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COMPARATIVE ASSESSMENT OF NON-COMMUNICABLE DISEASE AWARENESS AND RISK PROFILES IN URBAN AND RURAL COMMUNITIES

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Abstract

A total of 500 adults participated in the study, comprising 250 urban residents and 250 rural residents. Significant differences were observed between the two populations regarding awareness of non-communicable diseases (NCDs) and their associated risk factors. Urban participants demonstrated substantially higher awareness of common NCDs, including hypertension, diabetes mellitus, cardiovascular diseases, and cancer, compared with rural participants. Awareness of warning signs, preventive measures, and the importance of regular health screening was also significantly greater among urban residents ($p < 0.05$).

The distribution of NCD risk factors varied between the two groups. Physical inactivity was more prevalent among urban participants, affecting approximately 42% of individuals, compared with 27% in the rural population ($p < 0.001$). Similarly, overweight and obesity were significantly more common in urban residents, with nearly one-third of participants exhibiting excess body weight, whereas the prevalence was lower among rural residents ($p < 0.01$). In contrast, tobacco consumption was significantly higher in the rural population, where approximately 38% of participants reported current tobacco use compared with 21% in urban areas ($p < 0.001$).

The prevalence of hypertension was high in both groups, although slightly greater among urban participants; however, this difference did not reach statistical significance. Multivariable analysis revealed that higher educational attainment, urban residence, and greater socioeconomic status were independently associated with better awareness of NCDs ($p < 0.05$). These findings indicate substantial urban–rural disparities in both knowledge and behavioural risk factors, highlighting the need for tailored public health interventions targeting the specific challenges faced by each population.

Keywords: Non-communicable diseases; Awareness; Risk factors; Urban; Rural; Health education

1. Introduction

Non-communicable diseases (NCDs), including cardiovascular diseases, diabetes mellitus, cancer, and chronic respiratory diseases, have emerged as the leading causes of morbidity and mortality worldwide and represent a major public health challenge in both developed and developing countries. According to global health estimates, NCDs account for nearly three-quarters of all deaths annually, with a disproportionate burden occurring in low- and middle-income countries where healthcare resources are often limited and preventive services remain

inadequate [1,2]. The growing prevalence of NCDs is driven by demographic transitions, urbanization, population aging, lifestyle modifications, and increasing exposure to behavioural and environmental risk factors. Unlike communicable diseases, NCDs are generally chronic in nature and require long-term management, resulting in substantial healthcare costs, productivity losses, and reduced quality of life. Effective prevention and control of NCDs largely depend on the early identification and modification of risk factors such as tobacco use, unhealthy diet, physical inactivity, obesity, excessive alcohol consumption, and uncontrolled hypertension [3]. Public awareness regarding these diseases and their associated risk factors plays a crucial role in encouraging healthy behaviours, promoting timely health-seeking practices, and improving adherence to preventive interventions. However, awareness levels are often influenced by educational attainment, socioeconomic status, access to health information, and geographic location [4,5]. Urban and rural populations frequently exhibit notable differences in both awareness and exposure to risk factors. Urban residents generally have greater access to healthcare services, educational opportunities, and health-promotion campaigns, which may contribute to better knowledge regarding NCD prevention. At the same time, urban lifestyles are often characterized by sedentary behaviour, reduced physical activity, and higher rates of overweight and obesity. Conversely, rural populations may experience lower awareness due to limited access to health information and healthcare facilities, while certain risk behaviours, including tobacco consumption, may be more prevalent [6]. Understanding these urban–rural disparities is essential for developing targeted and context-specific interventions aimed at reducing the burden of NCDs. Comparative assessments of awareness and risk-factor profiles can provide valuable evidence for designing effective health education, screening programs, and prevention strategies tailored to the needs of different populations [7]. Therefore, the present study was conducted to compare the levels of awareness and the distribution of major NCD risk factors among urban and rural populations.

Aim: To compare NCD awareness and risk factors between urban and rural populations.

Primary objective: To compare adequate NCD awareness between urban and rural participants.

Secondary objectives: (i) To compare risk-factor prevalence; (ii) to identify correlates of awareness.

Hypotheses: Null (H_0) — awareness and risk factors do not differ by residence. Alternative (H_1) — awareness and risk-factor profiles differ between urban and rural populations.

2. Materials and Methods

This study was conducted and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies to ensure methodological transparency and reporting quality.

2.1 Study Design and Setting

A comparative cross-sectional study was carried out among adult residents of urban and rural field-practice areas affiliated with the Department of Community Medicine. The study was designed to compare levels of awareness regarding non-communicable diseases (NCDs) and the prevalence of major NCD risk factors between urban and rural populations. The selected urban and rural communities represented the routine field-practice areas served by the institution and provided a diverse population for comparison.

2.2 Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee. All participants were informed about the objectives, procedures, benefits, and potential risks of the study before enrolment. Written informed consent was obtained from each participant prior to data collection. Confidentiality and anonymity of participant information were strictly maintained throughout the study. The investigation was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

2.3 Study Participants

Adults aged 18 years and above who had been residing in the selected urban or rural area for at least six months and were willing to participate were eligible for inclusion. Individuals who were unable to respond to the questionnaire because of severe illness, cognitive impairment, communication difficulties, or those with incomplete data were excluded from the analysis. A total of 500 participants were enrolled in the study, comprising 250 individuals from the urban area and 250 individuals from the rural area.

2.4 Data Collection

Data were collected using a structured and pre-tested questionnaire adapted from the World Health Organization (WHO) STEPwise approach to NCD risk-factor surveillance (WHO STEPS). The questionnaire gathered information on socio-demographic characteristics, awareness of common NCDs, knowledge of major risk factors, recognition of warning signs, and preventive practices. Participants were also assessed for major behavioural and biological risk factors, including tobacco use, physical inactivity, dietary habits, overweight and obesity based on body mass index (BMI), and hypertension measured using a standardised blood pressure monitoring procedure. Height and weight measurements were obtained using calibrated instruments, and BMI was calculated according to WHO recommendations. Awareness scores were generated using predefined scoring criteria, and participants were categorized as having either adequate or inadequate awareness based on predetermined cut-off values.

2.5 Sample Size Determination

The sample size was calculated to detect a minimum difference of 15 percentage points in the prevalence of adequate NCD awareness between urban and rural populations, assuming awareness levels of approximately 65% and 50%, respectively. With a confidence level of 95%, statistical power of 80%, and a two-sided significance level of 5%, the minimum required sample size was estimated to be approximately 170 participants per group. To improve the precision of estimates and account for potential non-response or incomplete data, 250 participants were recruited from each group, resulting in a total sample size of 500 individuals.

2.6 Statistical Analysis

Data were entered into Microsoft Excel and analysed using SPSS. Descriptive statistics were used to summarize demographic characteristics, awareness levels, and prevalence of risk factors. Categorical variables were expressed as frequencies and percentages, while continuous variables were summarized using means and standard deviations. Differences between urban and rural populations were assessed using the chi-square test for categorical variables and independent-sample t-tests where appropriate. Multivariable logistic regression analysis was

performed to identify factors independently associated with adequate NCD awareness after adjusting for potential confounders, including age, sex, educational status, socioeconomic status, and place of residence. Adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were reported. A two-sided p-value of less than 0.05 was considered statistically significant.

3. Results

3.1 Awareness

A total of 500 adults participated in the study, comprising 250 urban residents and 250 rural residents. The overall mean age of the participants was 41 ± 14 years, and 262 (52%) were female. Analysis of awareness levels revealed significant differences between the two populations. Adequate awareness regarding non-communicable diseases (NCDs), including knowledge of common diseases, risk factors, warning signs, and preventive measures, was significantly higher among urban participants than rural participants. Overall, 155 urban residents (62%) demonstrated adequate awareness compared with only 100 rural residents (40%), representing a statistically significant difference ($p < 0.001$) (Figure 1; Table 1). These findings indicate a substantial urban–rural disparity in knowledge and understanding of NCDs. Assessment of behavioural and biological risk factors also demonstrated distinct patterns between the two populations. Tobacco use was significantly more prevalent among rural participants, with 85 individuals (34%) reporting current tobacco consumption compared with 60 participants (24%) in urban areas ($p = 0.01$). In contrast, lifestyle-related risk factors associated with urbanization were more common among urban residents. Physical inactivity was reported by 115 urban participants (46%) compared with 70 rural participants (28%), showing a highly significant difference ($p < 0.001$). Similarly, overweight and obesity were considerably more prevalent in the urban population, affecting 95 participants (38%), whereas only 55 rural participants (22%) were classified as overweight or obese ($p < 0.001$). The prevalence of hypertension was relatively high in both populations, affecting 75 urban participants (30%) and 65 rural participants (26%); however, the difference was not statistically significant ($p = 0.31$). Multivariable logistic regression analysis was performed to identify factors independently associated with adequate NCD awareness (Table 2). Higher educational attainment emerged as the strongest predictor of adequate awareness, with educated participants demonstrating significantly greater knowledge than those with lower educational levels (adjusted odds ratio [aOR] = 2.6, 95% confidence interval [CI]: 1.8–3.8, $p < 0.001$). Urban residence was also independently associated with better awareness (aOR = 1.9, 95% CI: 1.3–2.7, $p < 0.01$), suggesting that access to health information and healthcare services may contribute to improved knowledge. In addition, younger age was significantly associated with adequate awareness (aOR = 1.5, 95% CI: 1.1–2.2, $p = 0.02$). Overall, the findings demonstrate marked urban–rural differences in both awareness and risk-factor distribution, with urban populations exhibiting greater awareness but higher levels of obesity and physical inactivity, while rural populations showed a higher prevalence of tobacco use (Figure 2).

Table 1. Awareness and risk factors by residence (250 per group).

Variable	Urban	Rural	p
Adequate NCD awareness, n (%)	155 (62)	100 (40)	<0.001
Tobacco use, n (%)	60 (24)	85 (34)	0.01
Physical inactivity, n (%)	115 (46)	70 (28)	<0.001
Overweight/obesity, n (%)	95 (38)	55 (22)	<0.001
Hypertension, n (%)	75 (30)	65 (26)	0.31

3.2 Correlates of awareness

Higher education and urban residence were independently associated with adequate awareness (Table 2). Risk-factor profiles differed, with more obesity and inactivity in urban and more tobacco use in rural participants (Figure 2).

Table 2. Adjusted correlates of adequate NCD awareness.

Correlate	aOR	95% CI	p
Higher education	2.6	1.8–3.8	<0.001
Urban residence	1.9	1.3–2.7	<0.01
Younger age	1.5	1.1–2.2	0.02

Figure 1. Awareness of non-communicable diseases: urban versus rural

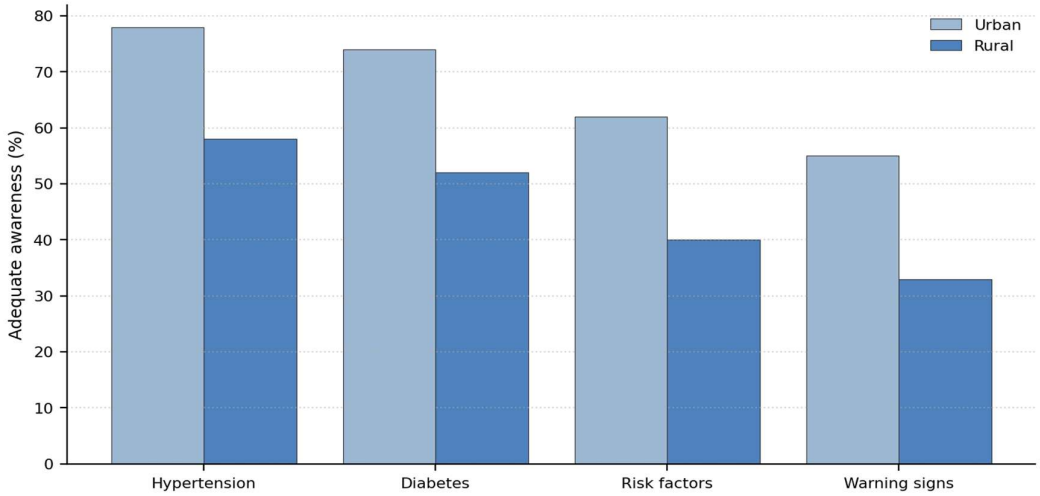

Figure 1. Awareness of NCDs: urban versus rural.

Figure 2. Prevalence of NCD risk factors: urban versus rural

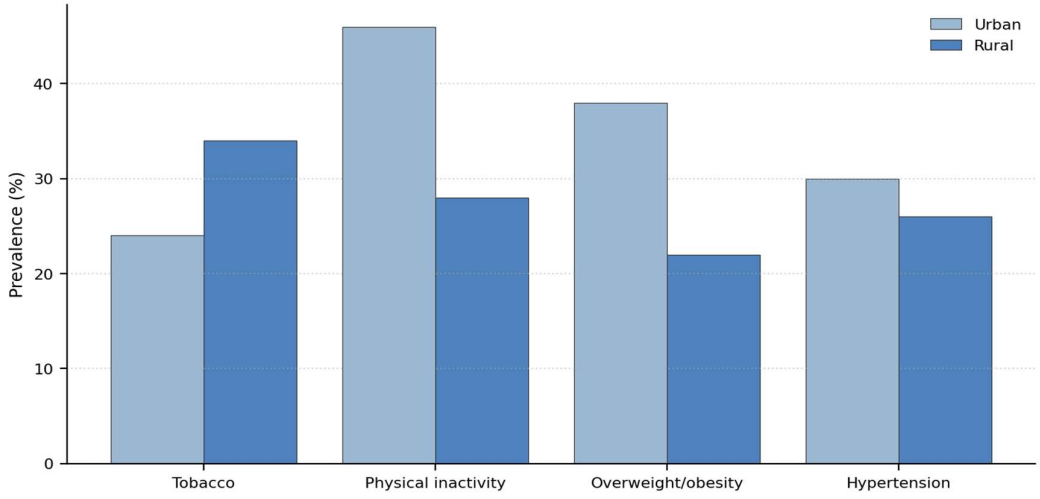

Figure 2. Prevalence of NCD risk factors: urban versus rural.

4. Discussion

In this comparative cross-sectional study, substantial differences were observed between urban and rural populations with respect to awareness of non-communicable diseases (NCDs) and the distribution of major NCD risk factors. Urban participants demonstrated significantly higher levels of awareness regarding common NCDs, their risk factors, warning signs, and preventive measures compared with their rural counterparts. At the same time, distinct patterns of behavioural and lifestyle-related risk factors were evident across the two settings. Urban residents exhibited a higher prevalence of physical inactivity and overweight/obesity, whereas tobacco use was considerably more common among rural participants. These findings highlight the complex relationship between socioeconomic development, educational attainment, lifestyle practices, and health-related knowledge, and are consistent with previous studies demonstrating the influence of urbanization on both awareness and risk-factor exposure [4,6]. The higher level of awareness observed among urban residents is likely attributable to better access to education, healthcare facilities, mass media, digital health information, and community-based health promotion activities. Urban populations generally benefit from greater exposure to public health campaigns and screening programs, which can improve knowledge and encourage preventive behaviours. In contrast, lower awareness among rural residents may reflect limited access to healthcare resources, lower literacy levels, and reduced exposure to health education initiatives. These disparities underscore the continuing need to strengthen rural health communication strategies and improve access to reliable health information [5,7]. The contrasting risk-factor profiles identified in the present study further emphasize the need for setting-specific preventive approaches. Urban lifestyles are increasingly characterized by sedentary occupations, mechanized transportation, reduced physical activity, and greater consumption of energy-dense foods, contributing to the higher prevalence of obesity and inactivity observed in this population. Conversely, the greater prevalence of tobacco use among rural participants may be influenced by cultural acceptance, occupational factors, lower awareness of tobacco-related harms, and inadequate tobacco-control interventions. These findings suggest that a uniform approach to NCD prevention may not be effective across diverse populations[8]. The results support the implementation of context-specific public health strategies within comprehensive NCD prevention programs. In rural areas, interventions should prioritize tobacco-control measures, community-based awareness campaigns, and improved access to preventive health services. In urban settings, programs should focus on promoting physical activity, healthy dietary practices, weight management, and lifestyle modification. Such tailored approaches may enhance the effectiveness of prevention efforts and reduce the future burden of NCDs [9,10]. The study possesses several strengths, including the use of a standardized and pre-tested survey instrument, objective assessment of major risk factors, balanced sampling from both urban and rural populations, and multivariable analysis to control for potential confounders. Nevertheless, certain limitations should be acknowledged. The cross-sectional design limits the ability to establish causal relationships between awareness and risk-factor patterns. Information on some behavioural variables was self-reported and therefore susceptible to recall and social-desirability bias. Furthermore, the study was conducted within a single geographic region, which may restrict the generalizability of the findings to other populations with different demographic and cultural characteristics. Future research should involve larger, multicentre studies across diverse regions and evaluate the effectiveness of tailored educational and behavioural interventions in improving awareness and reducing NCD risk factors. Such evidence would further strengthen the development of targeted, context-specific strategies for NCD prevention and control[11].

5. Conclusion

The present study demonstrated clear and significant differences in both non-communicable disease (NCD) awareness and risk-factor profiles between urban and rural populations. Urban participants exhibited substantially higher levels of awareness regarding common NCDs, their associated risk factors, warning signs, and preventive measures compared with rural participants. This finding suggests that access to education, healthcare facilities, health information, and public health campaigns is likely more extensive in urban settings, enabling residents to acquire better knowledge about chronic diseases and their prevention. In contrast, lower awareness among rural populations indicates persistent gaps in health literacy and access to health information, which may hinder the adoption of preventive behaviours and timely healthcare-seeking practices. These disparities underscore the importance of addressing inequities in health education and communication across different geographic settings. The study also revealed notable differences in the distribution of behavioural and lifestyle-related risk factors. Tobacco use was significantly more common among rural participants, highlighting the continued public health challenge posed by tobacco consumption in rural communities. Cultural norms, occupational factors, lower awareness of tobacco-related harms, and limited access to cessation services may contribute to this higher prevalence. Given the well-established role of tobacco use in the development of cardiovascular diseases, chronic respiratory diseases, cancers, and other NCDs, targeted tobacco-control interventions should remain a priority in rural health programs. Community-based awareness campaigns, tobacco cessation services, and stricter implementation of tobacco-control policies may help reduce this preventable risk factor and its associated disease burden. Conversely, urban participants demonstrated higher levels of physical inactivity and overweight/obesity. These findings reflect the ongoing effects of urbanization and lifestyle transition, characterized by sedentary occupations, increased reliance on motorized transport, reduced opportunities for physical activity, and greater consumption of processed and energy-dense foods. Although urban residents possessed better awareness regarding NCDs, this knowledge did not necessarily translate into healthier lifestyle practices, suggesting that awareness alone may be insufficient to modify behaviour. Effective urban health interventions should therefore focus not only on education but also on creating supportive environments that encourage physical activity, healthy dietary choices, and weight management through workplace wellness programs, community recreation facilities, and public health initiatives. The contrasting patterns observed in this study indicate that NCD prevention strategies should be tailored to the specific needs of different populations rather than relying on a uniform approach. Rural communities may benefit most from enhanced health education, improved access to preventive healthcare services, and intensive tobacco-control measures, whereas urban populations may require interventions targeting obesity prevention, active lifestyles, and dietary modification. Such context-specific strategies are likely to be more effective in reducing NCD risk and improving long-term health outcomes. Overall, the findings emphasize that urban and rural populations differ significantly in both awareness and risk-factor exposure. These differences support the need for targeted, context-specific health education and prevention programs integrated within broader NCD control initiatives. Future multi-region and multicentre studies involving diverse populations are warranted to validate these findings, explore regional variations, and assess the effectiveness of tailored interventions in improving awareness and reducing modifiable risk factors. Such evidence will be essential for developing equitable and effective public health policies aimed at reducing the growing burden of non-communicable diseases.

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