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# Be active: a food-based dietary guideline for elderly South Africans

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The goal of this paper is to support the ‘Be active!’ food-based dietary guideline (FBDG) for South Africans of seven years and older by means of a technical guideline regarding physical activity (PA) specifically for the elderly. Optimal nutrition and physical activity (PA) are essential to ensure healthy ageing. PA is an integral part of a healthy lifestyle; however, the rate of low PA in the elderly (59.7%) is high in South Africa (SA). Regular PA reduces the risks of chronic diseases, such as diabetes, high blood pressure, heart diseases and cancers. Therefore, this review study aims to gather available information concerning PA and suitable methods to promote PA among the elderly in SA. Lack of environmental support for PA, trainers, PA-educated caregivers, poor knowledge about the recommended level of PA and its benefits, lack of motivation by healthcare providers, poor health and nutritional status, and lack of opportunity for social engagement prevent the elderly from participating in PA. Elderly individuals without any physical challenges should participate in at least 150 minutes of moderate-intensity aerobic PA in a week, or at least 75 minutes per week of vigorous-intensity aerobic PA or an equivalent combination of both types of aerobic PA. It is better to start PA slowly and increase the duration and frequency gradually. Even those who have some disease limitations should try to change their status from ‘inactive or no activity’ to ‘some level of activity’ to enjoy the health benefits of PA. More research and programmes focusing on promotion of PA need to be implemented in order to improve PA among the elderly in SA.

**Keywords:** elderly, physical activity, health, chronic diseases, South Africa

## Introduction

This position paper is revisiting the existing ‘Be Active’ Food Based Dietary Guidelines (FBDG) for Physical Activity (PA)<sup>1</sup> and the goal is to demonstrate the required PA needs of the elderly specifically. The Department of Health (DoH) initiated the ‘Vuka South Africa – Move for your Health’ campaign (Vuka SA) in 2004/2005 to promote PA along with consuming a healthy diet to reduce the prevalence of non-communicable diseases (NCDs) such as obesity, type 2 diabetes (T2D), cardiovascular diseases (CVD), hyperlipidaemia and hypertension.<sup>2,3</sup> PA is an integral part of a healthy lifestyle.<sup>1</sup> Healthy diet, nutrition and PA are required to ensure healthy ageing.<sup>4,5</sup> Research on the longer-living elderly revealed that a healthy lifestyle contributes to longevity of the elderly.<sup>6,7</sup> Longevity and healthy ageing are attributed to many physiological factors such as maintaining an ideal bodyweight, controlling blood glucose and insulin levels and blood pressure, as well as maintaining healthy blood lipid profiles with low serum triglycerides and low-density lipoprotein (LDL-cholesterol), and high high-density lipoprotein (HDL-cholesterol) concentrations. Furthermore, leading an active lifestyle improves mental well-being.<sup>6–10</sup> In addition, it has been found that moderate-to-vigorous PA among the elderly induces sympathoadrenal activation that may lead to suppressed cytokine production, and thus reduced inflammation.<sup>10</sup> In short, the best practices of healthy lifestyles include regular PA, maintaining optimal health and mental well-being, and maintaining social and community networks.<sup>6,7</sup> Thus, despite the influence of genetic factors, regular PA as part of a healthy lifestyle, may ensure successful ageing.<sup>9</sup>

Balancing energy intake and energy expenditure is essential to maintain ideal bodyweight and reduce the risks of NCDs.<sup>4,11</sup> The effects of globalisation have made energy-dense and a variety of processed foods more available and accessible to communities, and the changed food systems contribute to a higher energy intake.<sup>4,11,12</sup> In addition, developing technology (resulting in people having more sedentary jobs using a computer and the internet) and inadequate availability of and access to recreational resources (such as parks to walk in) for PA prevent people, including the elderly, from leading an active healthy lifestyle. This results in a negative energy balance and causes weight gain or even obesity.<sup>4,11,13</sup>

PA is fundamental to energy expenditure and, subsequently, to the energy-balance process that helps to maintain optimal bodyweight and reduces risk of disease.<sup>4</sup> The majority of the elderly in SA are not physically active on a regular basis or at an adequate level, and the rate of low PA among the elderly ( $\geq 60$  years) was reported at 59.7% in SA,<sup>14</sup> although no national recent prevalence rate is available. The 2003 South African Demographic and Health survey (SADHS) indicated that 62.1% of men and 76.6% of women 65 years and older were classified as inactive (multiples of resting metabolic [MET] rate-minutes/week).<sup>15</sup> The elderly are thus vulnerable to NCDs.<sup>13</sup> The South African National Health and Nutrition Examination Survey (SANHANES-1) reported that 40.4% of participants aged  $\geq 55$  years lived with high blood pressure in 2012.<sup>13</sup> Women aged 65 years and above (84.3%) had a higher prevalence of hypertension than their male counterparts (83.7%).<sup>16</sup> The study on global AGEing and adult health (SAGE) wave 1 found that the elderly in SA had the highest prevalence of obesity (45.2%)

and self-reported hypertension (78.0%) compared with those in China, Ghana, India, Mexico and Russia.<sup>14</sup> A study conducted in a residential care facility in SA showed that 60.4% of the elderly participants were either overweight or obese.<sup>17</sup> Research evidenced that leading a sedentary lifestyle has a positive association with increased risk of chronic diseases and depression.<sup>7,14,18</sup> PA supports a healthy lifestyle whilst reducing the risk of disease. Therefore, a guideline for the elderly is necessary to promote PA and support leading an active healthy lifestyle in order to ensure healthy ageing.<sup>4,11,14</sup>

The South African food-based dietary guideline (FBDG) 'Be Active' published in 2001 recommended that adults should perform at least 30 minutes of moderate to vigorous activity on most days.<sup>19</sup> In the 2013 revised 'Be Active' guideline<sup>1</sup> the same recommendation was made. South Africans are not meeting the recommended levels of PA, and it is thus essential to promote PA.<sup>1</sup> However, no specific guidance for the elderly was provided in any of the previous guidelines. This position paper is the outcome of developing FBDGs for the elderly in SA, which was completed in 2018.<sup>20</sup> The revised 'Be active' FBDG for all South Africans, aged seven years and older, and published in 2013,<sup>1</sup> is still valid, but this present review is focused specifically on PA for elderly people in SA. This review, therefore, aims to study the available information concerning the health benefits of PA, challenges for being active, and recommendations to overcome barriers and promote active lifestyles and PA among the elderly in SA.

## Definition of terms

### Physical activity

According to the World Health Organization (WHO), PA is defined as any kind of bodily movement generated by skeletal muscles using energy. There are two concepts: exercise and PA.<sup>4</sup> Exercise is planned, structured, repetitive and purposeful actions executed to maintain body fitness. PA is an umbrella term that encompasses exercise and other activities which involve body movements such as household chores, working and recreational activities.<sup>4</sup>

### Intensity and metabolic equivalent (MET)

Intensity defines the extent of effort required to accomplish an activity, or the level at which an activity or exercise is being performed.<sup>4</sup> One MET is the amount of energy expended during sitting quietly and is equivalent to consumption of 4.18 kJ/kg/hour. Furthermore, one MET minute is defined as the sum of activity volumes performed in a week and that is the result of the multiplication of total time spent on each activity and MET values of every activity during a week.<sup>4</sup> Different activity levels have different MET values; for example, 3–6 MET is considered to be moderate PA. A combination of different levels of activities has different MET values as well. Activities of 750 MET minutes per week could be the result of a combination of a MET with a value of 4 for 15 minutes and 6 for 15 minutes respectively for five days, respectively.<sup>21</sup>

### Light-intensity activity

Light-intensity activity includes daily lifestyle activities other than sitting. Activities that account for between 1.3 and 2.9 METs are recognised as light-intensity activities. Examples of light-intensity activities are stretching, casual walking, slow dancing, lifting lightweight household goods, leisure sports (such as tennis), or light household (e.g. dusting, vacuuming) or yard work.<sup>22</sup>

### Moderate-intensity activity

During moderate-intensity, PA a person needs to put in a moderate effort, and breathing is harder. In addition, moderate-intensity PA makes the heart beat faster, and during such activity a person would be able to talk, but not sing.<sup>23</sup> Moderate-intensity PA accounts for approximately 3–6 METs.<sup>4</sup> Examples of moderate-intensity physical activities are walking quickly, cycling slower than 16 kilometres per hour (km/h), general garden work and pushing a lawnmower, dancing, cycling, brisk walking, or carrying moderate loads lighter than 20 kg.<sup>4,23–25</sup>

### Vigorous-intensity activity

During vigorous-intensity activity, a person needs to put in a large amount of effort. Vigorous-intensity activity makes the heart beat faster, and during such activity a person would not be able to talk easily and would need to catch his or her breath often. Vigorous-intensity PA accounts for values of approximately more than 6 METs. Examples of vigorous-intensity activities include: running, jogging, aerobics, cycling of  $\geq 16$  km/hour, swimming laps, energetic dancing, heavy gardening activities (such as digging), or carrying moderate loads heavier than 20 kg.<sup>4,23–25</sup>

### Strengthening activities

Strengthening activities support the building of muscle. Examples of strengthening activities include climbing stairs, lifting weights, exercising with resistance bands, carrying heavy shopping bags, heavy gardening (shovelling) and running.<sup>23,25</sup>

### Health benefits of physical activity for the elderly

It is well known that a healthy diet combined with PA has the potential to improve body composition, musculoskeletal health, and physical and cognitive performance, as well as to prevent NCDs across the lifespan. Both are thus crucial lifestyle factors that modulate health and nutritional status.<sup>26,27</sup> Lack of PA and high energy intakes can cause an imbalance in maintaining ideal bodyweight, and subsequently increase risk of NCDs.<sup>4,28</sup> PA has been identified as a protective factor against NCDs.<sup>27</sup> The WHO thus recommends healthy nutrition, an active lifestyle and maintaining ideal bodyweight to address NCDs as a long-term approach.<sup>28</sup>

PA has a wide range of health benefits and these are well documented. PA improves overall well-being as well as functional, emotional, mental or psychological health status, and also has cognitive, social and environmental benefits.<sup>21,22,27</sup> PA can also reduce all-cause mortality risk in the elderly.<sup>27,29</sup> A meta-analysis showed that a low dose of moderate-to-vigorous intensity PA reduced the mortality risk by 22%, and an increase in PA improved health benefits linearly.<sup>21</sup> A longitudinal study found that physically active elderly people experienced later onset of obesity and diabetes compared with their sedentary counterparts.<sup>30</sup> A large population-based study among more than 1 million elderly men and women in the Republic of Korea has found real-world evidence that when elderly individuals with insufficient PA increased their frequency of moderate-to-vigorous PA more than 3–4 times per week, this resulted in significantly lower risk of cardiovascular disease compared with those who continued to be physically inactive. This result was consistent among those elderly with chronic conditions and disabilities.<sup>10</sup> PA is also important for the prevention of osteoporosis and sarcopenia, as well as mental health.<sup>4</sup> Therefore, a guideline is necessary to address the existing public health

problems such as overweight and obesity, as well as NCDs, by improving PA amongst the elderly.<sup>4</sup>

### **Bone health and osteoporosis**

Bone health is a common and serious health challenge in the ageing process. Bone tissue undergoes architectural and compositional alteration during ageing and this potentially leads to osteoporosis.<sup>31</sup> Osteoporosis enhances the risk of bone fragility and thus bone fracture during ageing.<sup>4,31</sup> Inactive older adults have poorer biomarker profiles and increased risk of osteoporosis compared with those who are active.<sup>4,11</sup> A randomised control trial study showed that PA decreases the rate of falls among the elderly because it improves bone health.<sup>32</sup>

### **Muscle strength, sarcopenia and immobility**

PA promotes functional independence, as resistance exercise is the only way to prevent muscle loss and thus sarcopenia.<sup>32</sup> Regular PA helps to maintain an ideal bodyweight, and to have muscular fitness and optimal cardiorespiratory function.<sup>11</sup> PA is a conducive approach for the elderly to maintain muscle strength and thus assist them to live independently through active ageing and maintaining functional status to enjoy a good quality of life.<sup>21</sup>

### **Mental health**

Apart from improved physical well-being and better functional status, PA also assists the elderly to stay mentally and socially healthy.<sup>4,20</sup> Research showed that 4% of the elderly had symptom-based depression in the 12 months prior to the survey.<sup>20</sup> Anxiety, severe cognitive impairment and mood disorders, such as depression, are the most common mental disorders experienced by the elderly. Mental disorders increasingly cause higher morbidity and mortality rates, and hospitalisation.<sup>33–36</sup> Research suggested that aerobics can reduce anxiety and symptoms of depression.<sup>27,33</sup> Regular PA may contribute to healthy and active ageing as it improves cognitive function, diminishes the incidence of dementia, and improves overall health of the elderly with existing dementia.<sup>35</sup> Physically active older adults have a 25% lower risk of developing dementia and, most importantly, PA reduces the risk of developing Alzheimer's dementia by 28%,<sup>36,37</sup> and 20–30% for Parkinson's disease in the elderly.<sup>34</sup> Elderly persons who maintain an active lifestyle also have more self-confidence and self-esteem, and are more likely to participate in community engagement, which reduces the risk of becoming isolated.<sup>38</sup>

### **Physical activity of the elderly in South Africa**

SANHANES-1 indicated that one in four men and one in two women are physically unfit in SA.<sup>13</sup> At present 40% of the total adult South African population – 28.5% of men and 47.3% of women – do not meet the WHO PA guideline of 150 minutes of moderate or 75 minutes of vigorous PA per week respectively. It is further estimated that inactivity contributes 9% to premature mortality in SA and higher levels of PA are associated with lower mortality rates among the elderly.<sup>39</sup> However, no specific PA data exists for the elderly at the national level.<sup>13</sup> It seems as if the frequency and intensity of PA is reduced with increasing age in SA, as observed in smaller research studies. A study conducted in Cape Town and Mount Frere communities showed that 58.2% of participants aged 55–64 years and 48.8% of those ≥ 65 years old participated in moderate PA.<sup>40</sup> Peltzer and Phaswana-Mafuya found that 60.5% of the elderly in SA had low PA, 10.9% had moderate-intensity PA and 28.6% had high-intensity PA.<sup>41</sup> In addition, the SAGE wave 1 conducted in six countries (China,

Ghana, India, Mexico, Russia and South Africa) indicated that South Africans equal to or older than 60 years had the highest prevalence (59.7%) of low PA.<sup>14</sup> Furthermore, elderly people living in institutions had a low level of PA.<sup>42</sup> Aro and colleagues found that only 50.4% of the respondents (aged ≥ 60 years) living in residential care facilities were engaged in some form of PA on a regular basis.<sup>17</sup> Therefore, physical inactivity among the elderly in SA is a concern.<sup>41</sup>

## **Barriers to physical activity amongst the elderly**

### **Immobility**

There are a number of factors such as physical disabilities that prevent the elderly from participating in PA.<sup>43</sup> Reduced immobility imposed by degenerative and chronic diseases as age advances prevents older adults from enjoying an active healthy lifestyle.<sup>44,45</sup> Walking is one of the best forms of PA, as it is an integrative result of musculoskeletal, sensory, neural and cardio-respiratory functioning. Increased musculoskeletal strength enhances mobility.<sup>43–45</sup> In addition, age- and cultural-appropriate interventions, such as individual educational counselling on PA, may improve mobility in the elderly.<sup>43,44</sup> However, interventions also need to consider environmental barriers and targeted individual factors to improve PA levels and thus enhance mobility.<sup>44,45</sup> Communities need to promote availability of and access to a safe physical environment, and also subsequently attenuate the stereotype or negative attitudes toward PA by elderly people.<sup>44</sup>

### **Lack of knowledge, social support and services**

Many of the elderly do not participate in regular PA as they do not have adequate knowledge concerning the recommended types and levels, and also health benefits, of PA.<sup>4,17,44</sup> Research results showed that a lack of social cohesion, available environmental facilities (for example safe parks and walk ways in high-traffic areas) and trainers/caregivers, lack of motivation and guidance by health services providers, and lack of opportunity for social engagements were the factors that demotivated the elderly in SA against taking part in PA on regular basis.<sup>17,46,47</sup>

### **Lack of time and safety**

Limited time after managing household chores and safety concerns about walking outside as a result of the high crime rates in SA also act as barriers to participating in PA.<sup>41,46,47</sup> Many elderly people have a caregiver role in their homes and this results in more time involved with family-related responsibilities, and thus less opportunity for PA.<sup>43</sup> Elderly individuals who are struggling to manage time due to having the role of caring for grandchildren or their partners can maintain PA by walking to and from destinations, walking during the course of shopping, cooking, cleaning, washing of clothes and walking to visit friends.<sup>44,48</sup>

### **Socio-economic factors**

A systematic review underscored that elderly people of a higher age, and women in particular, are less likely to be engaged in PA.<sup>46</sup> Those of the elderly who are living alone, have a low income, or have been experiencing depression also tend to be less physically active. Furthermore, they often have low confidence, low self-efficacy and low self-control to plan, participate and maintain a routine PA schedule.<sup>43</sup>

### Physical activity recommendations for the elderly

The WHO recommended aerobic and muscle-strengthening activities to derive maximum health benefits. It is recommended that the elderly aged 65 years or above should:<sup>4,11</sup>

- Do at least 150 minutes (2 hours and 30 minutes) of moderate-intensity aerobic PA in a week, or at least 75 minutes per week of vigorous-intensity aerobic PA or an equivalent combination of both types of aerobic PA.
- Do aerobic PA in series lasting at least 10 minutes per day and continue with this throughout the week.
- Increase moderate-intensity aerobic PA to 300 minutes or 150 minutes of vigorous-intensity aerobic PA or an equivalent combination of both per week to obtain more health benefits of PA during ageing.
- Do muscle-strengthening activities, including movement of all muscle groups, on two or more days per week.

It is difficult for the elderly to gauge the intensity of activities and also to meet the recommended level of vigorous intensity activities. It is important for the elderly, including those with chronic diseases and disabilities, not to avoid PA but to engage in regular PA according to their abilities.<sup>49</sup> Elderly individuals who are not physically active should start PA in small steps at first and gradually increase the frequency, duration and intensity.<sup>11</sup> Dancing, aerobic exercises, doing household work such as gardening, cooking, cleaning, sweeping, scrubbing, walking to grocery shops and carrying moderately heavy weights (< 20 kg) items can assist the elderly to lead an active lifestyle.<sup>50,51</sup>

### Practical considerations for improving physical activity in the elderly

A systematic review and meta-analysis recommended that the elderly should try and do at least 15 minutes of moderate-to-vigorous intensity PA on five days per week to enjoy health advantages and concluded that 'Even a little is good, more may be better'.<sup>21</sup> Other practical considerations include:<sup>23,32,49</sup>

- Prevent weight gain and focus on weight maintenance.
- Choose an activity that a person likes such as walking, dancing, cycling or swimming.
- Start slowly, develop a plan, and maintain continuity of being physically active.
- Count minutes of PA and gradually increase time and frequency of PA, such as increase the activity level by 5–10 minutes at a time. Every additional minute of PA has health benefits.
- Use chairs to hold onto while exercising or use sitting exercises in the case of functional limitations.
- Engage in social activities, if possible, for example community garden or group walking activities.
- Elderly people often cannot sustain PA on their own for long periods of time. It is always better to start PA in a group or with friends or relatives or in senior centres where the elderly can participate together.
- Park a little further away, or, if public transport is used, get off at an earlier stop to walk a little further.
- Whenever possible, take the stairs instead of using elevators.
- Encourage elderly people to reduce sedentary behaviour by getting up and walking around in the house often

(during adverts) when sitting down and watching TV for example.

- Walk anytime in a secure place, if possible. A walking group can be formed so that the elderly person does not walk alone and feel unsafe. The elderly can also arrange with community centres, churches or schools to use their facilities to walk or exercise in a safe environment.
- The elderly can be provided with easy-to-understand technology such as pedometers to monitor and motivate them to increase their PA levels.

Many elderly people have poor mobility, and the WHO and Centers for Disease Control and Prevention (CDC) both recommended that this group should perform PA on three or more days in a week to improve balance and prevent falls.<sup>11,52</sup> In addition, when the elderly cannot meet the recommended amount of PA due to a poor health condition, they should try to be physically active for as long as they can endure it.<sup>11,49,52</sup> All these guidelines of PA are applicable for the elderly irrespective of gender, ethnicity, race or income level. Elderly people, even those with disease limitations, should try to change from 'inactivity or no activity' to 'some level of activity' to enjoy the health benefits of PA<sup>4</sup> and to maintain healthy and longer lives during ageing.<sup>52</sup>

### Promotion of physical activity among the elderly

Caregivers can use promotional activities with appropriate media, and methods such as face-to-face behavioural change intervention guided by educational theory (for example, social cognitive theory, theory of planned behaviour, and health belief model) can reduce sedentary lifestyle practices and improve PA behaviour.<sup>53,54</sup> Research results support interventions informed by behaviour change theories/models as more successful to achieve desired lifestyle behaviour changes.<sup>53,54</sup> Self-efficacy is a term that represents one's belief and confidence in being able to perform the required activities in order to gain desired outputs.<sup>55</sup>

Self-efficacy is an important predictor of PA and can motivate the elderly to do PA.<sup>8</sup> Self-efficacy strategies include: enabling to set goals of behaviour change, self-monitoring the changes, giving feedback on the outcomes of changed behaviour, and obtaining person-centred and autonomy-supportive individual counselling to promote PA for short and long-term duration in the elderly.<sup>56,57</sup> Thus, community centre-based and home-based interventions focusing on PA can improve maintenance of functional ability in the elderly.<sup>55–59</sup> Moreover, patient-centred health systems can motivate the elderly to maintain or improve PA by providing adequate and appropriate information regarding the health benefits of PA and recommendations for an active lifestyle.<sup>60</sup>

Walking is one of the most cost-effective methods of PA and research has shown that informing the elderly about the health benefits of PA improves their walking rate.<sup>61,62</sup> Furthermore, PA or exercise conducted by trainers/caregivers may motivate the elderly to maintain PA regularly. Interventions combining resistance and balance training by trainers or caregivers are the best methods to reduce falls and fractures in the elderly.<sup>63</sup> There is some evidence that using different mobility-supporting phone apps may promote behaviour change towards PA among elderly.<sup>64</sup> In addition, social support structures can help the elderly to be engaged in community networks as greater social support promotes PA in the elderly, even in diversified situations such as people of different

ethnicities and races.<sup>65</sup> Thus, programmes and interventions need to incorporate different media and channels to achieve wider coverage for promoting PA.<sup>66</sup>

### Conclusion and recommendations

The available literature supports the 'Be Active' FBDG for people older than seven years.<sup>1</sup> This position paper further provides sufficient evidence of the many health benefits of PA for the elderly. Thus, promoting an active lifestyle along with healthy nutrition is essential to improve health and reduce the risks of NCDs among the elderly in SA. PA is a societal issue and therefore, to promote PA among the elderly in SA, it is necessary to implement population-based, multi-sectoral, and coordinated and culturally sensitive programmes and interventions.<sup>4,11</sup> Along with the global awareness on 'Active Ageing', the South African DoH has to consider the importance of PA for the elderly and continue promoting the Vuka SA campaign,<sup>29</sup> and therefore should channel a budget for improving capacity in the health and other relevant departments to develop policies and private partnerships for the implementation and monitoring of PA in programmes, at the same time considering cultural sensitivity. The DoH draft National Multi-Sectoral Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2021–2026 recommends 'advocating for policy and regulations for improved urban design conducive for physical activity'<sup>39</sup> and this should be supported by all stakeholders in the health sector involved with care of the elderly. Together with the implementation of promotional programmes to improve attitude towards PA, it is also essential to ensure availability and accessibility of a safe environment for PA. PA training for caregivers of the elderly should be made available in the community setting. More in-depth research is needed to generate evidence-based promotional strategies to improve PA in the elderly in SA.

### Author contributions

All authors assiduously contributed to the preparation of this manuscript and gave their respective approvals.

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