UDK 796.012.6:316.334.55/56]:613.25(680)

# PERCEIVED BARRIERS AND REASONS FOR EXERCISE AMONG RURAL AND URBAN OBESE POPULATIONS IN BUFFALO CITY METROPOLITAN MUNICIPALITY, EASTERN CAPE

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https://doi.org/10.29038/2220-7481-2022-03-49-61

**Abstracts**

This study explored factors and barriers to exercise for rural and urban obese populations in Buffalo City Metropolitan Municipality, Eastern Cape. A purposive sample of 80 members from the two selected communities completed the questionnaire. A factor analysis was performed to identify factors that motivate physical activity and barriers to physical activity. Constructive motivating factors included increasing their self-image, enhancing their wellbeing, and getting highly involved in active and regular exercise. Negative motivators included finding it challenging to fit into old clothes and the worry of developing obesity-related diseases. Respondents noted the following impediments to regular exercises and physical activities; African cultural values, limited operational hours of physical activity facilities, insufficient time, and a lack of enthusiasm.

***Key words:*** activity, barriers, BMI, obesity, psychical.

**Тембані Мрвебі, Прівіледж Четені. Перешкоди та причини для занять фізичними вправами сільським і міським населенням із надмірною вагою в Буффало-Сіті (Східна Капська провінція).** Досліджено фактори та перешкоди для занять фізичними вправами сільським і міським населенням із надмірною вагою столичного муніципалітету Баффало-Сіті (Східний Кейп). У дослідженні взяли участь 80 осіб із двох обраних громад, котрі пройшли анкетування. За допомогою факторного аналізу виявлено чинники, що впливають на зростання фізичної активності або її зниження. У процесі дослідження конструктивними мотиваційними чинниками активізації фізичних занять виявлено підвищення самооцінки, покращення самопочуття, а також занепокоєння щодо необхідності змінити гардероб у зв'язку з надмірним зростанням ваги та розвитку захворювань, пов'язаних з ожирінням. Респонденти відзначили такі причини нерегулярних занять фізичними вправами або відсутності фізичних навантажень, як африканські вірування й релігія, короткий робочий графік спортивних та фітнес-закладів, недостатність часу й відсутність мотивації для занять спортом. Результат дослідження засвідчив, що сільські та міські жителі, які ведуть здоровий спосіб життя, більш умотивовані й рішучі до виконання фізичних вправ, незважаючи на низку справ, які їм доводиться виконувати щоденно. Отримані дані демонструють, що респонденти, які активно займаються фізичними вправами, мають загалом кращий стан здоров'я і серцево-судинної системи.

***Ключові слова:*** діяльність, перешкоди, індекс маси тіла (ІМТ), надмірна вага, ожиріння, фізичні вправи.

**Introduction.** Myriad studies (Dumith, 2015; McGuire, 2014; Petridou, Siopi, Mougios, 2019) claim that exercise is necessary for healthy individuals [8; 19]. Numerous organisations such as the American College of Sports Medicine (2019), the American Heart Association (2018), Diabetes South Africa (2018), and the World Health Organisation (2020) advocate that exercise reduces the likelihood of lifestyle diseases [25]. According to Samuel, et al. (2011), physical exercise is defined as any activity that requires physical strength to optimise physical fitness and wellbeing. Similarly, Stephen and Edwards (2018) suggest that it is a subset of physical activities that are purposefully planned in an attempt to improve health and wellbeing. However, physical activity and physical exercise are often used as a synonym in numerous discussions, as a result, there is little done to differentiate these two concepts. Just like obesity and overweight are often used interchangeable depending on the context.

Obesity and overweight are global problems prevalent in countries like South Africa, which is undergoing an epidemiological transition. By its nature, obesity is linked to risks of non-communicable diseases. The World Health Organisation report of 2017 shows that excess body weight and fatness were ranked fifth highest factors leading to death in South Africa (World Health Organisation, 2017). This is confirmed by the Cancer

ISSN 2410-2156 (Online), ISSN 2220-7481 (Print)

Association of South Africa which claim that obesity is set to have a profound effect on health outcomes, death rate, and prolonged non-communicable diseases that account for the top five causes of death in South Africa (Visser, Knight, Wallace & Blaauw, 2017).

This study was conceptualised using the biosocial health geography Socio-Ecological theory, namely the Health Belief Model. In the broader context of Health Geography theories, biosocial health geographies clarify and define ecology frameworks of health behaviour are well-known ideas that propose that multiple individuals shape behaviour, sociocultural, and physical-ecological issues (Simfukwe, 2017) [23]. The Health Belief Model (HBM) is a psychological health behaviour transformation framework advanced to illustrate and provide predictions regarding health and associated ecological behaviours (Dumith, 2015) [8]. It can be used to guide location-based health promotion and an individual's behavioural reaction to health-related circumstances that are shaped by several perspectives regarding an illness and its physical space or environmental aspects. (Simfukwe, 2017) [23].

Therefore, this study aimed to explore factors and barriers which influence exercising among rural and urban obese populations in Buffalo City Metropolitan Municipality, Eastern Cape. The findings of the research would yield much-needed assistance through advancing a culturally suitable weight-loss intervention.

The study is arranged as follows: section 2 provides a literature review about the topic. Section 3 provides the methods and techniques used to gather and analyse the data. Section 4 gives a summary of the results and discussions. Lastly, section 5 concludes the study.

**Environmental Risk Factors of Obesity and Exercise**

According to Brownson, Boehner and Luke (2015), obesity is a health challenge or threat that is associated both with environmental and genetic exposures. As indicated by the World Health Organisation (2019), obesity is described as a high or abnormal fat gaining that presents a health risk [4]. According to Rosenheck (2018), this condition is measured through the use of the (BMI) body mass index method, which is measured by a person's weight in kilograms divided by the square of height in metres [22]. Extensively obesity increases stroke, diabetes, heart disease and some forms of cancer, and those are some of the severe dangers of these risk factors (Brownson et al., 2015) [4]. According to Murphy et al. (2015) and Martin et al. (2000) exercise as medicine is highly important among remedies employed as part of treatment for some of the obesity-related risk factors [15]. Recent epidemiological literature shows that obesity has been dominant among, especially urban populations in the Sub-Saharan region (Dunton, et al., 2016) [8].

Environmental factors of obesity, according to Simfukwe (2017), are physical inactivity, overeating, a high carbohydrate diet, medication, psychological factors, and chemical imbalances in the body [23]. Simfukwe (2017) elaborated that these factors are misunderstood and attended to differently. For example, chemical imbalance-based obesity is frequently sent to gyms for remedial purposes in urban areas, while overeating-established obesity is commonly confused with genetic-based obesity in the rural context (Simfukwe, 2017) [23]. According to Xu et al. (2017), environmental factors of obesity may be attributed to physical inactivity, overeating, high carbohydrate diet, medication, psychological factors, and chemical imbalances in the body, location, access, affordability and the lifestyle of the people [26]. According to Puonne and Mciza (2016), how individuals understand or think about obesity is uniquely shaped by different issues depending on age, ethnicity, culture, and customs. A similar culturally based view was found in Matoti-Mvalo's (2006) study, where most women in South Africa attached thinness to HIV/AIDS and consequently, they preferred to be obese than face the stigma associated with thinness. Such views are held by numerous Black communities in South Africa (McGuire, 2014) [16; 20].

Looking at genetic risk factors of obesity the researcher perused several studies with interesting views. Some of those views are of Megan et al. (2021) who clarified that genome-wide association studies have presented that most genetic variants contribute to obesity development. However, studies focusing on this complex trait tend to dwell majorly on ancestrally tracked populations, despite the high prevalence of obesity in some minority groups (Yang et al., 2007). Xu et al. (2017) suggest that variation in body fat and body composition may have a substantial genetic component, with numerous family studies demonstrating that much of the variation in BMI-related measures are heritable [26].

Although more recently, genome-wide association studies (GWAS) and replication studies have identified multiple genetic variants across a range of ethnic groups, none explain a substantial amount of population variation in Body Mass Index (Puone and Mciza 2016) [20]. Daniel et al. (2013) suggest that candidate gene and genome-wide association studies have led to the discovery of nine loci involved in Mendelian forms of obesity and 58 loci contributing to polygenic obesity [7]. However, rarely does obesity occur in families according to a clear inheritance pattern caused by changes in a single gene (Daniel et al., 2013). Xu et al.

(2017) suggest that the most implicated gene is MC4R found in a small fraction of obese people in various ethnic groups Xu et al. (2017) [7; 26]. According to Puonne and Mciza (2016) affected people feel extremely hungry and become obese because of consistent overeating (hyperphagia). So far, rare variants in at least nine genes have been implicated in single-gene (monogenic) obesity (Daniel et al., 2013) [7; 20]. In other words, it is very difficult to separate the genetic-based obesity functions from environmental influences, as Xu et al., (2017) and Puonne and Mciza (2016) elaborate [7; 20]. As much as genetic predispositions influence the activity of over-eating disorders most times, rarely will a variant be responsible for progressive obesity over time without the influence of environmental factors.

According to Choquet and Meyre (2011) in most obese people, no single genetic cause can be identified, and genome-wide association studies have found more than 50 genes associated with obesity, most with very small effects. Several of these genes also have variants that are associated with monogenic obesity, a phenomenon that has been observed in many other common conditions (Choquet and Meyre, 2011). In summary Xu et al. (2017) extends that most obesity seems to be multifactorial, which is the result of complex interactions among many genes and environmental factors.

Physical inactivity has been found in many studies to affect rural and urban communities, and that discovery is elaborated on in the studies mentioned underneath. In a study conducted by Kowaleski (2017) on Hawaiian native rural and urban communities, with an increased percentage of take-away outlets, the findings pointed out that they are a correlation between an increased number of food outlets and low exercise resources. According to McGuire (2014), general factors associated with obesity are frequently ignored by various health practitioners to a greater extent and obesity prevalence is associated with socio-economic status, gender and ethnicity values. However, numerous exercise programmes are not tailored based on these risk factors and are targeted at everyone, while the food remains one of the essential factors linked to obesity (Wilcox, Van Sebille, and Hardesty, 2015).

Researchers such as Simfukwe, (2017), Puone and Mciza (2015), and Litman (2020) have all found that there is an effective and worth attached to multiple health behaviour change interventions involving physical exercise, despite evidence of the effectiveness and value (Ettarh et al., 2013) [9; 13; 20; 23]. There is a clear indication that they anticipate a variety of advantages and obstacles to transforming behavioural patterns. McGuire (2014) further elaborates that although there are known and widespread health benefits of exercise for disease prevention and obesity, the urban South African women's perspective regarding the advantages and limitations of behavioural shifts are different from those of men. Furthermore, interpretation of women's perspectives is essential to assist improve and designing approaches that appropriately enhance the workout routine shifts. It might also be essential to comprehend and sustain the upholding of behavioural shifts in the context of the establishment of physical exercise behavioural adjustment strategies (Rosenheck, 2018) [22].

According to Pender, Murdaugh, & Parsons (2011), apparent advantages are characterised as perceptions and understanding concerning the efficacy of prescribed procedures and activities in preventing a health concern [18]. On the other hand, Van Stralen et al. (2009) explains them to be views of repercussions of activity, such as risk, cost, discomfort, the time needed, and delay [24]. There is a variation of claims about the usefulness of exercising which is an essential factor of physical activity among South African women and men (Adams & McCrone, 2011) [1]. Consequently, some research has discovered that only expected advantages influence physical activity, while others have found that only reported restrictions do (Van Dyck et al., 2014) [24].

In a study conducted in Durban in Kwa Zulu Natal, Trost and colleagues (2002), advanced that advantages were shown to be favourably connected with physically exercising and challenges were found to be negatively associated. Van Stralen et al. (2009) discovered that among older individuals, anticipated advantages were connected and related to the continuation and commencement of regular exercise; with impediments not linked with initiating workout routines [24]. However, may be negatively associated with physical activity persistence and endurance. A comprehensive survey of reviews conducted by Bauman et al., (2012) was not convincing in determining if exercising advantages and obstacles were indicators or causes of fitness routines [2]. However, rather than the perceived barriers are the main reason people affected by obesity and unwanted fatness remain inactive.

**Theoretical Framework**

The study is grounded on the Health Belief Model. The Health Belief Model (HBM) is a psychological health behaviour shifts model that was created to illustrate and understand health and environmental behaviours (Dumith, 2015) [8]. It can be employed to direct health interventions and people's behavioural reactions to health-related circumstances dictated by seven personal perspectives about obesity and where it occurs

(Simfukwe, 2017) [23]. These seven variables, which include anticipated vulnerability, perceived seriousness, anticipated challenges, perceived advantages, cues to action, and individual competence, serve as the foundation of the HBM (Burns & Bush, 2001) [5].

HBM was chosen for this study since it illustrates health-related behaviour at the scale of personal decision-making in both rural and urban settings (Simfukwe, 2017) [23]. When anticipated risks are investigated, the theory illustrates various preventive health behaviours (Burns & Bush, 2001) [5]. The majority of the framework's main elements are appropriate for this study. The HBM theoretical model shapes this study and its arguments. The HBM is a theoretical framework engaged in investigating overall adults' understandings of obesity, perceptions regarding the state, and the medical conditions they experience in their daily lives. This approach is the justification that will guide the study's course and allow the researcher to connect the research results to knowledge in the health geography field (Burns & Bush, 2001) [5].

**Methods**. This study followed an exploratory research design, where the aim was to explore how the two populations (rural vs urban) perceive exercise as an intervention to a healthy lifestyle. Exploratory research design is usually used to investigate a problem which is not clearly defined. In this case, the researcher wanted to gain a better understanding of these two populations.

**Study Area.** The study area is situated in the Buffalo City Metropolitan Municipality (BCMM) centrally located in the Province of the Eastern Cape, bordered towards the southeast near the Indian Ocean coastline. The Eastern Cape Province is the second-largest province in South Africa and it covers 169,580 square kilometres, constituting 13,9 % of the total land area in South Africa (BCMM 2012/2013:19) (Manyema, 2017) [14]. The province has two major metropolitan municipalities, which are the Buffalo City and Nelson Mandela Metropolitan Municipalities. Buffalo city is the main urban hub of the eastern areas of the province. It comprises an urban corridor stretching from East London to Mdantsane up to Dimbaza in the West. On both sides of the urban corridor, there is a vast stretch of rural areas.

**Study Population and Sample Selection.** The study population is people residing in the BCMM, both from Nahoon and Nxarhuni. A purposive sample is a non-probability sample chosen because it has similar characteristics to the population and the study's objectives (Burns & Bush, 2013) [6]. A purposive sampling technique was employed to select 80 overweight and obese participants from the mentioned areas. In the rural area, 40 participants from Nxarhuni included 20 who were exercising and 20 who were not exercising, were obese and were invited to be involved in the study. Likewise, in the urban area, 40 obese participants from Nahoon, 20 were exercising and 20 were not exercising, were invited and assessed to participate in the study.

**Inclusion Criteria.** According to Burns and Bush (2013), inclusion criteria are characteristics that the prospective subjects need to have if they were to be included in the study [6]. The following inclusion criteria were used:

✓ The participants included were from both genders and aged between 20–50 years, since people who are beyond those ages may be inactive.

✓ Participants' height and weight were used to measure their BMI. The BMI which fell between 25 and 30 indicated overweight, meanwhile, the BMI which was greater than 30 indicated obesity.

✓ Before the research, participants were physically examined to establish if they qualify to be eligible to participate. Also, if participants had any existing condition inhibiting them from exercising, they were not considered for the study. Only participants who were successful in the screening process were considered in the study.

**Research Instrument.** The study made use of the International Physical Activity Questionnaire (IPAQ) (Hagstromer, Oja, and Sjostrom, 2005) [11]. The questionnaire in this study serves as a vital tool and technique to gather the information that can be used for comparison on the global scale regarding health-related physical activity.

**Background of IPAQ**

A global benchmark for measuring physical activity was established in Geneva in 1998, with an extensive reliability and validity measurement conducted within 12 nations in 2000. The ultimate findings reflect that such benchmarks consisted of adequate characteristics that can be adopted in several contexts and within several languages and are appropriate for a large demographic-based prevalence empirical study relating to physical activity and health (Heinemann, 2016).

This closed-ended questionnaire consists of a biographical section and a section on participants' reasons and barriers to exercise as an intervention for physical health challenges, such as obesity, and a section on anthropometric measurements. The biographical section is composed of the body mass index assessment to determine if subjects were obese; the reasons and barriers for exercise section are composed of questions that

seek clarity on challenges and advantages facing the subjects. The third and last section was on physical activity involvement and frequency.

This second section is composed of closed-ended questions from the questionnaire on motivation for exercise and barriers to exercise that have been validated. These two questionnaires included the You and Exercise Barriers Questionnaire (YEBQ)

(Biddle, Kirjonen, Mutrie & Sorensen, 2007) and the Reasons to be Active Questionnaire (RAQ) (Biddle et al., 2007) [3]. The YEBQ consists of 15 items, which elicit responses on a 4-point Likert scale, while the RAQ consists of 25 Questions that elicit responses on a 3-point Likert scale. Van Niekerk (2010) found acceptable to high reliability on the YEBO (Cronbach's Alpha = ,778) and the RAQ (Cronbach's Alpha = ,827). The questionnaire further addressed participants' perceptions of lifestyle habits such as awareness to exercise, reasons to exercise, and barriers to exercise.

Participants in Nahoon and Nxarhuni were requested to respond to the questionnaire as the method of information gathering. Stratifying of the respondents was conducted regarding individually indicated weight form (usual bodyweight vs overweight). On the day of data collection, the researcher reported to the soccer field in Nxarhuni and to the Oxford striders clubhouse for Nahoon members, before commencing with data collection. Information sessions were given to the members in their various sections, and those who were not in their service points were given information individually. All research subjects were given time to read the information leaflet and a chance to decide if they wanted to participate in the study or not. Those who were available to participate in the study were given informed consent to complete, then fill in the questionnaire and take anthropometric measurements.

**Factor Analysis.** The questionnaire was subjected to a factor analysis, where the preferred method was principal component analysis with varimax rotation. All variables with an eigenvalue of more than 1 were included, while items with a factor loading of less than 0.45 were excluded. The reliability of the individual variables was determined by using Cronbach's alpha for measuring internal consistency.

**Results and Discussions.** A total of 79 respondents were involved in this study. the youngest of the participants was 19 years old. The results showed that the oldest participants were aged 62 years. In addition, the results show that the mean age for the participants was 35,05 years. Approximately 41,8 % (33) of the respondents were males, while 58,2 % (46) were females. This shows that more women than men took part in this study.

**Gender Group Differences for Age.** Independent sample t-tests were executed to establish substantial variations between the ages of male and female respondents who took part in this study. The results of data analysis done with regards to this are shown in table 1.

*Table 1*

**Gender Group Differences for Age**

| | Gender | N | Mean | Std. Deviation | Std. Error Mean | Sign |
|---|---|---|---|---|---|---|
| Age | Male | 33 | 35,06 | 9,71 | 1,69 | ,993 |
| | Female | 46 | 35,04 | 8,21 | 1,21 | |

The independent samples t-test results presented in Table 1 show no substantial variations between men and women in terms of age because the p-value of ,993 is high above the significance (alpha level) set at 0,05. According to Fagerland (2012), when the results of t-tests to compare two groups produce a greater p-value than 0,05, there are no significant differences between the two groups [10].

**Area Group Differences in Age**

To determine whether there were age differences between respondents from rural and those from urban areas, independent samples t-tests were performed. The findings of the statistical analysis in this regard are shown in table 2.

*Table 2*

**Area Group Differences in Age**

| | Area | N | Mean | Std. Deviation | Std. Error Mean | Sign |
|---|---|---|---|---|---|---|
| Age | Rural | 40 | 34,63 | 8,41 | 1,33 | ,666 |
| | Urban | 39 | 35,49 | 9,28 | 1,48 | |

The independent samples t-test results shown in table 2 show no significant differences between rural and urban responses in terms of age. This is because the p-value (,666) in the results is greater than 0,05, confirming no substantial variations between rural and urban respondents by age.

**Body Composition**

The research also sought to determine the respondents' body composition by measuring their weight and height, and measuring their body mass index (BMI). According to Lam, Kho, Chen, Wong and Fallows (2015), BMI measures body fat based on weight and height. Results concerning the body composition of the respondents are shown in table 3.

*Table 3*

**Body Composition**

| Variable | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Stature (Meters) | 79 | 1,24 | 1,89 | 1,70 | ,104 |
| Weight (Kilograms) | 79 | 60 | 130 | 85,73 | 14,08 |
| BMI | 79 | 21,38 | 65,04 | 29,80 | 6,19 |

Table 3 shows that the shortest respondent was 1,24 metres tall, while the tallest was 1,89 metres tall. The respondents had an average height of 1,70 (SD = ,104) metres. Regarding weight, the results indicate that the respondent with the lowest weight weighed 60 kilograms while the heaviest respondent weighed 130 kilograms. The average weight for the respondents was 85,73 (SD = 14,08) kilograms. When the BMI was calculated (BMI = weight/ (height) $^2$), results showed that the participants' BMI was between 21,38 and 65,04, with an average BMI of 29,80 (SD = 6,19). This is an indication that the participants were primarily overweight and obese.

**BMI Categories**

BMI categories considered in this study included average weight, overweight, and obese categories. According to Fargerland (2012) [10], categories for BMI of adults aged 20 years and over are classified as follows; BMI less than 18,5 is categorized as underweight, a BMI that is between 18,5 to 24,9 are classified as normal weight, BMI of 25 to 29,9 is classified as overweight, while a BMI that is 30 or more is categorised as obese. The results of the BMI categories established in this study are shown in table 4.

*Table 4*

**BMI Categories**

| BMI Category | Frequency | Percent |
|---|---|---|
| Normal weight | 13 | 16,5 |
| Overweight | 32 | 40,5 |
| Obese | 34 | 43,0 |

The results shown in Table 4 indicate that 16,5 % (13) of the respondents had normal weight, 40,5 % (32) of the respondents were overweight, and 43 % (34) of the respondents were obese. These results show that most of the participants were overweight or obese, representing the study's target group.

**Geographical Group Differences in BMI**

The research also sought to determine if there were differences between rural and urban-based respondents regarding BMI. To achieve this, independent sample t-tests were performed, the findings of which are indicated in table 5.

*Table 5*

**Geographical Group Differences in BMI**

| | Area | N | Mean | Std. Deviation | Std. Error Mean | Sign |
|---|---|---|---|---|---|---|
| BMI | Rural | 32 | 31,03 | 6,84 | 1,20 | ,889 |
| | Urban | 34 | 31,24 | 4,95 | ,849 | |

Results presented in table 4,8 show no substantial differences between urban and rural respondents in terms of BMI. The p-value from the results shown in table 5 was ,889, which is above the alpha level set at 0,05, thus confirming no differences between rural and urban groups for BMI. Both groups had a BMI of more than 30, which is the threshold for obese populations.

**Factor Analysis Results**

The researcher performed a factor analysis to determine the respondents' reasons and barriers to exercising. The first results of the factor analysis considered for this study are the Kaiser-Meyer-Olkin (KMO) benchmark of sample adequacy and Bartlett's Test of Sphericity. The KMO is used to measure the sampling adequacy, which has to be significantly higher than 0,6 for satisfactory factor analysis to be conducted. If any pair of variables has a value less than this, it is advised that they be dropped from the analysis. Kaisen (1974) [12] suggested 0,5 as a minimum (barely accepted), values between 0,7–0,8 acceptable, and values above 0,9 are superb. In addition, Bartlett's test of Sphericity reflects the significance of the correlation among variables and should be significant for factor analysis to continue, which in this case is satisfactory. Results of the KMO and Bartlett tests performed on the reasons for exercising are presented in table 6.

*Table 6*

**KMO and Bartlett's Test**

| **Kaiser-Meyer-Olkin Measure of Sampling Adequacy.** | | **.829** |
|---|---|---|
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1321.907 |
| | Df | 406 |
| | Sig. | .000 |

In Table 6, KMO was ,829, which is higher than the recommended 0,6 required for items to meet the satisfactory threshold for factor analysis to be conducted. In addition, from the similar table, one might understand that Bartlett's test of sphericity is significant, with its linked probability less than 0,05. It is 0,000, i.e., the significance level is small enough to reject the null hypothesis. It implies that the correlation matrix is not an identity matrix, hence the factor analysis can proceed.

**Total Variance Explained for The Reasons to Exercise**

The results yielded a seven-factor solution with a total variance attributable to each factor, and the cumulative variance of the factor and the previous factors is presented in table 7. The seven factors explain 69,24 % of the cumulative variance.

*Table 7*

**Total Variance Explained for the Reasons to Exercise**

| **Component** | **Initial Eigenvalues** | | | **Extraction Sums of Squared Loadings** | | | **Rotation Sums of Squared Loadings** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Total** | **% of Variance** | **Cumulative %** | **Total** | **% of Variance** | **Cumulative %** | **Total** | **% of Variance** | **Cumulative %** |
| 1 | 10,307 | 35,541 | 35,541 | 10,307 | 35,541 | 35,541 | 4,593 | 15,838 | 15,838 |
| 2 | 2,458 | 8,477 | 44,018 | 2,458 | 8,477 | 44,018 | 4,228 | 14,579 | 30,417 |
| 3 | 1,964 | 6,772 | 50,790 | 1,964 | 6,772 | 50,790 | 3,022 | 10,420 | 40,837 |
| 4 | 1,581 | 5,451 | 56,240 | 1,581 | 5,451 | 56,240 | 2,661 | 9,175 | 50,013 |
| 5 | 1,336 | 4,607 | 60,847 | 1,336 | 4,607 | 60,847 | 2,207 | 7,609 | 57,622 |
| 6 | 1,281 | 4,418 | 65,265 | 1,281 | 4,418 | 65,265 | 1,699 | 5,858 | 63,479 |
| 7 | 1,152 | 3,973 | 69,237 | 1,152 | 3,973 | 69,237 | 1,670 | 5,758 | 69,237 |
| 8 | 1,023 | 3,529 | 72,766 | | | | | | |
| | | | | | | | | | |
| Extraction Method: Principal Component Analysis. | | | | | | | | | |

To further identify potential meaningful factors, the scree plot was examined. The results presented in Figure 1 confirmed the earlier observation of 7 factors with eigenvalues greater than 1.

The inspection of Cattell's scree plot (see figure 1) supported the appropriateness of rotating seven factors for reasons to exercise.

Table 8 shows how the items loaded on the 7 factors extracted through factor analysis for reasons to exercise. The higher the absolute value of the loading, the more the item contributes to the variable. One item with loading of less than 0,5 was suppressed.

After factor loadings of the variables were examined, the various factors were labelled in line with the main theme of the items that loaded under the same factor.

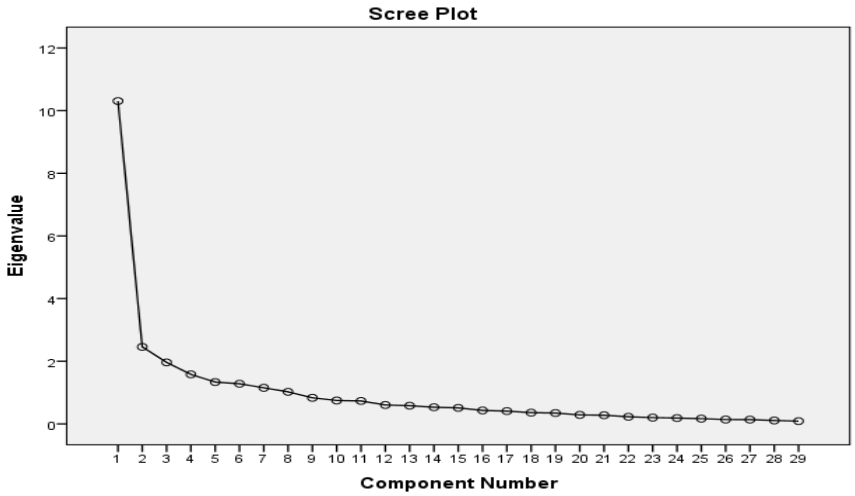


**Fig. 1.** *Scree Plot for Reasons to Exercise*

*Table 8*

**Rotated Component Matrix**

| Item | Component | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Q32RA | ,757 | | | | | | |
| Q31RA | ,704 | | | | | | |
| Q41RA | ,700 | | | | | | |
| Q26RA | ,684 | | | | | | |
| Q43RA | ,622 | | | | | | |
| Q23RA | ,605 | | | | | | |
| Q8RA | ,541 | | | | | | |
| Q15RA | | ,792 | | | | | |
| Q13RA | | ,792 | | | | | |
| Q22RA | | ,737 | | | | | |
| Q34RA | | ,727 | | | | | |
| Q20RA | | ,719 | | | | | |
| Q29RA | | ,653 | | | | | |
| Q2RA | | | ,740 | | | | |
| Q3RA | | | ,735 | | | | |
| Q1RA | | | ,622 | | | | |
| Q10RA | | | ,571 | | | | |
| Q27RA | | | | ,807 | | | |
| Q36RA | | | | ,659 | | | |
| Q35RA | | | | ,558 | | | |
| Q7RA | | | | ,537 | | | |
| Q18RA | | | | | ,655 | | |
| Q17RA | | | | | ,634 | | |
| Q5RA | | | | | ,626 | | |
| Q30RA | | | | | | ,728 | |
| Q11RA | | | | | | ,686 | |
| Q25RA | | | | | | | |
| Q39RA | | | | | | | ,871 |
| Q38RA | | | | | | | ,639 |
| Items are coded as follow: Q = Question, RA = Reasons to be Active<br>Extraction Method: Principal Component Analysis.<br>Rotation Method: Varimax with Kaiser Normalization. | | | | | | | |
| a. Rotation converged in 10 iterations. | | | | | | | |

The first factor was named *General well-being*, and included 7 items, such as item 32: "Exercising improves my self-concept", item 31: "My physical endurance is improved by exercising", item 41; "Exercise improves overall body functioning for me", item 26: "Exercising helps me sleep better at night". General well-being includes the presence of positive experiences of both physical and psychological benefits from exercise. It had a high reliability (alpha = ,87) and rendered a mean score of 3,25 (SD = ,463) (see table 8).

The second factor was named *Physical health* and included 6 items, such as item 15: "Exercising increases my level of physical fitness", item 13: "Exercising will keep me from having high blood pressure "and item 22: "Exercise increases my stamina". Physical health refers to the physical benefits one achieves when doing physical activities. The factor had a high reliability (alpha = ,88) and rendered a mean score of 3,24 (sd = ,411) presented in table 8.

The third factor was labelled *Psychological health* and included 4 items, of which item 2: "Exercise decreases feelings of stress and tension for me", item 3: "Exercise improves my mental health", item 1: "I enjoy exercise" and item 10: "Exercising makes me feel relaxed". Psychological health refers to the psychological benefits one can gain from physical exercises, such as relaxation and mental health and joy. The factor had a high reliability (alpha = ,81) and rendered a mean score of 3,27 (SD = ,511) (see table 8).

Factor 4 was named *Quality of life and work.* The factor included 4 items, namely item 27: "I will live longer if I exercise", item 36: "Exercise improves the quality of my work", and item 35:" Exercise allows me to carry out normal activities without becoming tired" and item 7: "Exercise increases my muscle strength". Quality of life and work refers to the general benefit of an improved ability to live and work better when doing physical exercise. The factor had a high reliability (alpha = ,79) and rendered a mean score of 3,15 (SD = ,510) (see table 8).

Factor 5 was labelled *Cardiovascular health* and included 3 items, of which item 18: "Exercising improves the functioning of my cardiovascular system", item 17: "My muscle tone is improved with exercise" and item 5: "I will prevent heart attacks by exercising". Cardiovascular health refers to the benefit of improved functioning of the cardiovascular system as a result of physical exercise. The factor had a high reliability (alpha = ,75) and rendered a mean score of 3,30 (SD = ,483) presented in table 8.

Factor 6 included 2 items and was labelled *Social benefit.* The two items loading on the factor were item 30: "Exercising is a good way for me to meet new people" and item 11:" Exercising lets me have contact with friends and persons I enjoy". Social benefit refers to the contact a person has with others such as friends and meeting new people through physical exercise. The factor had a low reliability (alpha = ,58) and rendered a mean score of 3,08 (SD = ,498). The low reliability could be due to the few items loading on the factor presented in table 8. However, an iter-item correlation of ,418 was large enough to still interpret the factor as a reason for exercise.

Lastly, factor 7 was named *Entertainment*, and it included two items, item 39: "Exercising increases my acceptance by others" and item 38: "Exercise is good entertainment for me". Entertainment refers to the entertaining value of physical exercise that leads to the increase of acceptance from others. The factor also had a low reliability (alpha = ,55) and rendered a mean score of 2,96 (SD = ,485). The low reliability could be due to the few items loading on the factor (see table 8). However, an iter-item correlation of ,383 was large enough to still interpret the factor as a reason for exercise

**Description And Reliability of The Variables**

After factor loadings of the variables were examined, a range of factors was given names in line with the main theme of the items that loaded under the same factor. The first factor was named cardiovascular health, the second factor was named psychological benefit, the third one was named general well-being, the fourth was named physical benefit, and the fifth, sixth and seventh were named quality of life and work, socialise and entertainment, respectively. Reliability tests were performed together with other descriptive statistics that include means and standard deviation. The results are shown in table 9.

Results shown in table 9 indicated that all the variables had Cronbach alpha coefficients that are above the reliability threshold of 0,70 as recommended by Nunally (1978) except for "socialise" and "entertainment." The two variables had low reliability, probably because they had few items (two each). However, the inter-item correlation (,418 and ,383, respectively) is high enough to interpret these two factors. These results mean that cardiovascular health, psychological benefit, general well-being, physical benefit, quality of life and work, socialising, and entertainment are significant reasons for exercising among this sample's rural and urban population groups. The reasons for exercising identified above concur with those in literature, including improved physical fitness, improved mental health, development of muscle strength, feelings of wellbeing, reduced tension and stress, improved cardiovascular function, and improved sleep and enjoyment (McGuire, 2014).

*Table 9*

**List of Reasons to Exercise and Reliability of Variables**

| Variable | N | Minimum | Maximum | Mean | Std. Deviation | Reliability |
|---|---|---|---|---|---|---|
| Cardiovascular Health | 79 | 1,67 | 4,00 | 3,30 | ,483 | ,75 |
| Psychological benefit | 79 | 2,00 | 4,00 | 3,27 | ,511 | ,81 |
| General Well-being | 79 | 1,00 | 4,00 | 3,25 | ,463 | ,87 |
| Physical benefit | 79 | 2,14 | 4,00 | 3,24 | ,411 | ,88 |
| Quality of Life and Work | 79 | 2,00 | 4,00 | 3,15 | ,510 | ,79 |
| Socialize | 79 | 1,50 | 4,00 | 3,08 | ,498 | ,58 |
| Entertainment | 79 | 2,00 | 4,00 | 2,96 | ,485 | ,55 |

**Group Differences for Reasons to be Active for Overweight and Obese Participants**

The research investigated differences in reasons to be active for overweight and obese participants between rural and urban groups. The results of the statistics that were computed to achieve this are shown in table 10.

*Table 10*

**Group Differences for Reasons to Be Active Just for Overweight and Obese Participants**

| Reason to exercise | Area | N | Mean | Std. Deviation | Std. Error Mean | Sign |
|---|---|---|---|---|---|---|
| Physical benefit | Rural | 32 | 3,16 | ,409 | ,072 | ,400 |
| | Urban | 34 | 3,24 | ,384 | ,065 | |
| General Well-being | Rural | 32 | 3,19 | ,372 | ,065 | ,945 |
| | Urban | 34 | 3,20 | ,538 | ,092 | |
| Psychological benefit | Rural | 32 | 3,25 | ,483 | ,085 | ,520 |
| | Urban | 34 | 3,16 | ,528 | ,090 | |
| Quality of Life and Work | Rural | 32 | 3,14 | ,478 | ,084 | ,590 |
| | Urban | 34 | 3,08 | ,532 | ,091 | |
| Cardio-vascular Health | Rural | 32 | 3,16 | ,508 | ,089 | ,087 |
| | Urban | 34 | 3,36 | ,405 | ,069 | |
| Socialize | Rural | 32 | 2,90 | ,482 | ,085 | ,094 |
| | Urban | 34 | 3,10 | ,456 | ,078 | |
| Entertainment | Rural | 32 | 2,89 | ,453 | ,080 | ,850 |
| | Urban | 34 | 2,91 | ,451 | ,077 | |

The results presented in table 10 show no geographical group differences between rural and urban participants in relation to their reasons for being active. All p-values were above the recommended 0,05, which means that there were no significant differences in why overweight and obese people from rural and urban areas engaged in exercise. Overweight and obese populations from rural and urban areas seem to agree on reasons to exercise in this sample.

**Geographical Group Differences in Enough Exercises**

The research also investigated differences in participants getting enough exercise between rural and urban populations who are obese and overweight. The results of this investigation are presented in table 11.

*Table 11*

**Geographical Group Differences in Enough Exercises**

| Reason to exercise | Exercise | N | Mean | Std. Deviation | Std. Error Mean | Sign |
|---|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Physical Benefit | Not Enough Exercise | 45 | 3,10 | ,361 | ,0539 | ,000 |
| | Enough Exercise | 34 | 3,42 | ,409 | ,0702 | |
| General Well-Being | Not Enough Exercise | 45 | 3,16 | ,338 | ,0505 | ,045 |
| | Enough Exercise | 34 | 3,37 | ,573 | ,0983 | |
| Psychological Benefit | Not Enough Exercise | 45 | 3,13 | ,496 | ,0739 | ,003 |
| | Enough Exercise | 34 | 3,47 | ,471 | ,0809 | |
| Quality of Life and Work | Not Enough Exercise | 45 | 3,04 | ,483 | ,0720 | ,026 |
| | Enough Exercise | 34 | 3,30 | ,514 | ,0881 | |

*The end of the table 11*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Cardio-Vascular Health | Not Enough Exercise | 45 | 3,17 | ,469 | ,0699 | ,004 |
| | Enough Exercise | 34 | 3,48 | ,450 | ,0773 | |
| Socialize | Not Enough Exercise | 45 | 2,87 | ,441 | ,0658 | ,000 |
| | Enough Exercise | 34 | 3,36 | ,431 | ,0740 | |
| Entertainment | Not Enough Exercise | 45 | 2,82 | ,466 | ,0695 | ,003 |
| | Enough Exercise | 34 | 3,14 | ,452 | ,0776 | |

*Table 12*

**Correlation between BMI and Reasons for Exercise**

| Variables | BMI | | PhB | GW | PsB | QLW | CH | Soc | Ent |
|---|---|---|---|---|---|---|---|---|---|
| BMI | Correlation Coefficient | 1,000 | -,173 | -,162 | -,330** | -,168 | -,302** | -,267* | -,293** |
| | Sig. (2-tailed) | . | ,128 | ,154 | ,003 | ,140 | ,007 | ,017 | ,009 |
| Physical Benefit | Correlation Coefficient | -,173 | 1,000 | ,693** | ,547** | ,707** | ,593** | ,253* | ,146 |
| | Sig. (2-tailed) | ,128 | . | ,000 | ,000 | ,000 | ,000 | ,025 | ,200 |
| General Well-being | Correlation Coefficient | -,162 | ,693** | 1,000 | ,506** | ,578** | ,549** | ,227* | ,186 |
| | Sig. (2-tailed) | ,154 | ,000 | . | ,000 | ,000 | ,000 | ,044 | ,101 |
| Psychological Benefit | Correlation Coefficient | -,330* | ,547** | ,506** | 1,000 | ,476** | ,574** | ,327** | ,237* |
| | Sig. (2-tailed) | ,003 | ,000 | ,000 | . | ,000 | ,000 | ,003 | ,004 |
| Quality of Life and Work | Correlation Coefficient | -,17 | ,71** | ,58** | ,47** | 1,00 | ,53** | ,32** | ,15 |
| | Sig. (2-tailed) | ,140 | ,000 | ,000 | ,000 | . | ,000 | ,004 | ,180 |
| Cardio-vascular Health | Correlation Coefficient | -,30** | ,59** | ,54** | ,57** | ,52** | 1,00 | ,29** | ,23* |
| | Sig. (2-tailed) | ,000 | ,000 | ,000 | ,000 | ,000 | . | ,008 | ,044 |
| Socialize | Correlation Coefficient | -,26 | ,253* | ,22* | ,32** | ,32** | ,29** | 1,00 | ,32** |
| | Sig. (2-tailed) | ,017 | ,003 | ,004 | ,003 | ,004 | ,008 | . | ,003 |
| Entertainment | Correlation Coefficient | -,293** | ,146 | ,186 | ,237* | ,154 | ,220* | ,327** | 1,00 |
| | Sig. (2-tailed) | ,009 | ,020 | ,101 | ,035 | ,176 | ,004 | ,003 | . |

PhB – Physical benefit, GW – General Wellbeing, Psychological Benefit-PsB, Quality of Life and Work-QLW, Cardio-vascular Health-CH, Socialize-Soc, Entertainment-Ent

**. Correlation is significant at the 0,01 level (2-tailed).

*. Correlation is significant at the 0,05 level (2-tailed).

Results in table 11 show significant differences between participants who get enough exercise and those who do not. Overweight and obese participants who get enough exercise, rated all reasons to exercise significantly higher than those who did not get enough exercise. This could be due to motivation differences. The p-values of all the reasons to exercise are below 0,05, proving that the differences are significant.

**Correlation between BMI and Reasons for Exercise**

The results in table 12 show significant negative correlations between BMI and four reasons for exercising, which yielded p-values less than 0,05, namely, psychological benefit, cardiovascular health, socialisation and entertainment reasons. This means that the higher the BMI, the less motivated the participants were to exercise for psychological benefit, cardiovascular health, socialisation and entertainment reasons. This could be due to a loss in motivation to exercise the higher a person's BMI becomes. On the other hand, the results also showed no statistically significant correlation between exercising for quality of life and work, general wellbeing and physical benefit and BMI.

**Discussions.** This study found that most obese commuters both rural and urban find it challenging to interact physically with their peers because of psychological reasons like the lack of social support, and their perception of themselves is diminished due to their appearance. Some of these members have their body size limit their mobility and ability to do some of the daily activities they want to do. This was consistent with Agne's (2012) finding that attributed weight gain among Hispanics to the occurrence of several physical constraints. Such as a compromised body image, a distorted body composition, reduced bio-motor ability, and susceptibility to injuries. Furthermore, Cafasso (2020) suggests that in a worst-case scenario, obesity can cause deteriorating muscle mass and bone density (osteosarcopenic obesity), which can lead to fractures, physical disability, postural defects

This study reported that rural and urban members who lead a healthy lifestyle have also reflected being motivated and are determined to manoeuvre around their daily activities easily physically. The findings further clarify that they are usually more entertained and are achieving better cardiovascular health. The findings can be compared to the results from earlier research conducted in South Africa (Mvo & Steyn, 1999; Puoane et al, 2005; Puoane et al, 2012; Dalais, 2013) who found that physically active members whether from the rural setting or urban, understand and perceive themselves as healthy [7; 17; 20; 21].

This study also reported that Nahoon and Nxarhuni respondents participating in exercising and keeping fit perceive themselves as achieving good general well-being and having better self-actualisation. This is consistent with Agne's (2012) results that Latinos see weight loss as a method to strengthen their well-being. Wellbeing and health. Simfukwe (2017) and Puone et al., (2015) found similar factors as well. They further add that the benefits of these attributes can be reflected in the manner exercising members portray specific behavioural patterns both in their professional and home environment, as some change the way they walk, the way they dress, and their overall body image of themselves (Simfukwe, 2017; Puone et al.,2015). These findings are also applicable to overweight and obese members, and the results are also reflected in a study by Puoane et al. (2015) in their Cape Town study among obese health workers. A general overview of the perceptions of fitness is that the urban population perceives themselves as having a superior quality of life, being well socialised, getting good exercise benefits, and achieving good cardiovascular health. However, they do not match their perception with the amount of exercise they do. It has been notable that only a few get enough exercise in line with WHO standards and norms.

**Conclusions.** It was established that both populations in urban and rural areas have a positive perception of exercise as a health tool for managing obesity. The study noted that lack of social support, lack of accessibility, and inconvenience are some of the barriers to exercise. Meanwhile, the participants' health, psychological benefit and general well-being were some of the reasons for exercising. The study noted that they were significant differences in the correlation of BMI and age, days of exercising and other factors. Furthermore, they were a significant difference between urban and rural participants in physical activity because rural participants are involved in physical jobs such as farming and so on. Meanwhile, urban participants live sedentary lifestyles hence they lack exercise.

The results indicated that participants living in both urban and rural areas understand the importance of a healthier lifestyle, however, the level of physical activity applied is less than required to obtain a healthy lifestyle. This is because of their daily activities which involve high-intensity activities. Regarding urban dwellers, the researcher concludes that they must change their lifestyles and follow a lifestyle in which they have to engage in some physical activities so that they can enjoy the benefits of exercise.

This study was limited to the Buffalo Metropolitan Municipality out of all the municipalities in the Eastern Cape Province. Although the study was limited to BCMM, only one rural and one urban location were considered for participants' sampling. Furthermore, the sample was a non-probability sample and the size was too small to be generalizable to a bigger population. The other major limitation was to get people who were both overweight/obese and exercising.

**Declarations**

**Data Availability Statement (DAS)**

Data sharing is protected by the Protection of Personal Information Act 4 of 2013 (POPIA) were permission needs to be sought from the subjects. As a result data cannot be shared.

**Ethics Approval and Consent to Participate**

The study was approved by the UREC, University of Hare

**Consent for Publication**

Not applicable

**Availability of Supporting Data**

Not applicable

**Competing Interests**

The authors declare no conflict of interest

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Стаття надійшла до редакції 23.08.2022 р.