The physical activity and health status of two generations of Black South African professional women

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Increased health risks associated with physical inactivity in the Black population have been reported in recent years. Black women, suffering the highest levels of inactivity, overweight and obesity, are at greatest risk of developing chronic diseases of lifestyle. This explorative-descriptive study investigated the physical activity patterns and health status of two generations of Black professional women, reflecting pre-democracy and post-democracy age groups. Quantitative measures were used, including the ActiGraph GT1M accelerometer, the Global Physical Activity Questionnaire and the Health-Promoting Lifestyle Profile. Sample groups comprised teachers, nurses, social workers and public sector managers. Participants aged between 35 and 45 years were allocated to the older generation group (n = 111), whilst those aged between 18 and 21 years (students in the mentioned professional fields) were allocated to the younger generation group (n = 69). The results indicated that these women displayed lower levels of health-promoting behavioural practices than expected, significantly lower levels of physical activity and significantly higher levels of overweight and obesity than the South African norms. The observation that the younger group appeared to be replicating the patterns of the older women is a cause of concern. Greater compliance to health-promoting behaviours was expected in this group owing to participants' professional involvement in health, education and social development fields. Wide-ranging initiatives are necessary to promote physical activity and health amongst the Black female population in South Africa.

Gedurende die afgelope jare het navorsing onder die Swart bevolking 'n toename in gesondheidsrisiko's wat met fisieke onaktiwiteit geassosieer is, getoon. Swart vroue, wat die hoogste vlakke van onaktiwiteit, oorgewig en obesiteit toon, blyk ook die grootste risiko te loop om leefstylverwante chroniese siektes te ontwikkel. Hierdie ondersoekend-beskrywende studie het die fisieke aktiwiteitspatrone en gesondheidstatus van twee generasies van Swart professionele vroue ondersoek. Die tweegenerasiesteekproef verteenwoordig voor- en na-demokrasie-ouderdomsgroepe. Kwantitatiewe meetinstrumente, naamlik die ActiGraph GT1M versnellingsmeter, Globale Fisieke Aktiwiteitsvraelys en die Gesondheidsbevorderende Leefstylprofiel is gebruik. Die steekproef het onderwysers, verpleegkundiges, maatskaplike werkers en bestuurders in die openbare sektor ingesluit. Deelnemers tussen 35 en 45 jaar is aan die ouergenerasie-toetsgroep toegewys (n = 111), terwyl dié tussen 18 en 21 jaar (studente in bogenoemde studierigtings) aan die jongergenerasie-toetsgroep toegewys is (n = 69). Die resultate het gewys dat die Swart professionele vroue laer as verwagte gesondheidsbevorderende gedrag, betekenisvol laer vlakke van fisieke aktiwiteit en betekenisvol hoër vlakke van oorgewig en obesiteit toon as die Suid-Afrikaanse norme. Die waarneming dat die jonger groep dieselfde gedragspatrone as die ouer vroue getoon het, is 'n bron van kommer. 'n Groter nakoming van gesondheidsbevorderende gedrag is onder die jonger groep vroue verwag, aangesien hulle hul opleiding in die professionele sektor van gesondheid, onderwys en maatskaplike werk ontvang. 'n Holistiese benadering is nodig om fisieke aktiwiteit en gesondheid onder Swart Suid-Afrikaanse vrouens te bevorder.

Introduction

Problem statement

Background

Habitual physical activity has declined in our modern world owing to automation, technological advancement and the growth of passive forms of leisure and recreation (Simpson 1989:153; Sparling *et al.* 2000:367). Many of the chronic diseases found in developed countries today are associated fundamentally with the pervasive sedentariness of modern life (Sparling *et al.* 2000:367). Disturbingly, this trend is also becoming evident in the developing world (WHO 2003, 2004, 2005 (cited in Lambert & Kolbe-Alexander 2006). The South African population has moved towards a disease profile similar to that seen in developed countries (Steyn 2006:249). Increasing

urbanisation, industrialisation and the adoption of more Western ways have resulted in the escalation of chronic diseases of lifestyle in South Africa, accounting for nearly 40% of adult deaths (Bradshaw *et al*. 2003:iii).

The growing health risks associated with physical inactivity in the Black population were highlighted by studies conducted more than 10 years ago (Mollentze *et al*. 1995:90; Sparling *et al*. 1994:896; Steyn *et al*. 1991:480). Later studies confirmed these findings (Kruger, Venter & Vorster 2001:733; Vorster *et al.* 2000:505). Black women in particular were identified as a high-risk group, having the country's highest levels of inactivity, overweight and obesity (DoH 2002; WHO 2005 cited in Lambert & Kolbe-Alexander 2006).

In the 1980s a number of researchers explored physical activity and leisure patterns in various metropolitan areas (Taljaard 1985:99; Taljaard 1986:109; Van der Wal & Steyn 1981:81; Wilson & Hattingh 1989:85). In the 1990s, studies often focused on physical activity and its implications for health promotion (Kruger 1999; Levitt *et al*. 1999:946; Sparling *et al.* 1994:896). The start of the new century saw broader initiatives, such as the first national survey of time use (Statistics South Africa 2001) and studies that contributed to the World Health Organization's (WHO) investigation into physical activity (WHO 2005; cited in Lambert & Kolbe-Alexander 2006). These studies highlighted a growing trend of non-active leisure pursuits and low levels of physical activity amongst adults, children, youth and women, and particularly amongst Black women in South Africa. The WHO survey found that less than one third of South Africans met the American College of Sports Medicine and Centers for Disease Control's recommendations for health-enhancing physical activity (to accumulate 30 minutes of moderate activity on most, but preferably all days of the week), and that nearly half (46%) were reportedly inactive (WHO 2005; cited in Lambert & Kolbe-Alexander 2006). In South Africa, where women constitute the majority of the population, only 23% participate in sport (Sports Information and Science Agency 2000:11), and this drops to 10.8% for Black women (Kruger, Venter & Vorster 2003:16).

Cultural, economic, political and ideological patterns all affect women's participation in sport (Hargreaves 1994:5). Black women have been disadvantaged within the complex political history of South Africa. The National Party government's policy of apartheid included discriminatory laws and practices, which encompassed migrant labour, segregation, forced removals and poor living conditions for Blacks (Bernstein 1985:6). Black women carried a heavy burden as a result, but their oppression also came from historical and cultural conditions. They have been marginalised in their own patriarchal societies (Goosen & Klugman 1996:31; Nauright 1997:19). According to Roberts (1992:3), the majority of Black South African women suffer triple oppression on the basis of class, colour and gender.

However, the role and position of women in South Africa has changed dramatically over the past transitional decade. The 1994 constitution guarantees the equality of women and allows for affirmative action to address both gender and race inequalities. Many laws that discriminated against women have been changed. The government has shown commitment to gender equality and a number of bodies now deal specifically with gender issues, for example, most recently, the Ministry of Women, Youth, Children and People with Disabilities.

The extent to which these policy changes have impacted on women's lives, particularly on that of the Black woman, is debatable, as the legacies of colonialism and apartheid, as well as historical and cultural patriarchy, still shape their lives. Patterns of social change do not emerge immediately with legislation, but manifest over time. However, despite obstacles, democratisation has encouraged South African women to imagine new possibilities (McFadden 1992:510; Pelak 2005:53; Seidman 1999:287).

In the light of historical, social and policy developments, coupled with recent empowering legislation, this study sought to determine the status of physical activity and health of two groups of Black professional women in South Africa, reflecting pre-democracy and post-democracy generations.

Aim and objectives of the study

The primary aim of this research was to investigate the physical activity patterns and health-promoting behaviour of two generations of Black professional women. The professional women were teachers, nurses, social workers and public managers from the Nelson Mandela Metropolitan area. More specifically, the objectives were to:

- describe and compare the physical activity patterns of the two generations of Black women through questionnaires and accelerometers
- describe and compare the health-promoting behaviour of the participants using height and body mass measurements and questionnaires
- use the research findings to make recommendations.

Research methods and design

This explorative-descriptive study used quantitative methods to describe and compare the physical activity and health status of the participants as well as to describe and compare their health-promoting behaviour.

Participants and sampling

The population for this study was two generations of Black professional women residing in the Nelson Mandela Metropolitan area. The sampling method was purposive and criterion based to ensure that the participants shared similar characteristics, thus allowing for in-depth information on the phenomena to be gathered during the study (Holloway & Wheeler 1996:75). The participants were Black African women, whose home language was Xhosa. The older generation (OG), aged between 35 and 45 years, were qualified, practising teachers, nurses, social workers or

public managers (n = 111, mean age = 39.87 years). These women, through their occupations, were in constant contact with the community and could be regarded as role models who influence community lifestyle, attitudes and behaviour. The younger generation (YG), aged between 18 and 21 years, (n = 69, mean age = 20.12 years) were Black African female students in the disciplines of teaching, nursing, social work or public management, who resided and studied in the Nelson Mandela Metropolitan area. For the purpose of this study, the students were considered to be 'professional women' as they were the next generation of professional women and potential role models. Initially, the study sample was set at a minimum of 100 participants in each of the two age categories. However, only 69 participants in the age category 18–21 years were available for participation. This was as a result of the declining number of Black students studying the traditional professions of teaching, nursing and social work at the higher education institutions in the Nelson Mandela Metropolitan area.

With institutional ethics approval, data were collected using valid and reliable measuring instruments. Feedback was given to each participant (n = 180) in the form of a report summarising their physical activity and energy expenditure, with recommendations on how this could be improved in meaningful but practical ways.

Measuring instruments

The measuring instruments used were anthropometric measurements (height and body mass), health-related behaviour measurements (the Health-Promoting Lifestyle Profile (HPLP); Walker, Sechrist & Pender 1987:76–81) and physical activity measurements (the Global Physical Activity Questionnaire (GPAQ)), and the ActiGraph GT1M accelerometer.

Anthropometric measurements

Body mass and height were measured using standardised procedures and body mass index (BMI) was calculated by dividing body mass (kg) by the square of height (m^2). Body mass was measured using a Seca 750 scale and height was measured with a portable stadiometer.

Health-related behaviour measurements

The HPLP (Walker *et al*. 1987:76–81) was used to measure the likelihood of participants engaging in health-promoting behaviours. The HPLP is a 48-item summated rating scale, which provides a measure of frequency of performance of specific health-promoting behaviours. An overall measure of the health-promoting components of lifestyle is obtained along with a measure of six subscales, namely, self-actualisation, health responsibility, exercise, nutrition, interpersonal support and stress management. Respondents are classified as 'low' with a health-promoting percentile score of 20% or less; 'average' with a health-promoting percentile score of between 21% and 79%; and 'high' with a health-promoting percentile score of 80% or higher.

Physical activity measurements

Physical activity participation was measured using the GPAQ, developed by the WHO for physical activity surveillance in developing countries. The GPAQ measures physical activity participation in three settings (or domains), namely, activity at work, travel to and from places, leisure activities and sedentary behaviour (WHO 2006). The GPAQ used metabolic equivalents (METs) and metabolic equivalent minutes (METminutes) in the analysis of physical activity. MET is the ratio of the work metabolic rate to the resting metabolic rate. One MET is defined as 1 $kcal \cdot kg^{-1} \cdot hour^{-1}$ and is equivalent to the energy cost of sitting quietly. A MET is also defined as oxygen uptake in $ml \cdot kg^{-1} \cdot min^{-1}$ with one MET equal to the oxygen cost of sitting quietly, around 3.5 $ml \cdot kg^{-1} \cdot min^{-1}$. A METminute is calculated by multiplying the MET score by the time (minutes) the activity was performed (Bull 2003). For the GPAQ, the following selected MET values were taken from previous research using the compendium compiled by Ainsworth *et al*. (2000:S498–S516):

- moderate physical activity (in work and leisure domains) = 4.0 METs
- vigorous physical activity (in work and leisure domains) = 8.0 METs
- transport-related walking or cycling = 4.0 METs.

The ActiGraph GT1M accelerometer was used to measure energy expenditure. The ActiGraph collects and reports physical activity in 'counts' and then converts these counts to calories. Counts are the summation of the accelerations measured during the epoch period. The ActiGraph also has a pedometer function, measuring the number of steps taken. A randomly selected sample of 69 participants (OG = 36, YG = 33) from the 180 who completed the GPAQ, wore the ActiGraph GT1M accelerometer. The participants were required to wear the ActiGraph on the waist with an elastic belt, either above or below their clothing. The ActiGraph had to be worn for 7 days, put on first thing in the morning and removed last thing at night and when bathing or showering. The ActiGraph data were deemed valid if the device was worn for at least 5 days. For activity counts, and time spent in moderate to vigorous activity, at least 3–4 days of monitoring are required to achieve reliability (Matthews *et al.* 2002:1376). Every morning the researcher reminded the participants to wear their ActiGraphs by an SMS to their cellphones. After the 7-day period had expired, information collected on the ActiGraphs were downloaded onto a computer for analysis.

Statistical analyses

The statistical analyses were done using Microsoft Excel and the statistical software package Statistica (version 7). As this study was primarily exploratory-descriptive in nature, mostly descriptive statistics were used, but some inferential statistics were also computed to determine the statistical and practical significance of the results. The descriptive statistics used included means, standard deviations and frequency distributions. Inferential tests used to compare the data from the two generations of Black women included the t-test, with Cohen's d as the practical significance statistic, and the chi-square test, with Cramer's V as the practical significance statistic.

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Ethical considerations

The following ethical principles were adhered to in the study:

- Written informed consent was obtained from the participants before their participation.
- Anonymity and confidentiality were ensured through the use of code names.
- The research proposal was approved by the Ethics Committee of the Nelson Mandela Metropolitan University.

Validity and reliability

The validity and reliability of the data were ensured by the following measures:

- Height and body mass were measured according to the standardised procedures set out by the Sports Information and Science Agency (2000).
- Valid and reliable questionnaires were used. The HPLP reported a high internal consistency (α = 0.922) for the total scale and subscale alpha coefficients ranged from 0.702 to 0.904 (Walker *et al*. 1987:76–81). The GPAQ was validated in nine countries (including South Africa) and reported good test–re-test reliability results (r = 0.67–0.81) and concurrent validity (r = 0.54) (Craig *et al*. 2003:1381–1395).
- The ActiGraph accelerometer has been shown to be a reliable and valid tool for the measurement of physical activity (Freedson, Melanson & Sirad 1998:777–781). It was used as the standard for validating the International Physical Activity Questionnaire in 12 European countries (Craig *et al*. 2003:1381–1395), as well as the GPAQ (Armstrong & Bull 2006:66–77).

Results and discussion

Characteristics of the respondents

The height, body mass and BMI data are presented in Tables 1 and 2. The results indicate that mean body mass and BMI were significantly greater for the OG than the YG. The mean BMI for the OG falls in the obese category (≥ 30 kg/m^2), whereas that of the YG falls in the normal category (< 25 kg/m^2).

There was a significant difference in the frequency distribution of the BMI categories between the OG and the YG (Table 2), with 87% of the OG and 41% of the YG being classified as overweight or obese.

Perception of body weight

As an additional measurement, participants were asked how they perceived their body weight. Perception of body weight (in relation to being underweight, of moderate weight and overweight) was significantly differently distributed between the YG and OG (Table 3). Owing to the small numbers in the 'perceived underweight' category, these values were consolidated with the 'perceived moderate weight' category for calculating inferential statistics. Although 41% of the YG and 87% of the OG were overweight, with a BMI ≥ 25 kg/m^2 (Table 2), only 33% of the YG and 57% of the OG perceived themselves to be overweight (Table 3).

Perceived weight in relation to BMI was significantly different between the YG and the OG (Table 4). In respect of perceived weight and BMI, Table 4 indicates that 65% of

TABLE 1: Physical characteristics of the two participant groups.

Variable	Mean	s.d.	*t*-test	*p*-value	Cohen's *d*
Height (m)					
OG	1.60	0.06	-	0.922	-
YG	1.60	0.05	0.10		
Body mass (kg)					
OG	79.97	16.02	7.32	< 0.0005	1.12
YG	63.15	13.05			
BMI (kg/m^2)					
OG	31.27	6.12	7.55	< 0.0005	1.16
YG	24.71	4.84			

BMI, body mass index; OG, older generation (n = 111); s.d., standard deviation; YG, younger generation (n = 69).

TABLE 2: Frequency distribution of the body mass index categories of the participants.

Category	OG (n = 111)		YG (n = 69)	
	n	%	*n*	%
Normal weight (BMI < 25 kg/m2)	15	14	41	59
Above normal weight (BMI ≥ 25 kg/m2)	96	87	28	41
Overweight (BMI = 25.00–29.90 kg/m2)	32	29	17	25
Obese (BMI ≥ 30 kg/m2)	64	58	11	16
χ^2	*df*	*p*-value	*V*	Outcome
46.46	2	< 0.0005	0.51	Significant

BMI, body mass index; *df*, degrees of freedom; OG, older generation; YG, younger generation; χ^2, chi-square; *V*, Cramer's *V*; *n*, number of participants.

TABLE 3: Perception of body weight.

Category	OG (n = 111)		YG (n = 69)	
	n	%	*n*	%
Perceived as underweight	0	0	2	3
Perceived as of moderate weight	48	43	44	64
Perceived as overweight	63	57	23	33
χ^2	*df*	*p*-value	*V*	Outcome
8.42	1	0.004	0.22	Significant

OG, older generation; YG, younger generation; *df*, degrees of freedom; χ^2, chi-square; *V*, Cramer's *V*; *n*, number of participants.

TABLE 4: Perceived weight in relation to body mass index.

Category	OG (n = 111)		YG (n = 69)	
	n	%	*n*	%
Perceived moderate weight and BMI < 25 kg/m2	12	11	35	51
Perceived moderate weight and BMI ≥ 25 kg/m2	36	32	11	16
Perceived overweight and BMI < 25 kg/m2	3	3	6	9
Perceived overweight and BMI ≥ 25 kg/m2	60	54	17	25
χ^2	*df*	*p*-value	*V*	Outcome
42.06	3	< 0.0005	0.48	Significant

BMI, body mass index; *df*, degrees of freedom; OG, older generation; YG, younger generation; χ^2, chi-square; *V*, Cramer's *V*; *n*, number of participants.

the OG and 76% of the YG correctly perceived their weight category. Of the OG and YG, 32% and 16%, respectively, underestimated their weight, whilst 3% of the OG and 9% of the YG overestimated their weight.

The South African Demographic and Health Survey (SADHS) of 1998 has highlighted the high rates of overweight and obesity amongst South Africans (men = 29%; women = 56%), with the highest rate occurring amongst African women (57%) (DoH 2002). The results of this study concur with those findings, with 87% of the OG and 41% of the YG being described as having above normal weight.

Obesity is a predisposing factor for developing hypertension, diabetes and other pathologies and a number of South African studies have shown that obesity is an independent predictor of the emergence of hypertension and diabetes in Africans (DoH 2002). South African studies conducted in the 1990s (Mollentze *et al*. 1995:90; Sparling *et al*. 1994:896; Steyn *et al*. 1991:480) predicted that as the Black community became more urbanised, job-related physical activity and physical activity for daily living would decline, and coupled with the adoption of lifestyles of typical industrialised populations, including Western diets, chronic diseases of lifestyle would begin to manifest. The prediction is indeed manifesting itself, as seen in recent research.

The treatment of obesity lies with prevention as it is an extremely difficult condition to treat effectively (DoH 2002). It is a very complex condition owing to the socio-cultural circumstances surrounding it. The SADHS 1998 revealed differences in self-perceived rates of obesity between African and White women in South Africa. Although the highest rates of obesity were reported amongst African women (57%), fewer perceived themselves to be obese (15%) compared to the ratio of White women, with measured overweight reported at 53% and perception of overweight also reported at 53% (DoH 2002). However, the present study showed greater awareness of overweight and obesity amongst the two groups of African women than reported in the SADHS 1998 (DoH 2002), with perceived overweight reported at 57% and 33% for the OG and the YG, respectively; measured overweight was reported at 87% and 41% for the OG and YG, respectively. Level of education may account for this greater awareness in comparison to the African women in the 1998 SADHS sample; however, some cultural traditions that convey positive associations with being overweight or obese may account for differences in perception in relation to White women. In a study on perceptions of overweight African women about acceptable body size of women and children (Mvo, Dick & Steyn 1999:27), Black women expressed the desire to lose some weight, but there was no negative social pressure to motivate this.

Health-related behaviour measurements

The results of the HPLP are presented in Table 5. Subscales with the highest means were self-actualisation and interpersonal support, whilst exercise had the lowest mean. The results showed intermediate levels of health promotion in the areas of health responsibility, nutrition, stress management, and in the total score. Significant differences were reported for the two groups with regard to health responsibility and the overall HPLP score, with the OG scoring higher than the YG in both areas. This indicates that the OG were engaging in more health-promoting behaviours than the YG. This is in keeping with the study by Walker *et al.* (1988:76), who reported higher scores in overall health-promoting lifestyles for older adults than for younger adults.

TABLE 5: Health-promoting lifestyle profile of the two participant groups.

Subscales	Mean (%)	s.d.	*t*-test	*p*-value	Cohen's *d*
Self-actualisation					
OG	75.84	14.46	0.63	0.531	-
YG	74.54	11.62			
Health responsibility					
OG	49.01	16.57	4.54	< 0.0005	0.70
YG	36.86	18.84			
Exercise					
OG	22.22	21.01	0.64	0.521	-
YG	20.19	19.80			
Nutrition					
OG	52.30	16.33	1.88	0.061	-
YG	47.67	15.64			
Interpersonal support					
OG	65.98	17.03	0.10	0.918	-
YG	65.70	18.56			
Stress management					
OG	50.84	17.15	1.22	0.222	-
YG	47.62	17.11			
HPLP total					
OG	56.64	10.98	2.47	0.015	0.38
YG	52.46	11.20			

HPLP, health-promoting lifestyle profile; OG, older generation; s.d., standard deviation; YG, younger generation.

The WHO formulation of health as 'physical, mental and social well-being, not merely absence of disease and infirmity' is in keeping with the growing interest in health promotion and the move from disease prevention (Breslow 1999:1030). With advances in medical science leading to an increase in life expectancy, improving the quality of life through the promotion of healthy behaviour has become important. The professional women in the study should ideally practise health-promoting behaviour practices, as they are role models in the community in view of their professions. They work in historically disadvantaged communities, many serving the poorest of the poor. Teachers, nurses and social workers are beacons of knowledge to people of all ages in the community and should serve as advocates of health promotion.

The overall HPLP scores for both the OG and the YG were satisfactory; however, in view of their education levels and professional status, these scores were expected to be higher. Their scores were significantly lower than those of nursing practitioners in the Blackwell (2004:81) study, as well as of the groups of White South African women in the studies by Dreyer and Dreyer (2001:142), Erasmus, Wilders and Meyer (2005:29) and Wilders and Strydom (2003:105).

Teachers, nurses and social workers could help others to lead healthier lives by adopting better health-related behaviours themselves, in order to serve as role models and change agents.

Physical activity measurements

The results relating to the GPAQ data are presented in Table 6.

The YG were significantly more active than the OG, expending a total of 1170.7 METmin/week compared to the 711.5 METmin/week of the OG. The YG expended significantly more METminutes than the OG in the transport domain (675.4 METmin/week versus 180 METmin/week). The difference between the OG and the YG with regard to the leisure time domain (280.3 METmin/week versus 157.7 METmin/week) was found to be not significant. However, the OG expended significantly more METminutes than the YG in the work domain (373.8 METmin/week versus 215.0 METmin/week). All of the total METminutes for the OG, and most of the total METminutes for the YG, were expended through doing moderate intensity activity. The YG spent significantly more time per day sitting than the OG: 630.0 min (10.5 h) and 445.7 min (7.4 h), respectively.

There was a significant difference between the YG and the OG in relation to the GPAQ activity levels (Table 7), with the YG being more active than the OG. The sufficiently active category or health-enhancing physical activity (HEPA) category is calculated as 7 or more days of any combination of moderate and vigorous activity, 3000 or more METminutes per week. The GPAQ calculates moderate and vigorous activity separately (in minutes per day and days per week) for the domains of work, transport and leisure. The combination of moderate and vigorous activity within the various domains can therefore exceed 7 days. Owing to the small numbers in the HEPA category, these values were consolidated with those of the minimally active category for calculating the statistical significance. An observation of note is that only 4% of the YG and none of the OG were sufficiently active to fall in the HEPA group.

TABLE 6: Results of the Global Physical Activity Questionnaire for the two participant groups.

Physical activity (METmin/week)	Mean	s.d.	*t*-test	*p*-value	Cohen's *d*
Work					
OG	373.80	321.39	3.69	< 0.0005	0.57
YG	215.07	196.69			
Transport					
OG	180.00	356.85	7.35	< 0.0005	1.13
YG	675.36	548.09			
Leisure					
OG	157.66	299.16	1.67	0.098	-
YG	280.29	677.54			
Total					
OG	711.46	544.00	4.38	< 0.0005	0.67
YG	1170.72	863.23			
Moderate					
OG	711.46	544.00	3.69	< 0.0005	0.57
YG	1062.90	729.09			
Sitting					
OG	445.68	109.36	10.51	< 0.0005	1.61
YG	630.00	122.19			

OG, older generation; s.d., standard deviation; YG, younger generation.

TABLE 7: Activity levels of the two participant groups according to the Global Physical Activity Questionnaire.

Activity levels	OG (*n* = 111)		YG (*n* = 69)	
	n	%	*n*	%
Inactive (< 600 METmin/week)	77	69	30	43
Minimally active (≥ 600 METmin/week)	34	31	36	52
Sufficiently active (HEPA)[a]	0	0	3	4
χ^2	*df*	*p*-value	*V*	Outcome
11.83	1	0.001	0.26	Significant

HEPA, health-enhancing physical activity; *df*, degrees of freedom; OG, older generation; YG, younger generation; χ^2, chi-square; *V*, Cramer's *V*; *n*, number of participants.
[a], Defined as 7 or more days of any combination of moderate and vigorous activity, ≥ 3000 METmin/week).

Accelerometer

The results of the ActiGraph accelerometer measurements are presented in Table 8. The ActiGraph was worn by both OG and YG participants for an average of 6 days. The YG were more active than the OG, with significant differences reported for energy expenditure, steps and time spent doing moderate activity.

The step categories as proposed by Tudor-Locke and Bassett (2004:1–8) were used in the analyses of the step data from the ActiGraph (Table 9). In relation to the step categories, the YG were significantly more active than the OG. Some 87% of the OG were classified as slightly active or sedentary.

All the physical activity measurements confirmed that neither the YG nor the OG were sufficiently physically active. They did not meet the recommendation issued jointly by the Centers of Disease Control and American College of Sports Medicine of engaging in at least 30 minutes of moderate-intensity physical activity on most, but preferably all, days of the week (Pate *et al.* 1995:402).

Although the YG were significantly more active than the OG in all the instruments measuring physical activity, they still did not reach the HEPA level (≥ 7 days of any combination of moderate and vigorous activity, ≥ 3000 METmin/week).

Certain trends can be identified when analysing the results obtained with these measuring instruments. The YG scored very high in the transport domain (GPAQ, Table 6) and had a mean step count of 9178 (Table 8) as measured by the ActiGraph. Most of their physical activity was accumulated in the transport domain, and less in the work and leisure domains. They expended more energy by walking to get to places. None of the YG had their own cars and they had to rely on public transport (buses and minibus taxis) to get to and from places. This would entail walking from their homes to the bus stops in their areas, and back again. The students who lived in university residences walked to their lectures, with many of them walking back and forth to their residences

TABLE 8: ActiGraph data of participants from the two generations.

Variable	Mean	s.d.	Minimum	Maximum	*t*-test	*p*-value	Cohen's *d*
Energy expenditure (cal)							
OG	105.85	83.32	7.83	347.49	2.85	0.006	0.69
YG	178.18	124.94	39.50	490.91			
Steps							
OG	6025.19	1935.08	3487.83	11384.80	5.42	< 0.0005	1.31
YG	9178.19	2846.73	4253.60	14453.67			
METs							
OG	306.67	111.95	163.11	621.81	1.81	0.075	-
YG	358.34	125.55	153.69	626.61			
Time (moderate activity)							
OG	17.08	12.21	2.50	52.20	6.19	< 0.0005	1.49
YG	42.26	20.83	12.00	83.71			
Time (hard activity)							
OG	0.60	2.71	0.00	16.17	0.63	0.533	-
YG	1.07	3.60	0.00	20.57			

METs, metabolic equivalents; OG, older generation (n = 36); YG, younger generation (n = 33).

between classes. They also walked to shopping centres and places of entertainment near the university campus. The majority (70%) of the OG had their own cars and drove to and from places; the rest (30%) travelled in lift clubs or used public transport. The area of concern here is that once the YG have qualified in their various professions, have found places of employment and start earning a salary, they too will be using cars to get to and from places. The transport domain, where most energy is used, will thus not have as big an influence as it presently does.

There was a significant difference in energy expenditure in the work domain (GPAQ, Table 6) between the YG and the OG, with the OG expending more energy in this domain. The OG did not expend much energy in their professional duties, or paid work. The social workers and public managers spent most of their working hours seated: meeting or consulting with clients, working at their computers, writing reports and driving to get to places. The nurses at the community clinics also spent a lot of time seated whilst consulting with patients and writing reports; during clinic days they spent more time standing and walking for short distances. Teachers spent most of their working hours standing, walking around the classroom, and then being seated at times. Most of the energy expended by the OG in the work domain came from their unpaid work, doing domestic chores. These professional women work full-time and run their households with very little help. More than half of the participants (61%) did not have any domestic assistance at home, 32% had assistance once or twice a week and only 7% had assistance on 3 or more days a week. In addition, 85% were raising children, with 41% being single parents. Light domestic chores were done before leaving for work, followed by further light domestic chores and cooking after work, whilst the thorough house cleaning and the laundry were done on weekends, coupled with family and community engagements. 'Sedentary but busy', borrowed from Henderson and Ainsworth (2003:313), is an apt description of the OG in this study. They are defined as sedentary by physical activity standards, but lead very busy lives.

There was a significant difference between the YG and the OG in the amount of time spent sitting, with the mean score being 630 min and 446 min a day, respectively. This is to be expected because the YG attended lectures daily. Between lectures they sat in the computer labs or the library, and sat chatting to friends. Both the YG and the OG spent much time watching television daily (146 min and 130 min, respectively), more than the comparative groups in the national time use survey. Information obtained from the in-depth interviews (from the qualitative part of the study, not reported here) indicates that the OG found watching television very relaxing at the end of the day, after all their chores had been completed. Many of the YG staying in the university residences had television sets in their rooms, which they watched whilst lying in bed.

The leisure-time physical activity scores were very low for both the YG and the OG. The score for the exercise subscale in the HPLP was the lowest for both the YG and the OG, and only 4% of the YG and none of the OG were sufficiently active to fall in the HEPA category of the GPAQ. All the data confirm the sedentary nature of the participants' lifestyles. The leisure domain is the only area these professional women can use to improve physical activity participation rates. Paid work and the unpaid work at home doing domestic chores do not allow for sufficient energy expenditure, whilst the transport domain is only a temporary outlet for energy expenditure for the YG. It is the leisure domain that has to gain more

TABLE 9: Activity classification of participants according to step categories.

Step category	OG (n = 36)		YG (n = 33)	
	n	%	*n*	%
Sedentary lifestyle (< 5000 steps/day)	11	31	1	3
Slightly active (5000–7499 steps/day)	20	56	10	30
Moderately active (7500–9999 steps/day)	2	6	10	30
Active (≥ 10 000 steps/day)	3	8	6	18
Highly active (> 12 500 steps/day)	0	0	6	18
χ^2	*df*	*p*-value	*V*	Outcome
23.91	4	< 0.0005	0.59	Significant

df, degrees of freedom; OG, older generation; YG, younger generation; χ^2, chi-square; *V*, Cramer's *V*; *n*, number of participants.

prominence in the lives of both groups of Black professional women. Both the YG and the OG need to be aware of the importance of leading an active lifestyle and should commit to setting aside 30 minutes a day for moderate-intensity physical activity. Determinants and barriers to leisure-time physical activity amongst Black women need to be identified and measures put into place to assist in promoting an active lifestyle for them.

The importance of physical activity in health promotion has been widely researched and has become widely recognised as key health behaviour, associated with preventing chronic diseases of lifestyle. Increasing urbanisation, industrialisation and the adoption of a more Western lifestyle have resulted in the escalation of such chronic diseases in South Africa and account for nearly 40% of adult deaths (Bradshaw *et al*. 2003:iii). Many South African studies have highlighted the sedentary nature of people's lifestyles, with a growing trend of non-active leisure activities. South African studies on physical activity and its effect on various health variables have also highlighted the increased health risks facing South Africans as a result of the low levels of participation in physical activity. Results from the present study confirm these trends, with very few participants (only 4% of the YG and none of the OG) meeting the recommended goal of 30 minutes of moderate exercise on most, but preferably all, days of the week and high levels of obesity. The activity levels are significantly lower and the levels of overweight or obesity are significantly higher than the South African norms (DoH 2002; WHO 2005 (cited in Lambert & Kolbe-Alexander 2006)).

Limitations of the study

The results are not generalisable to a larger context owing to the sample being limited to the relevant professional women residing in the Nelson Mandela Metropolitan area.

Recommendations

A wide range of initiatives is needed to increase the awareness of and participation in physical activity in the country and amongst Black women specifically. The implementation of the physical development component of life orientation in schools is essential. This is where the foundation of lifelong participation in physical activity is laid. In addition, people need to be alerted to the important messages of '30 minutes of physical activity on all or most days of the week' and 'Vuka South Africa, move for your health'. These messages need to be as widely known as the 'ABC' message of the HIV and AIDS campaign. This can be achieved through education in schools and other institutions and through the media. More important, perhaps, is that participation in these activities needs to be popularised through role models like politicians, church leaders, doctors, teachers, sports people, social workers, community leaders, nurses and celebrities to promote the message.

Conclusion

Democracy has brought about legislative and policy change in South Africa, allowing women more opportunities and the space to imagine new possibilities. Democracy enables choice, and an important implication in relation to health promotion is that everyone can choose to take responsibility for their own health; responsibility for health does not lie with the government or the health profession alone.

The professional women in the study engaged in fewer than expected health-promoting behavioural practices and displayed significantly lower levels of physical activity and significantly higher levels of overweight and obesity than the South African norms (DoH 2002; WHO 2005; cited in Lambert & Kolbe-Alexander 2006). This predisposes them to an increased risk of developing chronic diseases of lifestyle. The YG, despite enhanced opportunities, are following in the footsteps of the OG and are advised to prevent the decline by leading healthy, active lives.

Both the YG and the OG need to be aware of the importance of leading healthy, active lifestyles and to take responsibility for health choices – not only for themselves, but for the people around them. In a country like South Africa, with high levels of unemployment, illiteracy and an unskilled labour force, many people are not aware of the importance of leading a health-promoting lifestyle or what it entails. Professionals – teachers, nurses and social workers – working in disadvantaged communities are role models and it is important that they should not only talk about a healthy lifestyle but also model such a lifestyle. People need to be made aware that engaging in a healthy lifestyle is not only important for the prevention of lifestyle diseases, but that it contributes to the enhancement of quality of life and ultimately lessens the financial burden on an already under-resourced and struggling health care system in South Africa.

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Authors' conributions

C.M.W. was the main researcher, conducted the research and wrote the article, R.d.R. Academic supervisor.D.J.L.V.performed Statistical analyses and support

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