

BLACK SOUTH AFRICAN WOMEN'S PERCEPTIONS OF OBESITY IN THE MSUNDUZI DISTRICT OF PIETERMARITZBURG

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ABSTRACT

Aims: To establish the black South African women's perceptions of obesity in rural and urban areas in the Msunduzi District of Pietermaritzburg.

Methodology: The research design adopted was qualitative research methodology, using qualitative techniques, mainly the focus group interviews for data collection. These were complemented by traditional key informants' perspectives of obesity using rapid rural appraisal approach.

Results: The perceptions of obesity among the black women in SA might be influenced by their traditional and cultural beliefs that regard obesity as a sign of wealth and beauty. Among the focus groups there seemed to be no real word for obesity. Similarly, the traditional perspective did not seem to have any word for obesity.

Conclusion: The black South African women's perceptions of obesity seemed to be informed by their traditional beliefs of associating obesity with beauty, wealth and good health.

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INTRODUCTION

The World Health Organization (WHO), (2010) report on the global status of non-communicable diseases (NCDs) demonstrates that obesity is a growing threat in most low- and middle-income countries such as South Africa (SA). This report presents evidence that 80% of the health burden from NCDs like cardiovascular disease, diabetes and some cancers is carried by low- and middle-income countries. A similar global report by the WHO (2016) on diabetes as a serious chronic NCD, confirms this upward trend from 4.7% since 1980 to 8.5% in 2014. The 2013 South African National Health and Nutrition Examination Survey (SANHANES-1) report on national estimates of health status of adults regarding NCDs and other major risk factors, report similar findings (Shisana et al., 2013). Shisana et al. (2013) partly attribute the low intakes of fruits and vegetables in SA and to households being food insecure and poor. Food insecurity has been linked to detrimental health outcomes including obesity and some chronic diseases (Naicker et al., 2015).

The SA population, particularly black African people have demonstrated shifts in dietary intakes that culminate in the increasing prevalence of obesity (Shisana et al., 2013; Sartorius et al., 2015). Micklesfield et al. (2013) and Cois & Day (2015) indicated that within the Southern African region, SA's epidemiological transition is moving at an alarming rate. Concurrent dietary changes are evident even among the lower socio-economic households, who also suffer from combinations of poverty-related infectious diseases and non-communicable diseases (NCDs), including obesity (Drewnowski, 2009; Vorster et al., 2011; Micklesfield et al., 2013).

Black Africans are also thought to have abandoned their traditional plant-based diets, low in fat with high fibre content in favour of the 'western' diet (Kruger et al., 2005; Kimani-Murage et al., 2010; Popkin et al., 2012). The 'Western diet' is associated with dietary patterns characterised by high consumption of refined cereals, processed and red meats and the adoption of sedentary lifestyles (McNaughton et al., 2007; Kimani-Murage et al., 2010). Such dietary patterns are associated with increased

risk of NCDs such as type-2 diabetes and obesity and other chronic disease risk factors (McNaughton et al., 2007).

Cois and Day (2015) found a strong positive trend in body mass index (BMI) indicating overall increases in adult South Africans who are overweight or obese. Similarly, Micklesfield et al. (2013), that statistics from the 1998 National Demographic and Health Survey (SADHS), an obesity prevalence of 30% in all women over 15 years of age.

Other studies are of the view that overweight and obesity are on the rise in SA, largely among black African females who are also socio-economically disadvantaged, living with both under- and over-nutrition (Faber & Wenhold, 2007; Shisana et al., 2013). Both under- and over-nutrition have detrimental effects as they reflect micronutrient deficiencies (Faber & Wenhold, 2007).

Puoane et al. (2005) explore perceptions about factors associated with body weight and body image, in a sample where out of 44 participants, 25 were obese and 15 were extremely obese. The results suggested the influence of socio-cultural, behavioural and environmental factors (Puoane et al., 2005). In another study assessing dietary intakes, attitudes towards weight control, perceived causes of being overweight and perceived health risks, Faber and Kruger (2005) found that most of the rural women studied were unconcerned about their weight, and most overweight and obese women did not want to lose weight. These studies indicate consistent acceptance of being overweight or obese. The current study was to establish the black South African women's perceptions of obesity in rural and urban areas in the Msunduzi District, find out where they source food as opposed to producing it, to see the link between what they consume and health.

METHODOLOGY AND DESIGN

This was an exploratory study on the perceptions of women's obesity in the traditional African context. The study adopted the survey-based research design, using a focus group interview guide to conduct in-person interviews about the black South African women's

perceptions of obesity. The researcher-administered semi-structured interview guide provided the research instrument and qualitative research methodology for the study. Data were collected using qualitative techniques, mainly the focus group interviews complemented with traditional key informants' perspectives of obesity. The rationale for choosing this qualitative method (focus groups) was because of time and resource constraints. Discussions were not recorded because of the noise factor. Instead there were two post-graduate students who wrote down the responses from the groups. For the researcher to gain access to these communities, a relationship with May'khethele Project in Pietermaritzburg was developed by formally writing to their leadership to request their co-operation in the current study. This United States Agency International Development (USAID) supported project granted the researcher access to Maykhethele community. They were aware that the Ethical Clearance had been granted to continue with the study. May'khethele Project provide HIV/AIDS education to rural and urban communities focusing on orphans, vulnerable children and youth. The co-operation with May'khethele Project helped the researcher to gain entry to some of the urban and rural communities they serviced such as Elandskop and the KwaQanda rural villages. The topic of the study was briefly explained to each focus group and they were aware that participation was voluntary.

The study population was black African females organised into six homogeneous groups of under 35 years of age classified as youth, and over 35 years as adults, in both rural and urban areas. The rural focus group participants were drawn from two rural villages, one of them Elandskop, which provided two youth groups consisting of 13 and 10 participants. The Kwa-Qanda focus group consisted of 16 adult participants. Because of the limited availability of participants, and May'kethele work schedules in those communities, the focus groups could only be arranged on the days of their weekly meetings with May'kethele Project. They would allocate time (about two hours) for the focus groups after their schedule for the day on the dates that had been pre-booked. Similarly, the urban focus groups which were drawn from May'khethele community members, had to be

pre-booked. The pilot group of six, as well as two youth focus groups of 16 and 12 per group and one adult group of six participants were all from the May'khethele community. The total number of focus group participants was 73.

The researcher used the Focus Group Interview Guide (Table 1.) for all the focus groups in relaxed settings using the groups' mother tongue which was Zulu. That setting allowed the discussions to flow and elicit the participants personal perceptions on the topic. Each question was asked, and participants engaged each other until the moderator felt it had been exhausted. Each of the six questions provided a discussion theme and the moderator would only probe for clarity, however some statements were recorded verbatim. The reliability was ensured through documenting the discussions using post-graduate students to document what was said. The researcher also took a wider sample of participants grouped into four categories namely: adult rural, adult urban, youth rural and youth urban to improve the validity of the study.

To gain further insight into the topic the researcher also engaged three traditional key informants to enquire about their perceptions of obesity from a traditional perspective, using short individual telephonic interviews. One was from Qamata and a member of the House of Traditional Leaders in the Eastern Cape, the second from Maphumulo in KwaZulu Natal and a leader of Traditional Healers in SA, the third from Gauteng an academic and an African Traditionalist. They were selected because of their status and indigenous knowledge of African culture. The researcher would initially phone to introduce the topic and request time for a short interview. On the set date the researcher asked (1) their perceptions of obesity among black women and (2) about food eaten in households. The researcher would request that the conversation be on speaker phone to write down the information they provided. They could elaborate as much as they wanted to on each question.

The short telephonic interviews of traditional key informants were undertaken using the Rapid Rural Appraisal (RRA), which is an approach for developing a preliminary understanding of a

TABLE 1: THE SOCIO-DEMOGRAPHIC DETAILS OF THE RESPONDENTS

No.	Interview questions	Various responses
1.	Where do you get your food for home consumption? Why?	Spaza shops, supermarkets or food markets.
2.	What are the traditional Zulu words for a fat body? Why?	There is no Zulu word for a fat body.
3.	What do you like about a fat body in a woman? Why?	Dignity, wealth, respectable, beauty
4.	What do you not like about a fat body in a woman? Why?	Problem with dress sizes at times, when there is extreme fatness.
5.	What do you like about a thin body in a woman? Why?	African women don't look right when thin.
6.	What do you not like about a thin body in a woman? Why?	People think one has HIV/AIDS

situation such as the prevalence of obesity (Beebe, 1995). The technique is commonly used in rural development projects and key informants are major tools for RRA. Cross-checking, according to Chambers (1981), is worthwhile as it asks for more useful and additional information from different key informants regarded as knowledgeable on the topic. The three key informants were chosen because of their positions on traditional issues in their communities. Their information was used to compliment the data from focus group interviews. The researcher used only those key informants who were accessible, willing to participate and share their views through individual telephonic interviews.

Findings

Focus groups' data

The open-ended questions in the focus group interview guide were used to conduct the discussions. The initial question in all the focus groups which asked where they normally get food for home consumption (Table 1.) brought about divergent views. Overall the older participants, especially from the rural areas (KwaQanda rural village) associated the question with agriculture and planting. Most of them provided various reasons why they could not produce enough food for home consumption as they used to, such as ill health, poorly fenced gardens and lack of water for their gardens. Subsequently they stated that they often buy most of their food from the supermarket and spaza shops. But they stressed that they do not have enough money to buy food and often looked for specials in supermarkets.

The younger groups, both rural and urban associated the first question (Table 1.) with the need for more money to buy more food for their

households. They mentioned the food they buy from various supermarkets such as cooking oil, bread, rice, Rama margarine, mealie-meal, onion and potatoes. They perceived supermarkets to be cheaper especially when they had special promotions. In all the focus groups the first question ended up discussing the need for more money to buy food for their households. Planting and producing food from the fields and gardens was perceived to be backward and the least desired activity by the younger groups.

The second question enquiring about the traditional Zulu words for a fat body brought about various descriptions all of which appreciated fat bodies. There was no real word for fat bodies in their language. They referred to 'fuller bodies' and a 'rounded fuller figure'. All descriptions they gave of fat bodies suggested that the fuller the body and the rounded fuller figures were appreciated as they were associated with wealth and dignity. They were regarded as signs of people who ate well, a similar finding in both age groups.

The findings from the third question which asked what the participants liked about a fat body indicated that it was acceptable in the African culture and was deeply embedded in the value-systems of black Africans for a woman to be big. All focus groups perceived the rounded fuller figure as an African representation of health and beauty. One of the rural focus groups (KwaQanda older group) figuratively indicated that when a woman is fat, it was a sign that she was eating anything she desired.

The fourth question which enquired about what they do not like about a fat body did not yield clear responses from most groups as most of them could only see the benefits associated with fat bodies. One of the urban youth groups

Maykhethele) mentioned what they called extreme fatness which they said was not liked because it reduced one's physical activity levels and was problematic in getting dress sizes.

The fifth question which asked what they liked about a thin body in a woman was basically contrasted to the (what they called) rounded fuller bodies. It was negatively associated with people who were poor with little or no food to eat and not appreciated. A thin body was viewed as not respectable and people who are not well-off.

The sixth question which asked about what they do not like about a thin body was almost answered in question five. None of the focus groups appreciated thinness as it was negatively associated with ill-health especially HIV/AIDS and unhappiness.

Key informants' data

The role of the key informants was to provide further insights on the perceptions of obesity from the perspective of traditionalists. They were asked about (1) their perceptions of obesity among black women in general and (2) about food eaten in households.

On the question about their perceptions of obesity among black women:

The Qamata traditional key informant stated that obesity among African women is a relatively new phenomenon. The notion of obesity was not known, as only acceptable 'muscle build-up' referring to growing big without fat) in women's bodies was common especially after childbirth because traditionally women were highly active when engaged in various household chores. Similarly, the Maphumulo key informant stressed that women were highly active engaged in traditional chores to produce food by cultivating crops such as maize, beans and pumpkins in the fields and vegetable gardens. The implication was that women were too active to be fat. The Gauteng key informant also concurred that obesity was not common and referred to some food-order in diets with social meanings.

On the question of food consumed in households:

The Qamata key informant pointed that households used to consume food that had been produced from the home. This view had been supported by the Maphumulo key informant who indicated that overall the main traditional chores for women were to produce food for households, by cultivating crops such as maize, beans and pumpkin in the fields and vegetable gardens. The Qamata and Maphumulo key informants generally concurred that black women no longer eat traditional food but rather eat 'white man's food'. The Gauteng key informant indicated that the selection of foods through the food-order that had been culturally controlled, might have protected women from eating the foods they eat lately. The food they eat lately is what the Qamata and Maphumulo key informants called the 'white man's food' which might be a proxy for 'western' dietary patterns.

In the literature, what is termed 'western' dietary patterns has been consistently associated with shifts in dietary intakes that culminate in increasing prevalence of obesity (Shisana et al., 2013; Sartorius et al., 2015). Some studies found that overweight and obesity were on the rise in SA, particularly among black African females who were also socio-economically disadvantaged, living with both under- and over-nutrition (Faber & Wenhold, 2007; Shisana et al., 2013). Faber and Wenhold (2007) indicate that under- and over-nutrition have detrimental effects on people's health, as they reflect micronutrient deficiencies.

Discussion

While obesity is generally measured through a series of human body measurements to define the severity of the overweight or obesity (Ying Lee et al., 2008), the results from the current study suggested that the sampled women in the focus groups did not even have a real word for obesity in their language. The notion of obesity was not perceived to exist. Rather they had names like 'fuller bodies' or 'rounded fuller figure' which were adored and perceived as indicators of beauty and even a sign of affluence. That perspective was alluded to by the traditional key informants, who stated that the current levels of obesity were a new

phenomenon. Those perceptions were identified despite the World Health Organisation (WHO), (2011) report that the anthropometric indicators are predictive of the risk of chronic diseases.

Even though literature has provided scientific evidence of the links between obesity and non-communicable diseases (NCDs) through energy dense food consumption and low intakes of fruit and vegetables (Misra et al., 2011), all the focus groups did not seem to realise the link between consuming healthy food such as vegetables and good health. When purchasing their food from supermarkets and spaza shops, they said they chose food items that they could afford especially items on special promotion provided by the supermarkets.

The focus group participants seemed to focus on the convenience the supermarkets and shops provided selling mostly refined and energy-dense food products which did not need refrigeration. Some studies (Shisana et al., 2013; Drewnowski, 2015; Stelmach-Mardas et al., 2016), illustrated the role of high energy-dense food consumption as one of the main risk factors linked to obesity. The main products the focus group participants often sought in supermarkets tended to be associated with diet high in saturated fats, sugar and refined foods whilst low in fibre, such as cooking oils, margarine and varieties of calorific sweetened beverages, often termed 'western diet' (Popkin and Gordon-Larsen, 2004).

Ideally the consumption of these food products should be moderated to reduce obesity and NCDs (Drewnowski 2015). Drewnowski (2015) also presents a hypothesis that the observed social gradient in NCDs among the lower socio-economic households, may be partly related to food prices and diet costs, leading to low-cost, energy-dense and nutrient-poor diets, being those of choice for the poor. Igumbor et al. (2012), Shisana et al. (2013) and Swinburn et al. (2013) concur with the hypothesis that high energy-dense foods which typically contain high quantities of fat, sugar and/or starch, as opposed to low energy-dense foods such as fruits and vegetables, are detrimental to health.

There is evidence that obesity trends most evident among black women in SA are observed

among children and adolescents as well as other race groups which might suggest that the population is undergoing a rapid epidemiological transition (Shisana et al., 2013; Solomon et al., 2014; Sartorius et al., 2015). Sartorius et al. (2015) demonstrated the progression of obesity prevalence in three cross-sectional surveys of South African adults aged ≥ 15 years, in 2008, 2010/2011 and 2012, showing that obesity increased significantly from 23.5% in 2008, to 27.2% in 2012, with a significantly (p -value <0.001) higher prevalence among females (37.9% in 2012) compared to males (13.3% in 2012). These studies indicate that the prevalence of obesity is growing and diets with low fruit and vegetable intakes might expose people to the risk of developing NCDs.

It might be that the adoption of the 'western diet' the groups seemed to prefer, could expose them to the high prevalence of obesity and other degenerative diseases such as heart diseases, high blood pressure, type 2 diabetes and some cancers (Goedecke et al., 2005; Puoane et al., 2005; Shisana et al., 2013). The 'western diet' is food that is purchased mostly from large commercial entities known as 'Big Food', collectively referring to both multinational and national companies that dominate the food and beverage environment (Igumbor et al., 2012). In the broader consumer food environment Big Food ensures the availability, affordability and acceptability of highly processed products (Igumbor et al., (2012). It might be that Big Food's strategy of ensuring the availability, affordability and acceptability of their products might have 'lured' communities such as the participants in this study to choose their food products through special promotions of certain food items.

CONCLUSION

Perceptions of obesity among the sampled women from Msunduzi seemed to have been influenced by their cultural beliefs where obesity is not regarded as unhealthy. There does not seem to be any word for obesity in their language. Their cultural value systems are not supportive of slimmer bodies, as they regarded 'rounded figures', which are proxies for overweight and obesity, as attractive. This is notwithstanding evidence from literature, that

obesity is a public health concern resulting from lifestyles and contexts of epidemiological transition, where highly processed, energy-dense food is consumed. There might be need for government interventions that prioritise public health on food and nutrition and awareness about obesity as a risk factor for NCDs.

REFERENCES

- Beebe, J. (1995) Basic Concepts and Techniques of Rapid Appraisal. Human Organization. 54 (1) 42-51.
- Chambers, R. (1981) Rapid Rural Appraisal: Rationale and Repertoire. Public Administration and Development. (1) pp 95 – 106.
- Cois, A. and Day, C. (2015) Obesity Trends and Risk Factors in the South African Adult Population. BMC Obesity. 2: 24.
- Drewnowski, A. (2009) Obesity, Diets and Social Inequalities. Nutrition Reviews. 67 (1) 536-539.
- Drewnowski, A. (2015) The Carbohydrate-Fat Problem: Can We Construct a Healthy Diet Based on Dietary Guidelines? American Society for Nutrition. Adv. Nutr. 6: 3185-3255
- Faber, M. and Wenhold, F. (2007) Nutrition in Contemporary South Africa. Water SA, 33 (3) Special Edition.
- Goedecke, J., Jennings, C. and Lambert, E., (eds) (2005) Obesity in South Africa 1995-2005. Cape Town: UCT/MRC.
- Igumbor, E., Sanders, D., Puoane, T., Tsolekile, L., Schwarz, C., Purdy, C., Swart, R., Durao, S. and Hawkes, C., (2012) “Big Food” the Consumer Food environment, Health, and the Policy Response in South Africa. PloS Medicine. Access at: <http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001253>.
- Kimani-Murage, E., Kahn, K., Pettifor, J., Tollman, S., Dunger, D., Gomez-Olive, X. and Norris, S. (2010) The Prevalence of Stunting, Overweight and Obesity, and Metabolic Disease Risk in Rural South African Children. Public Health, 10 (158): 1-13. Accessed at: <http://www.biomedcentral.com/1471-2458/10/158>
- Kitzinger, J. (1995) Qualitative Research: Introducing Focus Groups. British Medical Journal. 311: pp 299-302.
- Kruger, H., Pouane, T., Senekal, M. and van der Merwe M-T. (2005) Obesity in South Africa: challenges for government and health professionals. Public Health Nutrition: 8 (5), pp 491- 500.
- McNaughton, S., Mishra, G., Stephen, A. and Wadsworth, M. (2007) Dietary Patterns Throughout Adult Life are Associated with Body Mass Index, Waist Circumference, Blood Pressure, and Red Cell Folate. The Journal of Nutrition. Nutritional Epidemiology. American Society for Nutrition. Accessed at: <http://academic.oup.com/jn/article-abstract/137/1/99/4664469>
- Micklesfield, L., Lambert, E., Hume, D., Chantler, S., Pienaar, P., Dickie, K., Puoane, T., and Goedecke, J. (2013) Socio-cultural, Environmental and Behavioural Determinants of Obesity in Black South African women. Cardiovascular Journal of Africa. 24 (9/11) 369-375.
- Misra A., Neha Singhal, N., Sivakumar, B., Bhagat, N., Jaiswal, A., and Khurana, L. (2011). Nutrition transition in India: Secular trends in dietary intake and their relationship to diet-related non-communicable diseases. Journal of Diabetes, 3(4): 278-292.
- Naicker, n., Mathee, A and Teare, J. (2015) Food insecurity in Households in informal Settlements in Urban South Africa. Issues in Public Health. South African Medical Journal. 105 (4) 268-270.
- Popkin, B., Adair, L. and Ng, S. (2012) Now and Then: The Global Nutrition Transition: The Pandemic of Obesity in Developing Countries. National Institute of Health Public Access Nutrition Reviews;70 (1): 3-21; 1-26
- Popkin, B. and Gordon-Larsen, P. (2004) The Nutrition Transition: Worldwide Obesity Dynamics and their Determinants. International Journal of Obesity. 28: S2-S9.
- Puoane, T., Matwa, P., Bradley, H. and Hughes, G. (2005) Socio-cultural Factors Influencing Food Consumption Patterns in the Black African Population in an Urban Township in South Africa. Human Ecology Special Issue, (14) 89-93.
- Sartorius, B., Veerman, L., Manyema, M., Chola, L. and Hofman, K. (2015) Determinants of Obesity and Associated Population Attributability, South Africa: Empirical Evidence from a National Panel Survey, 2008-2012. PLOS ONE. DOI: 1-20. Access at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130218>

- Shepherd, S. and Achterberg, C. (1992) Qualitative Research Methodology: Data Collection, Analysis, Interpretation and Verification. In Monsen, E. (eds) Research: Successful Approaches. Washington. The American Dietetic Association.
- Shisana, O., Labadarios, D., Rehle, T., Simbayi, L., Zuma, K., Dhansay, A., Reddy, P., Parker, W., Hoosain, E., Naidoo, P., Hongoro, C., Mchiza, Z., Steyn, N., Dwane, N., Makoae, M., Maluleke, T., Ramlagan, S., Zungu, N., Evans, M., Jacobs, L., Faber, M., & SANHANES-1 Team. (2013) South African National Health and Nutrition Examination Survey (SANHANES-1). Cape Town: HSRC Press.
- Solomon, A., Tsang, L., Woodiwiss, A., Millen, A., Norton, G., and Dessein, P. (2014) Cardiovascular Diseases Risk amongst African Black Patients with Rheumatoid Arthritis: The Need for Population Specific Stratification. Biomed Research International. 2014 (826095) 1-10.
- Stelmach-Mardas, M., Rodacki, T., Dobrowolska-Iwanek, J., Brzozowska, A., Walkowiak, J., Wojtanowska-Krosniak, A., Zagrodzki, P., Bechthold, A., Mardas, M. and Boeing H. (2016) Link between Food Energy Density and Body Weight Changes in Obese Adults. Nutrients. 8 (229) 1-13.
- Swinburn, B. Sacks, G., Vandevijvere, S., Kumanyika, S., Lobstein, T., Neal, B., Barquera, S., Friel, S., Hawkes, C., Kelly, B., L'Abbe, M., Lee, A., Ma, J., Macmullan, J., Mohan, S., Monteiro, C., Rayner, M., Sanders, D., Snowdon, W., and Walker, C. (2013) INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): overview and key principles. International Association for the Study of Obesity. 14 (1), 1-12.
- Vorster, H., Kruger, A and Margetts, B. (2011) The Nutrition Transition in Africa: Can It Be Steered into a More Positive Direction? Nutrients. 3, 429-441.
- World Health Organisation, (2016) Global Report on Diabetes. France: WHO Library Cataloguing-in-Publication Data. Access at: http://apps.who.int/iris/bitstream/handle/10665/204871/9789241565257_eng.pdf;jsessionid=EFEC8117FAB848B09B5AEB3AC53B89BC?sequence=1
- World Health Organization, (2010) Global Status Report on non-communicable diseases 2010. WHO Library Cataloguing-in-Publication Data, NLM classification: WT 500. Access at http://www.who.int/nmh/publications/ncd_report_full_en.pdf
- World Health Organisation, (2011) Waist Circumference and Waist-Hip Ratio: Report of a WHO Expert Consultation. Geneva, 8-11 December 2008. Geneva: WHO Library Cataloguing-in-Publication Data. Access at: http://apps.who.int/iris/bitstream/handle/10665/44583/9789241501491_eng.pdf?sequence
- Ying Lee, C., Huxley, R., Wildman, R., and Woodward, M., (2008) Indices of Abdominal Obesity are better Discriminators of Cardiovascular Risk Factors than BMI: A Meta-analysis. Elsevier, Journal of Clinical Epidemiology, 61, 646-653.
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