructured exercise and activities, such as organised walks, appeared the most popular and provided additional social benefits such as bringing people from the village together who didn't usually meet.

Social interaction

The social aspects of activities and being active were emphasised as being one of the most important factors for mental wellbeing and stimulating engagement. This was particularly prominent through engaging with old hobbies and interests, as promoted by the Wellbeing Navigator.

One resident described:

"My wife was encouraged to do old hobbies, she used to love to paint, and now she is in charge of running fortnightly painting group and makes cards. She get more social interactions this way, meets people she wouldn't have met before and is more active from this point of view."

Another spoke about building new relationships through re-discovering old interests and hobbies:

"I met someone who plays an instrument and liked jazz and I very much like these things. So now we meet up and talk about jazz and we actually go out and go to gigs together. It's nice to have met someone who I can now share that passion with again."

Qualitative Feedback

Resident led

Physical activities were more likely to be adhered to and continue if they were led by fellow residents. It was believed important that residents were involved in promoting and trying the new activities to encourage and motivate others.

Certain activities, like walking football and rugby were introduced to the village but were not maintained because residents did not encourage each other to try them. It appeared that encouraging residents to start their own activities led to more success at the activity being maintained. I**n particular, activities based upon old interests and hobbies were deemed a great way to engage others.**

An example of this was one resident, who described how he likes nature and bird watching, and since meeting some new people through other activities, he discovered others were also interested in understanding the local nature in the village and around the city. Therefore, he planned to develop a 'nature notes' booklet that outlines different types of flora and fauna that residents can read about and discover for themselves. He hopes to work closely with the Wellbeing Navigator to integrate this into the newsletter.

The new cardio wall and demonstration from the Wellness Navigator

Recommendations

Are Health MOT's within a retirement village feasible?

This report so far has presented the pilot study results of the implementation of Health MOTs delivered at an Inspired Village. However, this work also looked to determine if Health MOTs were feasible to measure and support residents overall health and wellbeing. A total of 20 measures have been combined to create an overall wellbeing score that is presented here for a village but can be scaled to report on various different levels.

All measures were successfully conducted with data recorded by the Wellbeing Navigator. The feedback from the Wellbeing Navigator suggests that they are suitable individuals who are knowledgeable and trusted within the community to lead the Health MOTs. This pilot has highlighted areas of continued development, but overall the Health MOTs are suggested to be feasible for use within retirement villages. A series of recommendations for next steps are highlighted below.

» Continue the collection of data through Health MOT's throughout the pilot village and other Inspired Village villages. This is in order to continue to build an evidence base of comparative data for the wellbeing score and also to allow segmentation of wellbeing, social and physical activity factors to provide further insights.

» Continue to on board and upskill Wellbeing Navigators that focus on delivering Health MOT's to residents.

» Use the existing pilot data to support residents to improve aspects of health and wellbeing. In particular, more focus should be made on residents achieving a healthy weight, by encouraging healthy eating and regular moderate intensity (not just walking) physical activities. In addition, providing activities that encourage residents to improve their flexibility and balance as these were lower scoring areas of the wellbeing score.

» Consider the use of the Health MOTs to conduct evaluation of the effectiveness of different activity offerings. As these are implemented across Inspired Villages and datasets begin to grow, their combination with information on the participation of residents in different activities will enable evaluation of the degree to which these offerings are causing maintenance or improvements in health and wellbeing.

» Continue to provide a wealth of activities for residents to partake in and ensure residents are involved in the promotion of these activities. Based on learnings from the semi-structured interviews, activities suggested and later led appeared to be the most successful.

» Ensure all physical activities and other activities offered encourage social integration and the building of new and existing skills. A key finding from the semi-structured interviews with residents highlighted the importance of being able to build new friendships, meet new people and remember old hobbies as ways of benefiting social and mental wellbeing.

» Continue to ensure all activities are reviewed on a regular basis, dependent on their adherence. This is to ensure that residents are satisfied with the activities available to them and that resources are not put into activities which are not desired or popular. For example, data indicated that activities such as cycling and tennis (racket sports) were not participated in by any of the sub-sample of residents, and barriers were highlighted about limited bike storage which reduced resident's partaking in cycling. This indicates that at present these are not necessarily needed at this village location, but may be needed at other locations.

» Determine, where possible and relevant, the possibility of future partnerships with operators and fitness providers to enhance the activity options provided and support the health of Inspired Village residents across other villages.

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