

Physical activity and physical fitness profiles of South African women

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Abstract

The purpose of this study was to determine the leisure time physical activity (LTPA) participation and physical fitness (PF) levels of South African women of the various ethnic groups. Individuals between the ages of 30 and 60 years ($\bar{X}=41.0$; $\pm=4.6$) who were part of a cross-sectional non-randomized availability population who voluntarily participated, were used in this study. The group that formed part of the physical activity survey included 3273 subjects (Asian =262; black=1357; coloured=239; white=1415) while the group for the physical fitness analysis included 3060 subjects (Asian=248; black=1015; coloured=199; white=1225). Subjects who used medication such as beta-adrenergic suppressors that could affect the fitness test were excluded from participating. Statistical analysis was done using the CSS: Statistica computer software to determine profile analysis of the participants. The results indicated that 85% of coloured women reported low physical activity participation, followed by black and Asian women where 83% of the participants indicated low physical activity participation, while 75% of white women revealed low physical activity levels. In contrast, 10% of the white women indicated high LTPA participation while only 5% of coloured women were very active. In the case of black and Asian participants, 8% and 6% respectively indicated high LTPA levels. Regarding physical fitness, 57%, 50%, 49% and 39% of the black, Asian, coloured and white respondents respectively showed low physical fitness levels, while 10%, 6%, and 5% of the white, Asian/black and coloured respondents showed high levels of physical fitness. This high prevalence of physical inactivity and unfitness may lead to various health problems and can increase the prevalence of hypokinetic ailments in adult women, increased health care costs and even premature death.

Key words: Physical activity, physical fitness, women, hypokinesis.

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Introduction

Physical activity is a complex behaviour that involves all daily activities resulting from muscle contraction which implies energy expenditure (Cooper, 2003). Although physical activity (PA) and movement of all types only account for 25% of energy expenditure in a typical day of a sedentary person (Bouchard, Blair & Haskel, 2007), regular PA is associated with various health benefits

(Oguma & Shinoda-Tagawa, 2004). On the other hand physical fitness (PF), which is closely linked to PA can be defined as a set of physiological attributes that result from PA and to some degree from genetic influences (Blair & La Monte, 2007). A vast amount of research has already established the positive correlation of PF with health (Kokkinos, Holland, Pittaras, Narayan, Dotson & Papademetrio, 1995). In this regard it is, however, important to distinguish between health-related PF and performance-related PF, focusing on various outcomes (ACSM, 2006).

The physical activity participation profile normally differs during the lifespan and is usually associated with various stages in life (Popham & Mitchell, 2006). This is also related to the different roles in women viz. marriage, motherhood and career challenges (Scharff, Homan, Dreuter & Brennan, 1999; Nomaguchi & Bianchi, 2004). Culture, ethnic grouping and religion (Juarbe, Lipson & Turok, 2003) as well as transitional changes occurring in South Africa over the last decade may contribute to the changing profiles of women regarding physical activity participation (Kruger, Venter & Vorster, 2003).

When the reasons for non-participation amongst women in a multi-ethnic environment were analysed, a lack of interest forms the major reason in the Asian (30.8%), coloured (26.9%) and black (24.1%) population, while 18.3% of the white group declared “no interest” in physical activity as the third important reason (DSR, 2005). The reasons for non-participation in the total female group in order of importance are as follows: lack of interest (24%), age (20.4%), no particular reason (15.2%) and time constraints (12.5%) (DSR, 2005). It is clear that despite the salutogenic effects associated with a physically active lifestyle, only a minority of the South African women indulge in regular physical activities to the extent that may cause positive health outcomes (Loock, 2008). A cause of major concern is the significant group of South African women who indicated “no interest” and/or “no particular reason” for this hypokinetic state. This tendency may indicate some ignorance on their part or just an unwillingness to accept self-responsibility for their own health and wellness. This may call for some focused intervention and educational strategies from various role players in order to get them to accept responsibility for their own health and wellness (Strydom, 2005).

Little information is available on PF and LTPA participation of South African women in a multi-ethnic context. Therefore, more research in this domain may reveal important information which is needed for intervention and educational strategies in this country.

Materials and methods

Study design

The study design was based on a once off, cross-sectional design, analysing an availability population of members of a comprehensive national health insurer in South Africa. As part of their health promotion initiative the health insurer offers wellness days where some health risk analysis as well as some field tests were done on members who volunteered.

Participants

Subjects between the ages of 30 and 60 years ($\bar{x}=41.0$; $\pm=4.6$) participated in this study. The group who formed part of the physical activity analysis included 262 Asian, 1357 black, 239 coloured and 1415 white women, while the physical fitness survey included 248 Asian, 1015 black, 199 coloured and 1225 white women. For the purpose of baseline data the group was also divided into younger (30-44 years) and older group (45-60 years) primarily representing the pre- and postmenopausal life stages as well as the clinical horizon for chronic cardiovascular ailments (Rowland, 1990; Beake, Zimbizi & Stevens, 1996). Individuals using medication such as beta-adrenergic suppressors that could affect the fitness evaluation were excluded from the group. Even though the research involved a non-randomized availability population, the large number of subjects that were analyzed gives significance to the study as it supplies comprehensive information about women from all over the country. The participants in the study were members of the same health insurer suggesting the participants to be more or less of the same socio-economic status.

Measuring instruments

- **Demographic information**

The following demographic information was gathered from the subjects: medical aid membership number, name, age, date of birth, ID number, gender, race and contact information.

- **Physical activity participation**

Physical activity participation was determined by means of a questionnaire, from which the energy expenditure per week could be calculated. This participation profile was classified into low physical active ($<500 \text{ kcal.week}^{-1}$), moderate active ($500\text{-}1499 \text{ kcal.week}^{-1}$) and high active ($>1500 \text{ kcal.week}^{-1}$) (ACSM, 2006:4,148).

- **Physical fitness (PWC₁₇₀)**

Physical fitness was determined by using the PWC₁₇₀ test according to the YCMA submaximal protocol for bicycle ergometry (ASCM, 2006). A mechanically braked Monark bicycle ergometer was used in this study. Results were expressed in an age adjusted percentile fitness score.

- **Body mass**

A dynavit electronic scale was used to determine body mass to the nearest 0.5 of a kilogram.

- **Procedures**

All assessments were done by registered Biokineticists, who received prior training in order to standardize all procedures and protocols. Subjects were asked not to ingest alcohol, caffeine or tobacco at least three hours before the test. A health risk screening was performed on all participants to ensure safety and readiness for participation. All participants were asked to sign an informed consent prior to the testing. Participants were dressed in comfortable, light clothing. The assessment of the physical activity profile and body mass were initially done followed by the PWC₁₇₀.

- **Statistical analysis of data**

CSS: STATISTICA computer software (Statsoft, Inc. 2003) available at the North-West University (Potchefstroom Campus) was used to analyse the data. Descriptive analyses were used to determine the mean and standard deviation. The profile analysis was determined by using the frequency variance.

Results

Table 1 presents the descriptive statistics of the participants, while Table 2 reveals the descriptive statistics regarding the mean physical activity and physical fitness scores of the female respondents.

Shown in Figures 1 and 2 are the physical activity and physical fitness profiles of respondents in the different ethnic groups. Age classification in this analysis was not feasible due to the small numbers of participants in some of the groups.

Table 1: Demographic statistics of the respondents

		N	Mean	SD
Younger group (30 – 44yr)	Total group	2422	36.8	4.6
	Asian	222	35.4	4.1
	Black	1078	36.6	4.6
	Coloured	207	36.5	4.7
	White	915	37.4	4.7
Older group (45 – 60yr)	Total group	968	51.5	3.9
	Asian	45	49.6	3.5
	Black	331	51.0	3.7
	Coloured	43	51.0	3.7
	White	549	52.0	4.0
All groups (30 – 60 yr)		3390	41.0	8.0

N= number; SD = standard deviation

Table 2: Descriptive statistics regarding the physical activity (kcal.week⁻¹) and physical fitness (percentile) levels of the respondents

Physical Activity		N	Mean	SD
Younger group (30 – 44yr)	Total group	2348	598.8	1177.8
	Asian	218	601.6	1647.8
	Black	1043	559.4	1165.5
	Coloured	199	415.6	636.9
	White	888	685.4	1141.6
Older group (45 – 60yr)	Total group	925	689.8	1275.7
	Asian	44	615.7	1250.1
	Black	314	565.0	1158.8
	Coloured	40	432.0	675.9
	White	527	789.9	1368.6
All groups (30 60yr)		3273	624.5	1206.8
Physical Fitness		N	$\bar{x}$	SD
Younger group (30 – 44yr)	Total group	2208	31.9	23.0
	Asian	204	29.7	22.3
	Black	964	27.7	21.2
	Coloured	176	31.2	21.7
	White	864	36.5	24.2
Older Group (45 – 60yr)	Total group	852	36.8	23.0
	Asian	38	35.2	20.2
	Black	277	28.0	20.7
	Coloured	35	29.0	19.2
	White	502	41.3	20.7
All groups (30-60yr)		3060	33.2	23.1

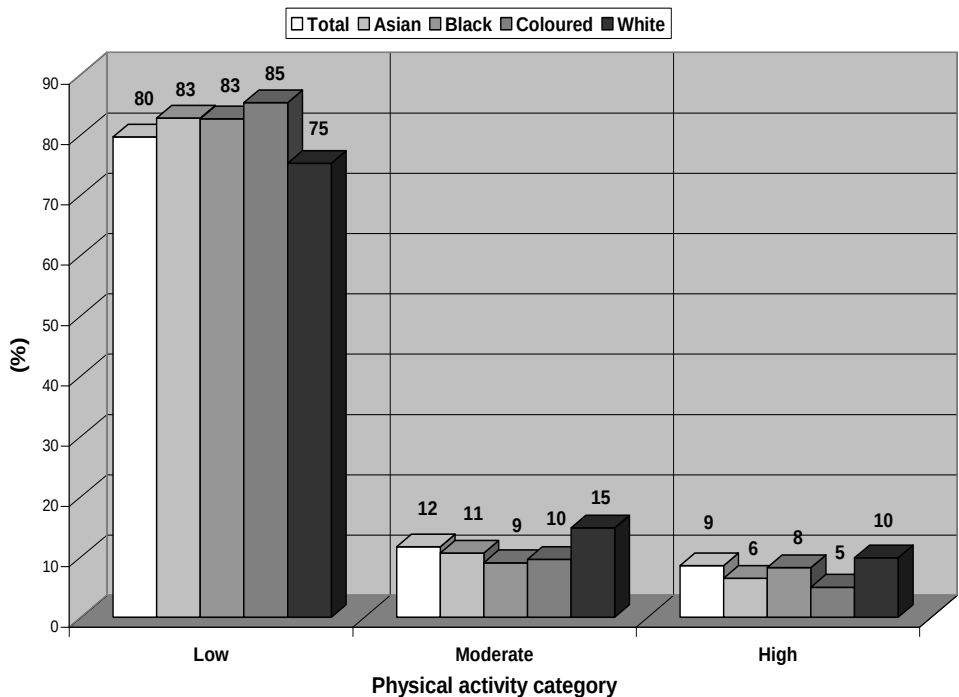


Figure 1: Physical activity participation profiles of South African women participating in this study.

Discussion

From Table 2, it is clear that for both parameters (physical activity and physical fitness) the older group seems to be superior to the younger group. In both groups a consistency regarding the more active to least active ethnic group consists with the white women being the most active group followed by the Asian, black and coloured women. As far as the superiority regarding physical fitness is concern the same tendency existed within the older women showing a higher fitness index than the younger group, however, the ranking order differs in the groups. In both groups the white women showed the highest physical fitness index, followed by a diverse ranking order in the younger and older group.

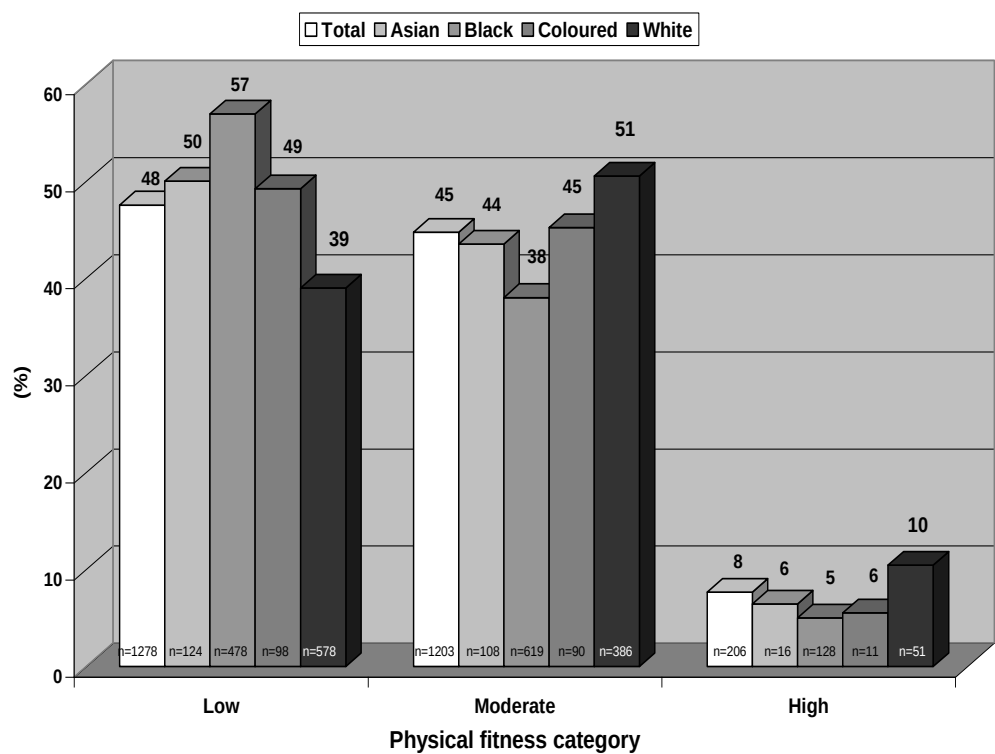


Figure 2: Physical fitness profiles of South African women participating in this study

Figures 1 and 2 present the profile of the research group regarding a ranking of low, moderate and high physical activity participation (Figure1) and physical fitness (Figure 2). Due to the small number of participants in some of the groups it was not possible to discriminate between younger and older women, therefore, the profiles represent the participants over the entire age distribution (30-60 years). A closer look at Figures 1 and 2 reveals an interesting pattern. With regard to the physical activity (PA) the overwhelming amount of participants (80% of total group) fall in the low active groups – with only a small percentage in the moderate and high active group (12% & 8% of total group, respectively). Within each of these three groups (profiles) some minor fluctuations between the various ethnical groups occur. In Figure 2 (physical fitness profile) the pattern looks totally different – with 48% and 46% of the total number of participants falling into the low and moderate physical fitness groups, respectively with gain in some variations between the ethnical groups in the different profiles. In this case (physical fitness) the variations seem to be greater than is the case in Figure 1. Regarding the physical fitness profile (Figure 2), 57% of the Black participants were classified as being low fit compared to the 50%, 49% and 39% of the Asian, coloured and white participants respectively. Regarding the moderate fitness groups, 51% of the white participants form the major portion

compared to the 45%, 44% and 38% of the coloured, Asian and Black participants.

The results of this study reveal that the majority of the women fall into the low PA group. In the case of PF virtually the same tendency occurred except for the white group where 54% fall in the moderate fitness group with 39% in the low fitness group. The high number of participants classified as low physically active and unfit is a major concern regarding the health and wellness of the South African women and if the individuals do not deliberately decide to change their lifestyle, this detrimental tendency may escalate which may result in the increase of hypokinetic diseases (Strydom, 2005). This, further may result in increasing health care costs, both for the individual and the health insurer.

In the light of the global increased number of people reaching advance age (Ehrman, Gordon, Visich & Keteyian, 2009), the challenge to get people more physically active in order to delay the onset of chronic conditions associated with old age will become greater. To face this challenge all health professionals should take up the responsibility and support the commendable initiative of the ACSM and American Medical Association "exercise is medicine" action plan which aims to convince medical as well as other health practitioners to include "exercise" as part of their "medicine prescription" to patients (Exercise is Medicine, 2007). In this respect, the health disciplines focusing on exercise as therapy viz biokinetics, clinical exercise physiology and so on (Strydom, 2005) should assume responsibility to guide and educate the public to become more physically active in order to improve their health and wellbeing.

The results from this study also support the figures of the WHO (2005) indicating that 48.6% of all South African women between the age 18-69 years are physically inactive. As indicated in Table 2 the younger group reveals lower PA and PF indexes than the older group. This is true for all four ethnic groups. The reason for this may probably be due to the multiple family responsibilities of the younger group (Verhoef & Love, 1992; Schaff *et al.*, 1999). In this respect Verhoef and Love (1992) indicated that mothers with children tend to be less active during leisure time than those without children. However, in a randomized research study by the Department of Sport and Recreation (DSR) on the South African population (2005) it was indicated that time constraints (which may include family responsibilities) are only mentioned in the fourth place (11.2%) as the reason for non-participating in PA. The first three reasons mentioned by the respondents were "not interested (28.1%), age (19.2%) and "no particular reason" (15.8%). From this finding, it seems as if a major effort should be made in order to educate women about the detrimental health issues associated with physical inactivity. This should involve all levels of society in order to reach as many people as possible. The methods which should be used in these efforts,

however, are not clear and call for innovative operational strategies and future research (Haskell, Blair & Bouchard, 2007). Some researchers have also suggested that priority needs of persons in medically underserved populations, including those with low incomes and limited formal education should be given a priority (Haskell *et al.*, 2007).

The research by the DSR (2005) also indicated that the reason for non-participation differs amongst the four ethnic groups. The major reason for non-participating in the Asian (30.8%), Black (24.1%) and coloured (26.9%) groups was indicated as “not interested”, while in the white group the above-mentioned reason was indicated as the second important (18.8%) while age (23.6%) was indicated as the most important reason for non-participating. Bengoechea, Spence and McGannon (2005) indicated that environmental safety may also be a major constraint for women to indulge in informal physical activity.

From Table 2 it is also clear that some variation existed between the various ethnical groups regarding their physical fitness. In this respect Katzmarzk (2007) indicated that the information on the physical fitness profiles of various ethnic populations in most countries in the world are very limited and calls for more research. He, however, stated that evidence suggests that cardiorespiratory fitness levels are lower among Black persons in the United States compared to their white counterparts (Katzmarzk, 2007).

This however is not surprising as their physical activity participation is also lower than the white group. The findings of Katzmarzk (2007) support those of this study as the white group also indicated a higher cardiorespiratory fitness as the other three ethnic groups (Asian, black and coloured). This was consistent in the younger as well as in the older group. When looking at the average physical activity participation it is also clear that the white group had a higher PA index than the others. It is also clear in Figure 1 that the white group showed a higher percentage respondents classified into the moderate (15%) and high (10%) active group than is the case with the other groups.

The reason that a large number of the respondents (total group) were classified in the moderate (46%) physical fitness group compared to only 12% in the moderate group for physical activity participation may be due to the fact that physical fitness is only partially dependent on physical activity (Plowman & Smith, 2003). In this respect research indicated that genetics may also significantly contribute to the physical fitness status of an individual (Sharkey & Gaskill, 2007). Furthermore, it is also indicated that the genetic footprint of individuals may affect their physical activity participation (Bouchard & Rankinen, 2006). It is indicated that genetics may determine up to 62% the PA profile of an individual (Bouchard & Rankinen, 2006).

Although a very close but complex interaction between physical activity participation and physical fitness existed, both constructs must be regarded as separate contributors to the health and wellbeing of individuals in their own right.

Limitations

This study comprises some limitations. First the lack of random sampling may present some bias in the results. The small numbers in some of the groups limited discrimination between the younger and older population as far as their PA and PF profiles are concerned. The lack of objectivity in determining the physical activity participation profiles by means of self-reported questionnaires must always be kept in mind, in using these types of profiles.

Conclusions

The study indicated that a large portion of South African women are physically inactive. For physical fitness the number of women falling into the low fitness group was considerably low compared to PA (48% vs 80% respectively). This may be due to the fact that genetics can impact on the fitness of an individual. The on-job physical activity participation of the individuals can also affect their cardiorespiratory fitness.

Nevertheless the proportions of respondents classified in the low group (PA and PF) signal very important alarm to health professionals as both constructs are important in the maintenance and improvement of individual's health and wellness. As PA and PF are constructs which can significantly improve the national health status of a country, concerted efforts should be made regarding national health. However, the challenge of convincing people to take up self responsibility for their own health and wellness remain a very complex challenge – especially for a diverse country like South Africa.

References

- American College of Sports Medicine. (2006). *ACSM's Guidelines for Exercise Testing and Prescription* (7th ed). Baltimore: Lippincott Williams & Wilkins.
- Beake, L., Zimbizi, D. & Stevens, M (1996). Growing older. In M. Goosen & B. Klugman (Eds.), *The South African Women's Health Book: The Women's Health Project* (pp. 193-217). Cape Town: Oxford University Press.
- Bengoechea, E.G., Spence, J.C. & Mcgannon, K.R. (2005). Gender differences in perceived environmental correlates of physical activity. *The International Journal of Behavioural Nutrition and Physical Activity*, 2, 12-20.

Blair, S.N. & LaMonte, M.J. (2007). Physical activity, fitness and mortality rates. In C. Bouchard, S.N. Blair & W.L. Haskell (Eds.), *Physical Activity and Health* (pp. 144-158). Champaign, Illinois: Human Kinetics.

Bouchard, C., Blair, S.N. & Haskell, W.L. (2007). *Physical Activity and Health*. Champaign, Illinois: Human Kinetics.

Bouchard, C. & Rankinen, T. (2006). Are people physically inactive because of their genes?. *President's Council on Physical Fitness and Sport: Research Digest*, 7(2), 1-8.

Cooper, A. (2003). Objective measurement of physical activity. In J. McKenna & C. Riddoch (Eds.), *Perspectives on Health and Exercise* (pp. 83-108). Hampshire: Palgrave Macmillan.

DSR (2005). See: Department: Sport and Recreation, RSA (2005).

Department of Sport and Recreation, RSA (2005). *Participation Patterns in Sport and Recreational Activities in South Africa – 2005 Survey*. Cape Town: Formaset Printers.

Ehrman, J.K., Gordon, P.M., Visich, P.S. & Keteyian, S.J. (2009). *Clinical Exercise Physiology*. Champaign, Illinois: Human Kinetics.

Exercise is Medicine (2007). ACSM and AMA expand "Exercise is Medicine™" program. www.exerciseismedicine.org. Date of access 11 Nov. 2010.

Haskell, W.L., Blair, S.N. & Bouchard, C. (2007). An integrated view of physical activity, fitness and health. In C. Bouchard, S.N. Blair & W.L. Haskell (Eds.), *Physical Activity and Health* (pp. 360-374). Champaign, Illinois: Human Kinetics.

Juarbe, T.C., Lipson, J.G. & Turok, X. (2003). Physical activity beliefs, behaviors and cardiovascular fitness of Mexican immigrant women. *Journal of Transcultural Nursing*, 14(2), 108-116.

Katzmarzyk, P.T. (2007). Physical activity and fitness with age among sex and ethnic groups. In C. Bouchard, S.N. Blair & W.L. Haskell (Eds.), *Physical Activity and Health* (pp. 38-47). Champaign, Illinois: Human Kinetics.

Kokkinos, P.F., Holland, F.C., Pittaras, A.E., Narayan, P., Dotson, C.O. & Papademetriou, V. (1995). Cardiorespiratory fitness and coronary heart disease risk factor association in women. *Journal of the American College of Cardiology*, 26(2), 358-36.

Kruger, H.S., Venter, C.S. & Vorster, H.H. (2003). Physical inactivity as a risk factor for cardiovascular disease in communities undergoing rural to urban transition: The THUSA-study. *Cardiovascular Journal of South Africa*, 14(1), 16-23.

Looock, H.V. (2008). Fisieke aktiwiteit en enkele gesondheidsrisiko faktore by vroue. (Unpublished Masters – Dissertation), North-West University, Potchefstroom, South Africa.

Nomaguchi, K.M. & Bianchi, S.M. (2004). Exercise time: Gender differences in the effects of marriage, parenthood and employment. *Journal of Marriage and Family*, 66(2), 413-430.

- Oguma, Y. & Shinoda-Tagawa, T. (2004). Physical activity decreases cardiovascular disease risk in women. *American Journal of Preventive Medicine*, 26(5), 407-418.
- Plowman, S.A. & Smith, D.L. (2003). *Exercise Physiology for Health, Fitness, and Performance*. Baltimore: Williams & Wilkins.
- Popham, F. & Mitchell, R. (2006). Leisure time exercise and personal circumstances in the working age population: longitudinal analysis of the British household panel survey. *Journal of Epidemiology and Community Health*, 60(3), 270-274.
- Rowland, T.W. (1990). *Exercise and Health*. Champaign, Illinois. Human Kinetics.
- Scharff, D.P., Homan, S., Dreuter, M. & Brennan, L. (1999). Factors associated with physical activity in women across the life span: Implications for program development. *Women & Health*, 29(2), 115-134.
- Sharkey, B.J. & Gaskill, S.E. (2007). *Health and Fitness* (6th ed). Champaign, IL: Human Kinetics.
- Statsoft Inc. (2004) Statistica (*Data analyses software system*), Version 7, www.statsoft.com
- Statistica (2003). *Data Analysis Software*, Version 6. www.statsoft.com
- Strydom, G.L. (2005). Biokinetika – Handleiding vir student in Menslike Bewegingskunde. Potchefstroom, North-West University, South Africa.
- Verhoef, M.J. & Love, E.J. (1992). Women's exercise participation: The relevance of social roles compared to non-related determinants. *Canadian Journal of Public Health*, 83(5), 367-370
- World Health Organization (2005). World Health Survey, South Africa, 2005. <http://www.who.int/healthinfo/survey/instruments/en/index.html>. Date of access 2 April 2007