



**Can simple household assistive products enhance the self-care of health and wellbeing?**

|                  |  |
|------------------|--|
| Journal:         | <i>Journal of Integrated Care</i>                      |
| Manuscript ID    | JICA-08-2022-0043.R2                                   |
| Manuscript Type: | Case Study   |
| Keywords:        | Self care, Long Term Conditions, Integrated healthcare |
|                  |  |

SCHOLARONE™  
Manuscripts

## Abstract

### Purpose

The ageing population is a global phenomenon that is occurring in many countries around the world, including the UK. According to the Office for National Statistics (ONS), the proportion of the UK population aged 65 and over is projected to increase, reaching 25% by 2045. This increase will have a significant impact on a range of social and economic issues. One of the ways to reduce this impact is to improve self-care.

### Approach

The availability of simple assistive devices can facilitate physical activity and help complete daily living activities. These devices can also help in the self-management of long-term health and well-being. To encourage self-care, it is essential to create awareness about these assistive products. Simple assistive products such as shoe horns, magnifying glasses or a sphygmomanometer that are readily available to buy from shops were grouped into four boxes or kits. We provided these simple devices to 175 community-dwelling older adults in deprived areas and followed them up via a phone survey after 4 to 6 weeks.

### Findings

We recorded overall positive feedback on individual products and the kit. The results indicate that there was a sense of empowerment and ability by the recipients to take control of their health and well-being and management of their health condition using items contained in the kit provided.

### Practical Implications

Our results show that simple assistive products empower older adults to self-care and can provide a positive impact on their activities of daily living.

### Originality

Previous studies have shown that regular exercise can enhance both physical and mental abilities and reverse certain chronic health issues. Simple household devices can aid in increasing physical activity. This work highlights how these devices enable older adults to take care of themselves, with a focus on capturing their personal perspectives and experiences.

### Key Words

Self-care, Assistive Devices, Physical Activity

## What is known about this topic and what this paper adds?

As an ageing society with several individuals with comorbidities, there is a need for self-awareness and management of chronic conditions

The availability of simple household assistive devices can facilitate improvement in physical activity and help complete activities of daily living.

Numerous easily accessible assistive products are readily available to empower older adults to self-care.

Journal of Integrated Care

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

## Introduction

In the UK, the ageing population is increasing. According to data from the Office for National Statistics, in 2019, the number of people aged 65 and over in the UK was estimated to be around 12.4 million, representing almost 20% of the total population (ONS, 2021). This number is expected to continue to rise, with the proportion of the population aged 65 and over projected to reach almost 25% by 2046. On a global level, the proportion of the population aged 60 and over is also increasing. According to the United Nations (UN), the global population aged 60 and over is expected to more than double, from 962 million in 2017 to 2.1 billion in 2050. The proportion of the global population aged 60 and over is expected to increase from 12% in 2017 to 22% in 2050 (WHO, 2021). The ageing population can have significant impacts on a range of social and economic issues, including healthcare, pension systems, and the labour market. Governments and societies need to plan for and address the challenges and opportunities presented by an ageing population.

There is evidence to suggest that there may be a link between ageing and obesity. However, it is important to note that the relationship between these two factors is complex and not fully understood. Whilst it is beyond the scope of this manuscript to go into the epidemiological aspects of this relationship, the main link between ageing and obesity is that people who are obese may be more likely to develop certain health problems that are associated with ageing. For example, obesity is a major risk factor for several chronic conditions, including type 2 diabetes, heart disease, stroke, and certain types of cancer. These conditions can have a major impact on quality of life and can shorten lifespan.

Obesity is a term given to an excessive accumulation of adipose tissue which presents a health risk. Also, obese patients are at an increased risk of several comorbidities (Khaodhiar *et al.*, 1999). Current reports show that over 75% of those aged over 65 years old are classified as overweight or obese (UK Parliament, 2022). In addition to increasing the risk of chronic conditions, obesity can also contribute to many other health problems. For example, people who are obese may be more likely to develop musculoskeletal problems, such as osteoarthritis, and may be at increased risk of respiratory problems, such as sleep apnea.

On average it is estimated that obesity reduces life expectancy in the UK by 2.7 years and that each person pays an extra £409 a year to cover the burden that obesity rates bring to the UK. Reducing obesity would therefore have significant financial and health benefits for all. Overall, it is clear that maintaining a healthy weight is important for good health and well-being. There are a number of ways to achieve a healthy weight, including regular physical activity, eating a healthy diet, and making lifestyle changes.

There is a plethora of information that supports the notion that regular physical activity improves the physical and mental functions of an older adult (McPhee *et al.*, 2016). It also reverses some of the effects of chronic health conditions and helps maintain the mobility and independence of older people (Jadczak *et al.*, 2018). However, reports still indicate that an overwhelming majority of older people in the UK do not meet the minimum physical activity levels needed to maintain health (McPhee *et al.*, 2016). Whilst indicating that the health authorities have a responsibility to promote physical activity, this report highlights that the authorities are still challenged on how to stimulate this regular activity at a population level. The current evidence shows that regular physical activity is safe for frail and older people and it reduces the risks of them developing major health conditions (Giné-Garriga *et al.*, 2014; Jadczak *et al.*, 2018). Older people need to be helped to increase their physical activities by the provision of simple devices that keep the costs low and raise self-efficacy for exercise.

1  
2  
3 High blood pressure (HBP) and Diabetes mellitus (DM) are two known comorbidities associated with  
4 obesity. Global reports (Reddy, 2016; Unwin *et al.*, 2019; Yusuf *et al.*, 2020) highlight that HBP is the  
5 second biggest known global risk factor for the disease after inadequate diet. In the UK, HBP is the  
6 third biggest risk factor for the disease after smoking and an unhealthy diet. It is the largest single  
7 known risk factor for cardiovascular disease and related disabilities. HBP is also linked to the  
8 increased risk of chronic kidney disease, peripheral arterial disease, and vascular dementia (GOV.UK,  
9 2017). DM, one of the four main non-communicable diseases, is currently showing an increase in  
10 premature mortality (5%) and its prevalence is expected to rise to 700 million by 2045, up 51% from  
11 2019 (International Diabetes Federation, 2019). DM can lead to many long-term complications and is  
12 a major cause of lower limb amputation. Every 30 seconds a lower limb is amputated somewhere in  
13 the world as a consequence of DM (The Lancet, 2005) and people with DM are six times more likely  
14 to undergo an amputation than people without DM (Ahmad *et al.*, 2016). There are nearly 5 million  
15 people in the UK with type 2 diabetes, with many more people who are undiagnosed (Whicher *et al.*,  
16 2020). The UK National Health Service (NHS) reportedly spends at least £10 billion a year on diabetes  
17 which is equivalent to 10% of its total budget(Whicher *et al.*, 2020).

22 Looking at the socioeconomic statistics, a large number of people over the age of 65 years live with  
23 poor health, with the average person spending half their remaining years with a life-limiting health  
24 condition. 15% of people between 65-69 years have difficulties with at least one activity of daily  
25 living, and this figure increases to 33% in those over 85 (ONS, 2018). This growing and ageing  
26 population leads to increasing demands for care services, and public funding has not kept pace  
27 proportionately. The gap between required and available funding for care services was estimated to  
28 be £8 billion in 2021 (LGA, 2021). This has led to older people and families making up for the  
29 shortfall in care funding available. It is also worth noting that most care for the older population is  
30 delivered by family and friends, who are not medically trained. Many carers are elderly themselves,  
31 with people over 60 years making up the majority of unpaid carers. It is important to recognise that  
32 elderly caregivers in lower socio-economic status may face a range of challenges when providing  
33 care. It is important to provide support and resources to help these caregivers manage their caring  
34 responsibilities and to ensure that they can access high-quality care for themselves and for the  
35 people they are caring for.

39 Advances in technology and the availability of simple assistive devices can play a substantial role not  
40 only to support the caregivers but also facilitate improvement in completing the activities of daily  
41 living by the individual themselves. These can also help in enhancing the self-management of long-  
42 term health and well-being (Chambers *et al.*, 2021). To encourage self-care, it is important to create  
43 awareness that there are several assistive products readily available and easily accessible. This paper  
44 aims to **to evaluate the acceptance and usage of these products and whether they were effective in**  
45 **raising awareness of self-care.**

## 48 **Methods**

51 Several assistive products such as shoe horns, magnifying glasses, a sphygmomanometer, portion  
52 plates, and digital weighing scales that are readily available were grouped into four boxes or kits (full  
53 details of the products within these boxes are outlined in Appendix .). These kits focus on weight  
54 management(B1), support to increase physical activity(B2), support to self-monitor cardiovascular  
55 issues(B3) and help to prevent and manage foot complications in diabetes(B4). The current study is  
56 classified as a “Post Market Surveillance Study” of product(s) that were used unmodified for service  
57 evaluation or service redesign (Clarke, 1999; Kingston *et al.*, 2021). Post-market surveillance studies  
58 are studies that are conducted after a product has been made available for sale to the general  
59  
60

1  
2  
3 public. Post-market surveillance studies can be conducted using a variety of methods, including  
4 monitoring adverse event reports, conducting surveys or interviews with users, and analysing data  
5 from electronic health records or other sources. Given that the consumer products used within this  
6 study are readily available off the shelf and they were not modified in any form, local health  
7 research ethics approval was not required.  
8  
9

10 **The individuals who received these kits were recruited using a non-probability, convenience**  
11 **sampling technique through locations such as: local patient network, private care providers and GP**  
12 **practice networks. Participants were invited through either email or word of mouth.** The participants  
13 who were provided with these kits were asked if they are willing to be contacted for feedback and  
14 they provided full informed consent.  
15

16 A total of 175 boxes were distributed to different community groups during October 2021 to  
17 members in deprived areas of Stoke-on-Trent, United Kingdom; greater than 95% were aged 65  
18 years old or older. They were made aware of the contents of the kits and the purpose of the  
19 products and how to use them. The participants were instructed to use the kit straight away. Follow-  
20 up informal interviews were conducted via telephone by the project support worker (SW) around  
21 four weeks after receipt of a kit. These interviews were not scientifically designed or based on any  
22 validated questionnaire. The main purpose was to evaluate the acceptance and usage of these  
23 products. In total, 100 telephone evaluations were carried out. Telephone evaluations started after  
24 the initial cohort of recipients had had their kits for around 4 weeks. Most of the phone calls were  
25 carried out between 4 – 6 weeks after receipt of the kit. Some were carried out slightly later at  
26 around 7- 8 weeks after receiving the kit usually due to missed telephone calls at the 4 – 6-week  
27 mark. The questions asked included:  
28  
29  
30

- 31  
32 1. How long have you been using the kit for?  
33 2. How often have you used an item(s) of the kit?  
34 3. Which items out of the kit have you used most often? Why?  
35 4. Has the kit helped you to manage your health and wellbeing? If so, in what way?  
36 5. Do you feel more confident to manage your health condition at home?  
37 6. Which item did you feel was used the least in the kit?  
38 7. Do you have any additional health conditions that have been improved from using the kit - for  
39 example, low mood, or poor mobility?  
40  
41

42 As a pilot investigation, this work provides a descriptive overview of the findings and didn't follow  
43 any established quantitative or discursive research approaches.  
44  
45

## 46 47 **Results**

48 Although 175 kits were distributed in total at the time of reporting, around 20 recipients had not had  
49 their kit for 4 weeks by this date. Of the remaining 55, some individuals were contacted multiple  
50 times with no successful call carried out. The results outlined are for 100 participants. In terms of  
51 weight management kit (B1), 32 evaluations were carried out, from a total of 52 recipients of this kit.  
52 37 evaluations of increasing physical activity box were carried out of 64 receiving the kit. Whilst 17  
53 evaluations were carried out of 31 receiving the box for managing cardiovascular conditions, 14  
54 evaluations of the box containing products preventing diabetes complications were carried out of 28  
55 receiving the kit.  
56  
57  
58  
59  
60

1  
2  
3 Overall results indicated, generally, positive feedback on individual products and the kit. The  
4 respondents felt empowered to self-care and highlighted that these kits have made a substantial  
5 improvement to their activities of daily living.  
6

### 7 *Weight management*

8  
9 Forty per cent of the weight management kit recipients confirmed that they had lost weight since  
10 using the kit. Weight loss ranged from 3lb to 1 stone in the 4-6 week period. A small number of  
11 individuals had used the kit to help them gain/ or maintain weight where being underweight had  
12 been an issue before.  
13

14  
15 The recipients used the weight management kits to monitor and record their own body  
16 measurements, with the tape measure, digital scales and diary provided. A large proportion of the  
17 recipients used the products (particularly portion plate and microwave egg poacher) to help with  
18 portion control to improve their lifestyle and eating habits. Individuals reported that the portion  
19 plate helped to visualise their food intake and helped them gain a better understanding of the  
20 division of food groups required to maintain a healthy balanced diet. Most referenced this as an  
21 item used daily.  
22

23  
24 *"I have used the portion plate on a daily basis, and the digital scales and tape measure*  
25 *and we are starting to look at the cognitive behaviour therapy (CBT) book. Having the*  
26 *portion plate to refer to has really helped me. It has opened my eyes as to what I was*  
27 *eating before and helped me understand where I needed to make changes. My*  
28 *husband and I have both used the scales. The tape measure is useful if you want to see*  
29 *if you have lost inches rather than weight."*  
30  
31

32  
33 Many of the recipients listed the exercise bands as a useful tool to stay active at home mentioning  
34 the ease of use and convenience. Some individuals used the exercise bands as part of the regular  
35 exercise classes they attended in the community. Of the 32 feedback questionnaires completed 78%  
36 said they felt more confident to manage their health at home having received the weight  
37 management health kit.  
38

39  
40 Of the 32 contacts, 3 people felt they had not had enough time to fully engage with the kit, for which  
41 different reasons were offered. One individual felt due to their low mood they had not been able to  
42 use the kit properly but stated once they felt better, they would use the contents. One person felt  
43 they had not really looked at it in the time given but did intend to start looking more closely at the  
44 items. Another individual had been unwell with Covid and so not used the kit fully (they had used  
45 the digital scales).  
46

### 47 *Support to increase physical activity*

48  
49 Feedback from the second kit recipients varied with individuals using the content of the kit in  
50 different ways depending on their underlying health conditions and limitations. Many of the 37  
51 recipients informed that the torch and solar light were useful in and around the home. One theme  
52 that was identified was that there was a sense of reassurance and an emphasis on a feeling of  
53 increased safety from the items emitting light,  
54

55 *'My mobility is poor, so I try to keep fit. Using the torch has allowed me to check the*  
56 *ground when walking.'*  
57

58  
59 One individual reported they felt safer using the torch as they could access their house and the steps  
60 leading to the front door more easily. Whilst a few users stated the torch was used during the night

1  
2  
3 for safe access to the bathroom. Some individuals adapted the torch to utilise for their personal  
4 needs one individual said,  
5

6 *'I feel safer using my torch and keep it in my car. I can easily attach it to my handbag so*  
7 *I can hold my keys in my hand, it is brilliant.'*  
8

9 Overall, the torch and solar light were useful, inexpensive tools to avoid falls and helped users to feel  
10 safer both inside and outside of the home, offering increased visibility to the surrounding area.  
11

12 A common theme throughout the evaluation feedback was the positive impact that the items of the  
13 kit had on underlying health conditions. Many of the users referenced the improvement some items  
14 made to day to day living in relation to their arthritis. Users identified the hot and cold pack as a  
15 useful item to manage pain associated with their arthritis with one user stating,  
16

17 *'The kit helped with my arthritic pain - all over pain very bad but the heat pack has*  
18 *helped me with this.'*  
19

20  
21 Of the 37 who offered feedback 81% felt more confident to manage their health condition at home.  
22 Common answers included increased independence offered from items included in the kit. Many of  
23 the recipients mentioned poor grip as a limitation to their independence and barrier to carry out  
24 tasks such as opening jars and removing plugs. One individual informed us,  
25

26 *'The jar opener is useful as previously I have had to take a bottle of bleach back to the*  
27 *shop to open it, I have more independence now.'*  
28

29 Another user stated,  
30

31 *'The remote plugs are very useful, especially with my reduced strength in my hands I*  
32 *find it difficult to remove plugs.'*  
33

34 By offering practical items such as jar openers and remote plugs as part of the kit, people were able  
35 to continue with daily tasks with ease, reducing the need for assistance and support.  
36

### 37 *Support to self-monitor cardiovascular issues*

38  
39 The recipients of the third kit were provided with a blood pressure monitor to facilitate self-  
40 monitoring of their health condition. When contacted at between 4 – 6 weeks of receiving the kit  
41 76% had used the blood pressure monitor to review their blood pressure at home, 30% of these  
42 users had gone on to share their blood pressure values with their health care professional as part of  
43 their ongoing care. Some of the remaining individuals stated that they intended to liaise with the GP  
44 or Nurse in the near future to share their home values,  
45

46  
47 *'I knew my BP was raised but having a monitor and seeing for myself that my BP is*  
48 *raised has made me understand that I need to have a review with the GP. I plan to*  
49 *arrange an appointment once I have 1 month of readings recorded. I am taking BP*  
50 *twice a day.'*  
51

52  
53 Overall, there was a feeling of empowerment and confidence in managing their condition at home.  
54 Some also felt that the monitor offered them reassurance when they felt their blood pressure was  
55 potentially raised,  
56

57 *'I was concerned that my BP was raised as I felt unwell but when I did it, it was OK.'*  
58  
59  
60



1  
2  
3 Other recipients of the health kit found the exercise bands particularly useful to their health and  
4 underlying health issues. Recipients reported improved joints, mobility, and balance. One individual  
5 felt that his increased exercise had meant he no longer fell asleep in the evening. The exercise bands  
6 offer an accessible form of exercise, convenient and straightforward to use with some users  
7 reporting daily use of the item.  
8

### 9 *Help to manage foot health in diabetes*

10 Those receiving the diabetes kit were able to manage their condition at home with a large  
11 proportion of the recipients managing their foot care with the mirror and the magnifying glass  
12 provided. One individual said,  
13

14  
15  
16 *'I don't have a lot of feeling in my feet so checking my feet is important. My wife*  
17 *has used the mirror and the magnifying glass to check underneath my feet.'*  
18 Another reported, *'I have used the mirror to check my feet. This has helped as I am*  
19 *type 2 Diabetic, I cannot see under my feet, so this has been a very useful item.'*  
20

21 The mirror placed on the floor (along with a magnifying glass if required) is a practical solution for  
22 those who may not be able to ordinarily check their feet, perhaps due to mobility issues. In some  
23 instances, having the mirror in the kit offered a reminder for people to check their feet.  
24

25 Some of the recipients relayed that they had lost weight having used the contents of the kit as part  
26 of their routine. The portion plate was listed as an effective tool to help encourage a balanced diet  
27 and assist with healthier eating.  
28

29 A few of the users of this kit reported an improvement in their blood sugars. One user said,  
30

31  
32 *'My blood sugars have reduced recently, and I feel that is because of having the kit*  
33 *and being more proactive in managing my condition. The kit has prevented me*  
34 *from having to go to the GP practice possibly 2-3 times.'* Another user stated, *'I*  
35 *have managed to lose weight and changed my diet. I have been asked to monitor*  
36 *my blood sugars by the nurse and these have been improving recently.'*  
37

38 People used the magnifying/light glass, included in the kit, for various other routine tasks around the  
39 home including checking the ingredients and content levels in cans/food packets, checking their feet,  
40 and engaging in recreational activities such as puzzles and general reading.  
41

## 42 **Discussion**

43  
44  
45 Of the 100 recipients who responded to the follow-up telephone survey, 90% stated that they felt  
46 more confident to manage their health conditions at home. 97% of recipients who completed the  
47 evaluation (across all 4 kits) said they would recommend the kit to a family member or friend.  
48 Overall feedback indicates that using these types of assistive products can be a convenient and  
49 effective way to improve weight management and physical activity, and can help feel more  
50 empowered and in controlling their overall health and well-being.  
51

52  
53 The first two kits focused on weight management and physical activity. Using simple, available, and  
54 accessible assistive products such as pedometers or activity trackers can help individuals track their  
55 daily physical activity and set goals for increasing their activity levels. They can also include products  
56 like hand weights or resistance bands, which can be used for strength training at home. In addition  
57 to being accessible and easy to use, these types of assistive products can be empowering because  
58 they give individuals the tools and information they need to take control of their own health and  
59  
60

1  
2  
3 well-being. By tracking their activity levels and setting goals for themselves, individuals can feel more  
4 in control of their health and more motivated to make positive changes. This can ultimately lead to  
5 improved self-esteem, self-confidence, and overall well-being.  
6

7  
8 Enhanced physical activity has not only been linked to the improvement of various chronic health  
9 conditions (Elavsky *et al.*, 2005; Penedo and Dahn, 2005) but also to the improvement of balance  
10 and the reduction of falls (Duckham *et al.*, 2015; Finnegan *et al.*, 2018; García-Molina *et al.*, 2018).  
11 The prevalence of falls within the elderly population of the United Kingdom is high (GOV.UK, 2022),  
12 with those aged 65 or more judged to have a 30% chance per year of having a fall (NICE, 2017). The  
13 cost of falls to the National Health Service in the UK is estimated to be in the region of £4.4bn, with  
14 falls being the ninth highest cause of disability-adjusted life years (DALYs) in England in 2013 and the  
15 leading cause of injury (GOV.UK, 2022). There is also a significant social cost associated with falls.  
16 Many fallers will subsequently develop a fear of falling, and in 40% of cases, this will lead to a  
17 restriction in activities of daily living (Ambrose *et al.*, 2013). As physical activity declines, strength  
18 and balance also reduce, which in turn leads to an increased likelihood of further falls. Fallers may  
19 lose their independence and become more reliant on carers and family to undertake tasks that  
20 previously caused them no problems. Thus simple resistance exercise bands can be useful to  
21 enhance muscle strength in the legs and arms and body trunk.  
22  
23  
24

25  
26 There is much evidence to support a preventative approach to falling, with multifactorial falls  
27 intervention widely advocated (Gillespie *et al.*, 2012). Strength and balance classes are recognised as  
28 an effective means of improving the balance in elderly people who have been identified as being at  
29 risk of falling. Many of these programmes emphasize subjective analysis of falls and explore the  
30 intervention only when a falls risk is highlighted (Duckham *et al.*, 2015; Finnegan *et al.*, 2018; García-  
31 Molina *et al.*, 2018).  
32

33  
34 The third box focused on self-monitoring for cardiovascular issues. There are increasing calls for the  
35 use of self-care and information and communication technology (ICT) based self-monitoring of  
36 hypertension. This is believed to reduce the public health burden (Fujiwara *et al.*, 2022; Kitt *et al.*,  
37 2019; Mikulski *et al.*, 2022). Although we did not use mobile phones as outlined in some of these  
38 studies, the concept of self-monitoring is beneficial. In a similar vein, careful self-monitoring of  
39 diabetes and examination of the foot regularly is reported to avoid major complications such as  
40 diabetic foot ulcers and ultimately amputation (Boulton *et al.*, 2018). There has been a growing  
41 interest in the use of self-care and information and communication technology (ICT) for the self-  
42 monitoring of hypertension, as these approaches can be effective in helping individuals manage  
43 their blood pressure and improve their overall health and well-being.  
44  
45

46  
47 Self-care for hypertension typically involves taking an active role in managing one's own health,  
48 which can include things like following a healthy diet, exercising regularly, and taking medications as  
49 prescribed. ICT-based self-monitoring involves using technology, such as mobile apps or wearable  
50 devices, to track and monitor blood pressure levels and other health indicators. This can be  
51 especially useful for individuals who have difficulty accessing healthcare resources or who need to  
52 monitor their blood pressure regularly.  
53

54  
55 There are several potential benefits to using self-care and ICT-based self-monitoring for  
56 hypertension. For example, these approaches can help individuals stay informed about their health  
57 and identify potential issues early on, which can help prevent the development of more serious  
58 health conditions. They can also help individuals feel more in control of their health and more  
59 motivated to make positive lifestyle changes. Additionally, using these approaches can be  
60

1  
2  
3 convenient and cost-effective, as they often do not require individuals to visit a healthcare provider  
4 in person.  
5

6 The fourth box focused on diabetic foot issues. As people with diabetes are at an increased risk of  
7 developing foot problems such as foot ulcers and infections, checking the feet regularly and  
8 increasing physical activity can help prevent these types of problems. The kit had a mirror which the  
9 participants found very useful. In addition, the kit also had a portion plate. Using portion plates can  
10 be a useful tool for managing diabetes, as it can help individuals control the amount of food they eat  
11 and better balance their intake of nutrients. A portion plate is divided into sections, each of which  
12 represents a recommended serving size of a specific type of food. For example, one section may be  
13 for vegetables, another for protein, and another for grains. By filling each section with the  
14 appropriate serving size of each food group, individuals can ensure that they are getting a balanced  
15 meal that meets their nutritional needs. Using a portion plate can be especially helpful for  
16 individuals with diabetes, as it can help them control their carbohydrate intake. Carbohydrates are a  
17 major source of energy for the body, but they can also affect blood sugar levels. By using a portion  
18 plate to control the amount of carbohydrates they eat, individuals with diabetes can help manage  
19 their blood sugar levels and better control their condition.  
20  
21  
22  
23

24 Recipients of each type of kit offered a positive insight into the benefits of receiving their chosen kit.  
25 One of the common occurrences was the sharing of the kit with others. Many people, when asked  
26 about the usage of the kit, reported that it had benefitted not only the recipient but often others in  
27 the household and extended family members too. There were many examples of family members  
28 visiting the recipient of the kit to use electronic and technology-based devices such as digital scales  
29 and blood pressure monitors because individuals did not have these devices or tools themselves.  
30 This showcases improved social engagement and ultimately improvement in mental health. Others  
31 reported that they had shared their experience with others and in some cases advised friends or  
32 family to purchase easily accessed and available items offered in the kit. A good example of this was  
33 the remote plug. Many could identify an individual with similar needs to themselves who would  
34 benefit from the usefulness of the item.  
35  
36  
37

38 **This pilot study suggests that aggregating, simple readily available assistive products as themed kits**  
39 **can raise awareness of self-care and potentially improve physical activity and weight management.**  
40 However, the main limitation of this work is the actual measurement of improvement and a long-  
41 term follow-up on the use of these products. Further studies should focus on optimising the  
42 products and also design a structured scientific approach to quantify the improvement.  
43  
44

## 45 Conclusion

46 Overall, there was a sense of empowerment and ability by the recipients to take control of their  
47 health and well-being and management of their health condition using items contained in the kit.  
48  
49

## 50 References

- 51 Ahmad, N., Thomas, G.N., Gill, P. and Torella, F. (2016), "The prevalence of major lower limb  
52 amputation in the diabetic and non-diabetic population of England 2003-2013", *Diabetes and*  
53 *Vascular Disease Research*, SAGE PublicationsSage UK: London, England, Vol. 13 No. 5, pp. 348–  
54 353.  
55  
56  
57 Ambrose, A.F., Paul, G. and Hausdorff, J.M. (2013), "Risk factors for falls among older adults: a  
58 review of the literature", *Maturitas*, Maturitas, Vol. 75 No. 1, pp. 51–61.  
59  
60 Boulton, A.J.M., Armstrong, D.G., Kirsner, R.S., Attinger, C.E., Lavery, L.A., Lipsky, B.A., Mills, J.L., et

1  
2  
3 *al.* (2018), "Diagnosis and Management of Diabetic Foot Complications", *Diabetes*, American  
4 Diabetes Association, Vol. 2018 No. 2, pp. 1–20.

5  
6 Chambers, R., Owen, L., Rowley, A., Edden, P. and Chockalingam, N. (2021), *Smart Aids to Live Well:  
7 Staying Healthy with Assistive Technology* : Amazon.Co.Uk: Books, 1st ed., Amazon, available  
8 at:  
9 [https://www.amazon.co.uk/dp/1838397760/ref=cm\\_sw\\_r\\_em\\_api\\_glt\\_fabc\\_2DRGN9HND2YF](https://www.amazon.co.uk/dp/1838397760/ref=cm_sw_r_em_api_glt_fabc_2DRGN9HND2YF)  
10 CRAMB20X (accessed 1 April 2022).

11  
12 Clarke, A. (1999), *Evaluation Research*, SAGE Publications Ltd, 6 Bonhill Street, London England EC2A  
13 4PU United Kingdom , available at:<https://doi.org/10.4135/9781849209113>.

14  
15 Duckham, R.L., Masud, T., Taylor, R., Kendrick, D., Carpenter, H., Iliffe, S., Morris, R., *et al.* (2015),  
16 "Randomised controlled trial of the effectiveness of community group and home-based falls  
17 prevention exercise programmes on bone health in older people: the ProAct65+ bone study",  
18 *Age and Ageing*, Oxford Academic, Vol. 44 No. 4, pp. 573–579.

19  
20 Elavsky, S., McAuley, E., Motl, R.W., Konopack, J.F., Marquez, D.X., Hu, L., Jerome, G.J., *et al.* (2005),  
21 "Physical activity enhances long-term quality of life in older adults: Efficacy, esteem, and  
22 affective influences", *Annals of Behavioral Medicine* 2005 30:2, Springer, Vol. 30 No. 2, pp.  
23 138–145.

24  
25 Finnegan, S., Bruce, J., Skelton, D.A., Withers, E.J. and Lamb, S.E. (2018), "Development and delivery  
26 of an exercise programme for falls prevention: the Prevention of Falls Injury Trial (PreFIT)",  
27 *Physiotherapy*, Elsevier, Vol. 104 No. 1, pp. 72–79.

28  
29 Fujiwara, T., McManus, R.J. and Kario, K. (2022), "Management of hypertension in the digital era:  
30 Perspectives and future directions", *Hipertension y Riesgo Vascular*, Hipertens Riesgo Vasc,  
31 available at:<https://doi.org/10.1016/J.HIPERT.2022.01.004>.

32  
33 García-Molina, R., Ruíz-Grao, M.C., Noguerón-García, A., Martínez-Reig, M., Esbrí-Víctor, M.,  
34 Izquierdo, M. and Abizanda, P. (2018), "Benefits of a multicomponent Falls Unit-based exercise  
35 program in older adults with falls in real life", *Experimental Gerontology*, Pergamon, Vol. 110,  
36 pp. 79–85.

37  
38 Gillespie, L.D., Robertson, M.C., Gillespie, W.J., Sherrington, C., Gates, S., Clemson, L.M. and Lamb,  
39 S.E. (2012), "Interventions for preventing falls in older people living in the community", *The  
40 Cochrane Database of Systematic Reviews*, Cochrane Database Syst Rev, Vol. 2012 No. 9,  
41 available at:<https://doi.org/10.1002/14651858.CD007146.PUB3>.

42  
43 Giné-Garriga, M., Roqué-Fíguls, M., Coll-Planas, L., Sitjà-Rabert, M. and Salvà, A. (2014), "Physical  
44 exercise interventions for improving performance-based measures of physical function in  
45 community-dwelling, frail older adults: a systematic review and meta-analysis", *Archives of  
46 Physical Medicine and Rehabilitation*, Arch Phys Med Rehabil, Vol. 95 No. 4, available  
47 at:<https://doi.org/10.1016/J.APMR.2013.11.007>.

48  
49 GOV.UK. (2017), "Health matters: combating high blood pressure - GOV.UK", available at:  
50 [https://www.gov.uk/government/publications/health-matters-combating-high-blood-](https://www.gov.uk/government/publications/health-matters-combating-high-blood-pressure/health-matters-combating-high-blood-pressure)  
51 [pressure/health-matters-combating-high-blood-pressure](https://www.gov.uk/government/publications/health-matters-combating-high-blood-pressure/health-matters-combating-high-blood-pressure) (accessed 28 February 2022).

52  
53 GOV.UK. (2022), "Falls: applying All Our Health - GOV.UK", available at:  
54 [https://www.gov.uk/government/publications/falls-applying-all-our-health/falls-applying-all-](https://www.gov.uk/government/publications/falls-applying-all-our-health/falls-applying-all-our-health)  
55 [our-health](https://www.gov.uk/government/publications/falls-applying-all-our-health/falls-applying-all-our-health) (accessed 28 February 2022).

56  
57 International Diabetes Federation. (2019), *IDF Diabetes Atlas: Ninth Edition 2019*.

58  
59 Jadczak, A.D., Makwana, N., Luscombe-Marsh, N., Visvanathan, R. and Schultz, T.J. (2018),  
60

1  
2  
3 “Effectiveness of exercise interventions on physical function in community-dwelling frail older  
4 people: an umbrella review of systematic reviews”, *JBIC Database of Systematic Reviews and*  
5 *Implementation Reports*, JBI Database System Rev Implement Rep, Vol. 16 No. 3, pp. 752–775.

6  
7 Khaodhiar, L., McCowen, K.C. and Blackburn, G.L. (1999), “Obesity and its comorbid conditions”,  
8 *Clinical Cornerstone*, Clin Cornerstone, Vol. 2 No. 3, pp. 17–31.

9  
10 Kingston, R., Sioris, K., Gualtieri, J., Brutlag, A., Droege, W. and Osimitz, T.G. (2021), “Post-market  
11 surveillance of consumer products: Framework for adverse event management”, *Regulatory*  
12 *Toxicology and Pharmacology*, Academic Press, Vol. 126, p. 105028.

13  
14 Kitt, J., Fox, R., Tucker, K.L. and McManus, R.J. (2019), “New Approaches in Hypertension  
15 Management: a Review of Current and Developing Technologies and Their Potential Impact on  
16 Hypertension Care”, *Current Hypertension Reports*, Curr Hypertens Rep, Vol. 21 No. 6, available  
17 at:<https://doi.org/10.1007/S11906-019-0949-4>.

18  
19 LGA. (2021), “LGA response to ‘People at the heart of care: adult social care reform white paper’ |  
20 Local Government Association”, available at: [https://www.local.gov.uk/parliament/briefings-](https://www.local.gov.uk/parliament/briefings-and-responses/lga-response-people-heart-care-adult-social-care-reform-white)  
21 [and-responses/lga-response-people-heart-care-adult-social-care-reform-white](https://www.local.gov.uk/parliament/briefings-and-responses/lga-response-people-heart-care-adult-social-care-reform-white) (accessed 25  
22 December 2022).

23  
24 McPhee, J.S., French, D.P., Jackson, D., Nazroo, J., Pendleton, N. and Degens, H. (2016), “Physical  
25 activity in older age: perspectives for healthy ageing and frailty”, *Biogerontology*,  
26 *Biogerontology*, Vol. 17 No. 3, pp. 567–580.

27  
28 Mikulski, B.S., Bellei, E.A., Biduski, D. and De Marchi, A.C.B. (2022), “Mobile Health Applications and  
29 Medication Adherence of Patients With Hypertension: A Systematic Review and Meta-  
30 Analysis”, *American Journal of Preventive Medicine*, Am J Prev Med, Vol. 62 No. 4, pp. 626–634.

31  
32 NICE. (2017), “Falls in Older People: Guidance”, No. March 2015.

33  
34 ONS. (2018), “Living longer - Office for National Statistics”, available at:  
35 [https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/a](https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/articles/livinglongerhowourpopulationischangingandwhyitmatters/2018-08-13)  
36 [rticles/livinglongerhowourpopulationischangingandwhyitmatters/2018-08-13](https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/ageing/articles/livinglongerhowourpopulationischangingandwhyitmatters/2018-08-13) (accessed 25  
37 December 2022).

38  
39 ONS. (2021), “Population estimates for the UK, England and Wales, Scotland and Northern Ireland -  
40 Office for National Statistics”, available at:  
41 [https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/population](https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates)  
42 [estimates/bulletins/annualmidyearpopulationestimates/mid2019estimates](https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates) (accessed 24  
43 December 2022).

44  
45 Parliament, U. (2022), “Obesity Statistics - House of Commons Library”, available at:  
46 <https://commonslibrary.parliament.uk/research-briefings/sn03336/> (accessed 24 December  
47 2022).

48  
49 Penedo, F.J. and Dahn, J.R. (2005), “Exercise and well-being: a review of mental and physical health  
50 benefits associated with physical activity”, *Current Opinion in Psychiatry*, Curr Opin Psychiatry,  
51 Vol. 18 No. 2, pp. 189–193.

52  
53 Reddy, K.S. (2016), “Global Burden of Disease Study 2015 provides GPS for global health 2030”, *The*  
54 *Lancet*, Elsevier, Vol. 388 No. 10053, pp. 1448–1449.

55  
56 The Lancet. (2005), “Putting feet first in diabetes”, *The Lancet*, Elsevier, Vol. 366 No. 9498, p. 1674.

57  
58 Unwin, D.J., Tobin, S.D., Murray, S.W., Delon, C. and Brady, A.J. (2019), “Substantial and Sustained  
59 Improvements in Blood Pressure, Weight and Lipid Profiles from a Carbohydrate Restricted  
60

1  
2  
3 Diet: An Observational Study of Insulin Resistant Patients in Primary Care”, *International*  
4 *Journal of Environmental Research and Public Health*, Multidisciplinary Digital Publishing  
5 Institute (MDPI), Vol. 16 No. 15, available at:<https://doi.org/10.3390/IJERPH16152680>.  
6

7 Whicher, C.A., O’Neill, S. and Holt, R.I.G. (2020), “Diabetes in the UK: 2019”, *Diabetic Medicine*, John  
8 Wiley & Sons, Ltd, Vol. 37 No. 2, pp. 242–247.  
9

10 WHO. (2021), “Ageing and health”, available at: [https://www.who.int/news-room/fact-](https://www.who.int/news-room/fact-sheets/detail/ageing-and-health)  
11 [sheets/detail/ageing-and-health](https://www.who.int/news-room/fact-sheets/detail/ageing-and-health) (accessed 24 December 2022).  
12

13 Yusuf, S., Joseph, P., Rangarajan, S., Islam, S., Mente, A., Hystad, P., Brauer, M., *et al.* (2020),  
14 “Modifiable risk factors, cardiovascular disease, and mortality in 155 722 individuals from 21  
15 high-income, middle-income, and low-income countries (PURE): a prospective cohort study”,  
16 *The Lancet*, Elsevier, Vol. 395 No. 10226, pp. 795–808.  
17  
18  
19

## 20 Acknowledgements

21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

## Appendix : Capture of the content of the 4 My Health Kits



### B1: Tackle overweight & obesity

- Portion plate –encourage healthy eating
- Food diary
- Microwave egg poacher - healthy cooking/small portion
- Digital weighing scales/analyse BMI
- Tape measure- for waist measurement/ healthy weight
- Book-get fit
- Light pen
- Exercise/tube bands
- CBT book

### 2. B2: Get active –whatever your age or ability; prevent frailty

- Solar light
- Infra-red forehead thermometer
- Exercise/tube band
- Jar opener
- Light pen
- Hot & cold gel pack for pain relief
- Magnifying glass/light
- Mirror for under-foot
- Radar key-access disabled toilet
- Remote operator of electric plugs



- Foot file/shoe horn
- Tape measure

- Get fit book
- Phone armband

### 3. B3: Prevent or manage effects of cardiovascular disease

- Sphygmomanometer
- Tape measure
- Exercise/tube bands
- Light pen
- Know Heart Age leaflets
- Get fit book
- Portion plate
- Phone armband
- Microwave egg poacher
- Self-management blood pressure control plan



### 4.B4: Taking care of diabetes from lifestyle and 'at risk feet' perspectives

- Infra-red forehead thermometer
- Tape measure- for waist measurement/ keep healthy weight
- Foot file/shoe horn: These items are important for daily observation.
- Mirror to hold beneath foot weekly to note infection/callouses etc.
- Magnifying glass to look under foot
- Portion plate –encourage healthy eating
- Book – managing diabetes/healthy eating
- Light pen
- Diabetes footcare advice leaflet





1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

Journal of Integrated Care