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Original Article

The prevalence of behavioral non- communicable diseases risk factors among black Africans in peri-urban community in South Africa

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SUMMARY

Background: Non-communicable diseases (NCDs) are a leading cause of mortality in South Africa, with their burden influenced by lifestyle, living conditions, ethnicity, and gender.
Methods: A cross-sectional study (N=100; n=50 males, n=50 females; mean age 25.15 ± 5.98) followed the WHO STEPwise approach which ensured systematic data collection. Standardized self-reported questionnaires were used to gather data on key behavioural risk factors, including tobacco use, physical activity, and dietary behaviours. The data collection was conducted over a four-month period, during which participants first completed qualitative questionnaires to provide insights into their lifestyle behaviours.
Results: Physical inactivity emerged as the most prevalent risk factor (20%), followed by tobacco use (17%) and poor nutrition (14%). Smoking rates were significantly higher among males compared to females (26% vs. 8%; $P = 0.04$), and among younger participants (≤25 years) compared to older ones (24.56% vs. 6.97%; $P = 0.01$). Poor nutrition was also more common in younger individuals ($P = 0.05$). While females reported lower smoking rates, they exhibited higher levels of physical inactivity than males (23% vs. 14%).

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Conclusion: The findings highlight the persistent prevalence of modifiable behavioural risk factors for NCDs among young adults in South Africa, with distinct age and gender-related patterns. Targeted interventions addressing physical inactivity, tobacco use, and poor nutrition, particularly among males and younger individuals, are essential for reducing the long-term burden of NCDs. Gender-sensitive and age-specific public health strategies may improve lifestyle behaviours and contribute to more effective NCD prevention.

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Introduction

Non-communicable diseases (NCDs) are chronic, non-transmissible conditions. The predominant NCDs, accounting for approximately 80% of NCD-related mortality, include cardiovascular diseases (CVDs), various forms of cancer, and chronic obstructive pulmonary disease (COPD) [1]. NCDs are among the top causes of death in South Africa accounting for 39% of total deaths in 2010 and 57% in 2016 [2]. Cardiometabolic diseases (CMD), encompassing conditions such as cardiovascular disease (CVD) and diabetes mellitus, represent a major component of the global non-communicable disease (NCD) burden. Notably, CVDs alone were responsible for 17.3% of all recorded deaths, while diabetes mellitus ranked as the second leading cause of mortality [3].

Certain non-communicable diseases (NCDs) have been found to exhibit varying prevalence across different gender and ethnic groups. A South African study reported significantly higher age-standardised mortality rates for ischaemic heart disease among individuals of Asian descent compared to Coloured, White, and Black South Africans. Conversely, Black South Africans exhibited significantly higher age-standardised death rates for diabetes and cerebrovascular diseases [4]. These findings are consistent with those of a systematic review conducted in the United States, which also identified ethnic disparities in NCD risk factors. The review revealed that hypertension was significantly more prevalent among Black Americans compared to their White counterparts, while Mexican Americans demonstrated the lowest levels of physical activity, followed by American Indians and Black Americans [5].

Studies conducted in South Africa [6] have consistently shown that the prevalence of overweight and obesity is lower among males compared to females. Furthermore, research in the Limpopo and Mpumalanga provinces has reported a high prevalence of smoking among adult women [7]. Given that the majority of NCD risk factors are modifiable, proactive interventions have the potential to significantly reduce lifetime risk by preventing their onset [8]. Consequently, systematic surveillance of these risk factors is essential for informing NCD prevention and control strategies [9]. Moreover, a comprehensive understanding of the distribution and burden of chronic NCD risk factors across gender and ethnic groups within rural, urban, and peri-urban communities in South Africa is critical for evidence-based policy development and targeted public health interventions. This study aimed to assess the prevalence of key chronic NCD risk factors in the peri-urban community of KwaDlangezwa, KwaZulu-Natal, South Africa.

Methods

Study design

The study employed a qualitative approach to assess behavioural risk factors. Qualitative methods were used to explore in-depth insights into participants' perceptions, experiences, and lifestyle behaviours through structured self-reported questionnaires. A cross-sectional study design was

implemented, following the WHO STEPwise protocol, which facilitated the collection of self-reported data on key behavioural risk factors such as smoking, physical activity, and dietary intake. The study involved 100 Black African male and female adults aged 18 and above, who were randomly recruited on a voluntary basis using convenience sampling. An equal male-to-female ratio was maintained to ensure gender representativeness.

Study population

The study recruited Black African male and female adults aged 18 and above from the peri-urban community of KwaDlangezwa, KwaZulu-Natal Province, South Africa. A total of 100 participants were included (n=50 males, n=50 females) (Table 1). Participants were randomly selected and took part voluntarily, using either voluntary or convenience sampling methods. A 1:1 male-to-female ratio was upheld to ensure equal gender representation, with each male participant matched by a female participant. A sample size of 100 was chosen based on its common use in similar studies on NCDs and related risk factors in South Africa [10]. This number was selected to achieve a balance between statistical power and feasibility, ensuring sufficient data for meaningful analysis while considering practical limitations such as time, cost, and participant burden. To enhance the study's representativeness, random sampling was employed, and an equal male-to-female ratio was maintained to facilitate gender-based comparisons. Given these factors, a sample of 100 participants was considered adequate for a robust analysis and aligned with methodologies used in comparable studies conducted in KwaZulu-Natal and beyond. The study's inclusion criteria stipulated that eligible participant had to be Black African males or females between the ages of 18 and above, residing in Kwa-Dlangezwa within the Zululand region of KwaZulu-Natal. Conversely, individuals failing to meet these predefined parameters were excluded from participation. This encompassed individuals below 18 years, non-Black Africans, and those residing outside Kwa-Dlangezwa. These criteria were meticulously designed to ensure the study's relevance to the targeted population while maintaining the integrity and specificity of the research focus.

Although the study did not include formal indicators of socioeconomic status, informal demographic observations during recruitment revealed that the majority of participants were university students, particularly among the younger age group (≤25 years). This reflects the proximity of the study area to a higher education institution and suggests a relatively high educational level. A smaller proportion of participants mainly those over the age of 25 were employed, often in local government or service roles. This composition implies that the study population had limited income levels, particularly among students, but potentially higher health literacy due to their educational background. These socio-educational dynamics are relevant when interpreting behavioural risk factors for NCDs, as employment status and education influence lifestyle choices, health-seeking behaviour, and exposure to health promotion campaigns.

Table 1
Prevalence of behavioural noncommunicable risk factors and their association with gender and age

Variable	Category	Tobacco smoking (n) %	Physical inactivity (n) %	Poor nutrition (n) %
Total	**All**	(17) 17%	(20) 20%	(14) 14%
Gender	**Male (n = 50)**	(13) 26%	(7) 14%	(7) 14%
	Female (n = 50)	(4) 8%	(13) 23%	(7) 14%
	Fisher's exact	0.040[a]	0.20	N/A
Age	**≤25 years (n = 57)**	(14) 24.56%	(8) 14.03%	(11) 19.29%
	>25 years (n = 43)	(3) 6.97%	(12) 27.90%	(3) 6.97%
	Fisher's exact	0.010[a]	0.50	0.050[a]

Note: Values represent the number and percentage of participants who reported the presence of each specific behavioural risk factor. Subgroup totals reflect only the number of participants who exhibited each behaviour, not the full sample of 100 participants.

[a] $P \leq 0.05$: Significant difference. n=number of participants; N/A=not applicable.

Data collection

Behavioural data were collected using a structured, standardized self-reported questionnaire designed to assess key NCD risk factors, including tobacco use, physical activity levels, and dietary behaviour over a four-month period. Participants completed qualitative questionnaires covering their lifestyle behaviour. Ethical approval was obtained from the University of Zululand (UZREC 171110–030), and written informed consent was secured from each participant before any assessments were conducted. The recruitment process was strategically designed to maximize community engagement and participant outreach. This involved leveraging local meetings, community centres, and other public venues as platforms for engagement. Additionally, digital communication channels, including social media platforms, WhatsApp groups, and word-of-mouth referrals, were employed to enhance accessibility and participation. Collaboration with local community leaders further strengthened recruitment efforts, fostering trust and facilitating the inclusion of eligible participants.

Participants provided information on their smoking habits, frequency and duration of physical activity, and dietary patterns, including the consumption of fruits, vegetables, processed foods, and sugary beverages. The questionnaire was administered in-person to ensure accuracy, clarity, and completeness of responses. All data collection procedures adhered to ethical guidelines, maintaining participant confidentiality and voluntary participation throughout the process.

Smoking status assessment

Smoking status and history were evaluated in this study using a standardized self-reported questionnaire [11]. The questionnaire gathered information on participants' smoking frequency, categorizing them as experimental smokers (one to five cigarettes in the past 30 days), occasional smokers (three to ten times per week in the past 30 days), or daily smokers (smoked within the previous two hours before testing) [12].

Physical activity and poor nutrition assessment

To assess habitual physical activity and poor nutrition, and to develop a practical and cost-effective test battery [13], the study make used of the NCD Risk Questionnaire (NCD-RQ2) [14], which is a self-report questionnaire providing a globally standardized method for assessing physical activity, poor nutrition, and sedentary behaviour.

Data analysis

Data analysis was conducted using SPSS software, version 25 [15]. Descriptive statistics were employed to summarize participant characteristics, with results presented as means, 95% confidence intervals (CI), and standard deviations (SD). Associations between categorical variables were assessed using Fisher's exact test [16]. Given the assumption of non-normal distribution, the Mann-Whitney U test was applied to evaluate differences in continuous variables between groups [17]. A *P*-value of less than 0.05 was considered indicative of statistical significance.

Results

Behavioural non-communicable disease risk factors

Among the three behavioural non-communicable risk factors (Table 1), self-reported physical inactivity emerged as the most prevalent risk factor, affecting 20% of participants, while cigarette use was reported by 17%. Males (26%) had a greater prevalence of current smoking behaviour than females (8%) and younger age groups (25 years old; 24.56%) had a higher prevalence of current smoking behaviour than older age groups (>25 years old; 6.97%) ($P = 0.04$; $P = 0.01$ respectively). Fisher's exact

test demonstrated no association between physical inactivity, gender, and age ($P = 0.20$; $P = 0.50$, respectively). Poor nutrition was reported by 14% of the participants with age being significantly associated with an unhealthy diet ($P = 0.05$).

Discussion

The analysis of this study revealed that self-reported physical inactivity was the most prevalent behavioural risk factor, followed by tobacco smoking and poor nutrition, with prevalence rates of 20%, 17%, and 14%, respectively. These findings align with studies conducted in other countries, which consistently report lower physical activity levels among women compared to men [18,19]. In this study, females (23%) were found to be less physically active than their male counterparts (14%), a trend also observed in research by the Statistics South Africa [20]. This suggests an urgent need for obesity prevention strategies, as increased physical inactivity is strongly correlated with obesity and excess weight. Similar studies indicate that sociocultural factors, such as traditional gender roles, limited community support, and the availability of female-friendly exercise spaces, may contribute to lower physical activity levels among women [21]. Furthermore, the study found that the majority of physically inactive participants were older than 25 years, emphasizing the need for targeted interventions. According to Steyn *et al.* [22], Black Africans had the lowest subjective physical activity levels compared to other racial groups, which aligns with the present study's findings. Additionally, Fine *et al.* [23] reported a 66% prevalence of physical inactivity in a U.S. National Health Survey, further highlighting the global decline in physical activity levels.

Regarding tobacco use, the prevalence of smoking was significantly higher among males (26%) compared to females (8%), with younger individuals ($\leq$25 years old) exhibiting a higher smoking prevalence (24.56%) than those over 25 years (6.97%). These findings correspond with research conducted in India, Iran, and Turkey, where men have consistently been found to have higher smoking rates than women [24]. Cultural and societal norms may play a role in these gender differences, as evidenced in countries like Afghanistan, where female smoking is often stigmatized [25]. Historical data from South Africa further supports these findings, with national surveys from 2003 indicating that 35% of adult males and 10% of adult females were smokers [26]. Although South Africa has implemented comprehensive tobacco control programs, progress in reducing smoking prevalence has been slow. The reduction in smoking rates observed in this study may be attributed to the increased taxation on tobacco products rather than the direct impact of control measures [27]. Nevertheless, a decline in smoking rates has been associated with a stable decline in smoking-related cardiovascular deaths [28], reinforcing the effectiveness of tobacco regulation policies. The behavioural patterns observed in this study may also be partially explained by the social and educational context of the sample. Most participants were university students, particularly among the younger age group. Students often experience lifestyle challenges such as irregular meals, stress-related smoking, and limited time or access to physical activity, which could contribute to the observed prevalence of smoking and poor dietary habits. The low employment rate among participants may also reflect limited income, which affects access to healthier food options and recreational facilities. While formal socioeconomic data were not collected, the context of student life and limited financial independence likely played a role in shaping the health behaviours reported in this study.

Dietary habits also play a critical role in NCD risk. This study found that poor nutrition was reported by 14% of participants, with younger individuals ($\leq$25 years) exhibiting a significantly higher prevalence (19.29%) compared to older participants (>25 years; 6.97%). The association between age and poor nutrition was significant ($P = 0.05$), suggesting that younger individuals are more likely to engage in unhealthy dietary habits. This aligns with research by Alem *et al.* [29], who found that females generally reported higher fruit and vegetable consumption than males. Similar patterns have been observed in study from Finland, the Baltic countries, the UK, and several low- and middle-income nations, where gender differences in dietary knowledge and behaviour are well documented [30]. Overall, these findings underscore the need for targeted behavioural interventions, particularly for women and younger individuals, to promote physical activity, reduce smoking, and encourage healthier dietary habits. Health practitioners should play an active role in advocating for

lifestyle modifications, particularly for at-risk populations, to mitigate the growing burden of NCDs in peri-urban South African communities.

Conclusion

The findings of this study indicate that behavioural risk factors for NCDs are prevalent in KwaDlangezwa. Physical inactivity was identified as a significant concern within the community. The results highlight that the public health burden of physical inactivity is a global issue, one that requires international coordination to implement effective change and achieve public health objectives. To effectively manage NCDs, it is important to consider improving both the availability and quality of healthcare services as well as routine health screenings, especially for both men and women. During the implementation of behaviour modification programs, emphasis should be placed on encouraging participants, in particular females, to adopt healthy lifestyle behaviours, including regular physical activity and proper dietary habits. The high prevalence rates, along with some increasing trends, suggest the potential for future epidemics of non-communicable diseases.

The unequal distribution of risk factors among the people of KwaDlangezwa can be attributed to the influence of various socio-demographic factors, such as age and gender. This suggests that public health authorities and other relevant stakeholders must adopt targeted approaches in the planning and implementation of health promotion programs to ensure the effectiveness of preventive and control interventions. More research is needed because the data generated is useful for developing preventative and interventional interventions aimed at reducing significant risk factors for chronic noncommunicable diseases in the Black community. These data can be used to promote policies that eliminate socioeconomic inequities and satisfy the actual requirements of this demographic group.

Limitations of the study

This study employed a cross-sectional design using structured self-reported questionnaires, which allowed for the collection of data on key behavioural risk factors, including smoking, physical activity, and dietary intake. The use of the WHO STEPwise protocol provided a standardized approach for data collection, enhancing the comparability of findings with other studies. Additionally, an equal male-to-female ratio was maintained to facilitate gender-based analysis, ensuring that differences between the two groups were effectively examined. However, several limitations should be acknowledged. First, the reliance on self-reported data introduced the possibility of response bias, where participants may have underreported or overreported their behaviours due to embarrassment, recall issues, or social desirability bias. For example, reported fruit and vegetable consumption may not accurately reflect actual dietary intake. The use of more detailed food frequency questionnaires could have improved the assessment of dietary patterns and nutrient intake.

Second, the sampling method was primarily convenience-based, which may have limited the generalizability of the findings. Although efforts were made to ensure gender representativeness, the sample consisted predominantly of young and institutionalized individuals, which may not fully reflect the broader population of KwaDlangezwa or South Africa. Future studies employing randomized, population-based sampling would enhance the external validity of such research. Third, the study setting was restricted to a single peri-urban community, KwaDlangezwa. While this provided valuable localized insights, the findings may not be extrapolated to the entire province or country. Additional large-scale studies are needed to capture regional variations in NCD risk factors across diverse populations. Lastly, while the study effectively assessed physical activity and smoking behaviours, the methodology could be improved for dietary evaluation. The NCD Risk Questionnaire (NCD-RQ2) provided a basic assessment of dietary habits, but a more comprehensive dietary recall method or objective biomarkers could offer a more accurate representation of nutritional intake.

Future research should aim to include a larger, more diverse sample and incorporate objective measures such as accelerometers for physical activity and biochemical markers for nutrition

assessment. Despite these limitations, this study contributes to the growing body of knowledge on behavioural NCD risk factors in peri-urban South African communities and highlights the need for targeted interventions to address physical inactivity, tobacco use, and poor nutrition.

Authors' contribution

S.Z.M. was responsible for conducting the research, encompassing the study design, data collection, data analysis, and manuscript preparation. G.J.B. contributed to the study design, provided guidance on the research methodology, and supported the writing and revision of the manuscript. B.S. S. assisted with the study design, offered methodological guidance, and contributed to the manuscript revisions. I.S. also supported the study design, provided input on the research methodology, and contributed to the revision of the manuscript.

Ethical approval

This study received ethical approval from the Humanities Research Ethics Committee of the University of Zululand (UZREC), under Reference UZREC 171110–030, and was conducted in full compliance with institutional and national research ethics guidelines. Prior to participation, written informed consent was obtained from all participants after a thorough explanation of the study's objectives, procedures, and ethical considerations. Participation was entirely voluntary, with individuals free to withdraw at any time without consequence. To ensure confidentiality and anonymity, all personal identifiers were removed, and data were securely stored in a password-protected system. Additionally, the study adhered to the University's Research Policy on ethical conduct and data protection, with every effort made to ensure no harm was caused to participants.

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None.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: The authors declare no competing financial or personal interests that could have influenced the research. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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