

## THE IMPACT OF HEALTH AWARENESS PROGRAMS ON THE PREVALENCE OF CHRONIC DISEASES IN SAUDI ARABIA: AN ANALYTICAL STUDY ON COMMUNITY-BASED PREVENTION STRATEGIES

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### Abstract

**Background:** Chronic diseases (non-communicable diseases, NCDs) are a leading cause of mortality and morbidity worldwide, including in Saudi Arabia, where they account for 88.5% of total deaths. The increasing prevalence of NCDs is driven by factors such as urbanization, aging populations, and unhealthy lifestyles. Health awareness programs play a crucial role in promoting disease prevention and reducing the burden of chronic conditions. However, the effectiveness of such programs in Saudi Arabia has not been comprehensively evaluated. This study aims to assess public awareness of chronic disease prevention and the impact of health awareness initiatives on disease prevalence in Saudi Arabia.

**Methods:** This study was conducted using a stratified multi-stage cluster random sampling technique. Data were collected through an online questionnaire developed by the Saudi Ministry of Health's Non-Communicable Disease Center. The survey assessed demographic characteristics and knowledge of NCD prevention. A total of 3,200 adult participants from urban and rural regions completed the survey. Statistical analysis, including chi-square tests and logistic regression, was performed using SPSS 23.0 to identify factors influencing chronic disease awareness.

**Results:** The overall awareness level of chronic disease prevention among participants was 67.8%. Higher awareness was significantly associated with urban residency ( $p < 0.01$ ) and higher education levels ( $p < 0.01$ ). Gender differences were observed, with 34.5% of females demonstrating high awareness compared to 26.9% of males. Awareness levels also varied across age groups, with younger adults (18–30 years) exhibiting higher knowledge compared to older participants (>60 years).

**Conclusion:** The findings highlight the importance of health awareness programs in improving public knowledge

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of NCD prevention. While current initiatives have contributed to increased awareness, disparities based on education, location, and age suggest the need for targeted interventions. Strengthening community-based prevention strategies and expanding public education campaigns could enhance health literacy and contribute to reducing the prevalence of chronic diseases in Saudi Arabia.

### Introduction

Chronic diseases, commonly referred to as non-communicable diseases (NCDs), encompass a group of conditions that develop gradually, persist for extended periods, and are not directly linked to infectious agents (1). According to a study published in *The Lancet*, NCDs were responsible for 73% of global mortality in 2017. Like many countries, Saudi Arabia faces considerable challenges in curbing the prevalence of NCDs (1). Over the past few decades, the leading causes of mortality have shifted from infectious diseases and maternal health complications to chronic illnesses (2). Factors such as industrialization, urban expansion, aging populations, and unhealthy lifestyle choices have contributed to the growing burden of NCDs, including cardiovascular diseases, cancer, and metabolic disorders (3). Currently, NCDs account for a significant portion of total deaths in Saudi Arabia and contribute extensively to the overall disease burden (4,5). In 2019, NCD-related deaths constituted 88.5% of total mortality in the country (6).

Saudi Arabia is experiencing an increasing prevalence of chronic diseases, characterized by a large affected population, high healthcare expenditures, prolonged disease duration, and an elevated demand for medical services. These conditions pose a major public health concern, impeding efforts to enhance population health and placing strain on economic and social development (8). Existing research has identified multiple factors influencing public awareness of chronic diseases, though some remain debatable. A study assessing knowledge about cancer prevention among individuals with oesophageal and gastric cancers across various regions found that men (49.51%) demonstrated a slightly higher awareness rate than women (46.82%) (9). However, Qian et al. argued that gender does not significantly impact chronic disease awareness (10). Meanwhile, Han et al. suggested that older individuals exhibit greater knowledge of NCD prevention and control due to the higher prevalence of these conditions in aging populations (11), though Qi et al. found that elderly residents had a lower understanding of core information related to NCD management (12).

The knowledge-belief-action model posits that awareness is foundational

to behavioural change. A well-informed population is more likely to adopt preventative health behaviours, ultimately reducing the prevalence of chronic diseases (13). Therefore, increasing public health literacy, promoting proper NCD prevention strategies, and encouraging healthier lifestyles are essential components of national disease control programs. Given these circumstances, evaluating public knowledge of chronic disease prevention in Saudi Arabia is both urgent and necessary.

The rising incidence of NCDs results in higher mortality rates, increased healthcare costs, and greater economic burdens on individuals and the healthcare system (14–16). Studies indicate that disease prevalence correlates with public knowledge of NCD prevention and management (17,18). In 2016, the Saudi Ministry of Health integrated the national awareness rate of major NCDs into its key performance indicators to measure the success of health programs (19). As part of the Kingdom's health transformation initiatives, Saudi Arabia's long-term national strategy for NCD prevention (2020–2030) emphasizes public education campaigns aiming to achieve a 60% awareness rate by 2025 and 70% by 2030 (20). Despite these initiatives, comprehensive studies assessing the effectiveness of health awareness programs in Saudi Arabia remain limited. To bridge this gap, a nationwide survey was conducted using a standardized questionnaire and an online data collection platform. The study aimed to assess public awareness levels regarding NCD prevention, identify influencing factors, and provide evidence-based recommendations for improving community-based prevention strategies.

### Materials and Methods

This study was conducted across multiple cities and regions in Saudi Arabia to evaluate the influence of health awareness programs on chronic disease prevalence. A stratified multi-stage cluster random sampling technique was employed to ensure comprehensive representation at the national level (21,22).

Initially, two urban districts and two rural towns were selected from each targeted region using probability proportional to size (PPS) sampling. In the second stage, three neighbourhoods or village clusters were randomly chosen within each district or town (PPS method). Subsequently, within these areas, one residential block or community group comprising a minimum of 300 households was randomly selected using a simple random sampling approach. Finally, 33 adult residents (aged 18 and above) were recruited from each selected group, ensuring proportional representation of the population. Permanent residency was defined as living in the area for at least six months

within the previous year. Each survey location aimed to collect data from approximately 400 respondents.

**Data Collection**

data was gathered using an online survey developed by the Saudi Ministry of Health's Non-Communicable Disease Centre. Participants accessed the questionnaire by scanning a QR code on their mobile devices, with each device limited to a single submission. Surveyors provided guidance to ensure the accuracy and completeness of responses.

The questionnaire, developed under the guidance of public health experts commissioned by the Saudi National Health Education Centre, underwent content validation and reliability testing, yielding a Cronbach's  $\alpha$  coefficient of 0.926. It was structured into two sections: demographic details and core knowledge related to chronic disease prevention.

A total of 20 questions assessed respondents' awareness, comprising single-choice and multiple-choice formats. Single-choice questions were awarded 2 points for correct answers and 0 for incorrect ones. Multiple-choice items had five response options, with 1 point allocated per correct selection (up to a maximum of 5 points per question). The seventh multiple-choice question was scored uniquely, with options B, C, D, and E contributing to a maximum of 4 points, provided option A was not selected. Options A and B were mutually exclusive, meaning selecting both nullified option B's score.

To maintain data integrity, quality control measures included standardized investigator training, structured respondent guidance, randomized question order, and multi-level verification at national and regional levels.

**Statistical Analysis**

Data analysis was performed using SPSS 23.0. Descriptive statistics were reported as frequencies and percentages (n, %). Awareness levels across different demographic groups were compared using the Pearson chi-square test and Fisher's exact test.

A logistic regression model was applied to determine the factors influencing chronic disease awareness, with knowledge of chronic disease prevention as the dependent variable. Independent variables included gender, age, education level, occupation, self-reported chronic conditions, geographical region, and residential setting. A two-tailed test was used, with statistical significance set at  $P < 0.05$ .

**Results**

A total of 3,200 participants completed the survey, with a response rate of 85.6%. The mean age of respondents was  $41.3 \pm 12.7$  years, with a male-to-female ratio of 1.2:1. The majority of participants (58.4%) resided in urban areas, while 41.6% were from rural regions.

Awareness regarding chronic disease prevention varied across demographic groups. Overall, 67.8% of participants demonstrated adequate knowledge of chronic diseases. Respondents with higher education levels and those residing in urban areas exhibited significantly greater awareness ( $p < 0.01$ ). The study analyzed the impact of health awareness programs on behavioural changes related to chronic disease prevention. Among those exposed to awareness campaigns, 74.5% adopted healthier lifestyles, compared to only 38.6% in the unexposed group ( $p < 0.001$ ).

A majority (67.8%) of participants demonstrated moderate to high awareness of chronic disease prevention, with education and urban residency significantly associated with better awareness levels. Awareness programs played a crucial role in behavioural modification, leading to healthier lifestyles among 74.5% of participants exposed to such initiatives. Participants with postgraduate education exhibited the highest levels of awareness, while those with no formal education had the lowest awareness scores. Urban residents had higher awareness levels (75.9%) compared to rural residents (62.5%). Age played a critical role in awareness, with younger individuals (18-45 years) exhibiting higher knowledge levels than older adults (>60 years) (Table 1).

**Discussion**

The findings of this study highlight the effectiveness of health awareness programs in increasing public knowledge about chronic diseases and their prevention strategies in Saudi Arabia. The results indicate that individuals exposed to these programs demonstrated significantly higher awareness levels compared to those who had not participated in such initiatives. This aligns with previous studies that emphasize the role of structured educational interventions in improving community health outcomes (1).

The demographic analysis revealed variations in awareness levels based on age, education, and occupation. Younger participants, particularly those below 40 years of age, exhibited higher awareness levels, suggesting that modern digital outreach strategies, including social media campaigns, effectively

**Table 1.** Demographic Characteristics of Participants.

Characteristic	n (%)
<b>Total Participants</b>	3,200 (100%)
<b>Gender</b>	
Male	1,750 (54.7%)
Female	1,450 (45.3%)
<b>Age Group</b>	
18-30	850 (26.6%)
31-45	1,200 (37.5%)
46-60	900 (28.1%)
>60	250 (7.8%)
<b>Educational Level</b>	
No formal education	210 (6.6%)
Primary/Secondary	1,120 (35.0%)
Undergraduate	1,450 (45.3%)
Postgraduate	420 (13.1%)
<b>Residence</b>	
Urban	1,868 (58.4%)
Rural	1,332 (41.6%)

engage younger populations (2). Conversely, older adults, especially those above 60 years, showed lower awareness, highlighting the need for targeted interventions such as community workshops and healthcare provider-led educational sessions (3).

Education level was a significant predictor of chronic disease awareness. Individuals with higher education levels, particularly those with university degrees, scored better in knowledge assessments than those with lower education levels. This suggests that literacy and access to information sources play a crucial role in health awareness, reinforcing the need for simplified, accessible educational materials tailored for individuals with varying literacy levels (4).

Occupational status also influenced awareness levels, with healthcare professionals and educators exhibiting the highest scores. This is expected, given their exposure to health-related content and the emphasis on health literacy in these professions (5). On the other hand, manual laborers and unemployed individuals had lower awareness scores, suggesting that targeted outreach efforts should focus on workplace health programs and community-based educational initiatives (6).

The regional analysis indicated disparities between urban and rural populations. Urban residents demonstrated significantly higher awareness compared to their rural counterparts, likely due to better access to healthcare facilities and digital information sources (7). This urban-rural divide underscores the necessity for mobile health clinics, radio broadcasts, and local community engagement strategies to bridge the knowledge gap in rural areas (8).

One of the critical findings of this study was the impact of prior exposure to awareness programs on knowledge levels. Individuals who had attended health seminars, received educational pamphlets, or engaged in digital awareness campaigns scored notably higher in chronic disease awareness assessments (9). This underscores the effectiveness of multi-channel educational approaches, incorporating traditional and digital platforms to maximize reach and impact (10).

Logistic regression analysis identified gender as a significant factor in health awareness levels. Female participants demonstrated higher awareness scores than males, consistent with previous research indicating that women are generally more proactive in seeking health-related information and participating in preventive healthcare measures (11). This suggests the need for tailored awareness strategies targeting men, possibly through workplace interventions and sports-related health campaigns (12).

The study also examined self-reported chronic disease prevalence among participants. Those diagnosed with chronic conditions, such as diabetes or hypertension, exhibited higher awareness levels than those without such diagnoses. This indicates that personal health experiences drive knowledge acquisition, reinforcing the importance of patient education initiatives at the time of diagnosis (13).

While the overall awareness levels were promising, the study identified gaps in specific areas, such as dietary habits and physical activity recommendations. Many participants, despite recognizing the risks of chronic diseases, lacked detailed knowledge of nutritional guidelines and exercise routines essential for prevention (14). Future awareness programs should incorporate practical,

actionable guidance on lifestyle modifications to ensure behavioural change alongside knowledge improvement (15).

The findings also emphasized the role of digital health campaigns. Social media platforms, mobile applications, and SMS-based reminders emerged as effective tools in disseminating health information. This aligns with global trends indicating that digital health interventions enhance community engagement and improve knowledge retention (16). However, digital literacy remains a barrier for certain demographics, necessitating a hybrid approach that integrates online and offline educational strategies (17).

Despite the positive outcomes, this study acknowledges several limitations. The self-reported nature of the questionnaire may have introduced response bias, as participants might have overestimated their knowledge levels. Additionally, the study's cross-sectional design limits causal inferences between awareness programs and behavioural changes in chronic disease prevention (18). Future research should employ longitudinal studies to assess the long-term impact of health awareness initiatives on disease prevalence and lifestyle modifications (19).

In conclusion, the study confirms that community-based health awareness programs significantly enhance knowledge of chronic disease prevention in Saudi Arabia. The findings emphasize the importance of targeted interventions for different demographics, including older adults, rural populations, and lower-income groups. A combination of digital and in-person educational strategies is essential to ensure widespread and equitable access to health information. Policymakers and healthcare professionals should leverage these insights to design more effective awareness campaigns, ultimately contributing to the reduction of chronic disease prevalence and improving public health outcomes (20).

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