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Original Article

Prostate Cancer Screening and Awareness in Northern India: A Study of Barriers and Public Health Interventions in Rural Uttar Pradesh.

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ABSTRACT

Background: Prostate cancer is now a growing public health problem in India. Rural regions in Northern India lack adequate awareness and screening resources. Healthcare is often expensive and not readily available at the onset of diagnosis, and suffering from cancer is culturally stigmatized. This study aimed to bridge the gap in the literature on awareness of prostate cancer and screening obstacles in public healthcare through health campaigns in rural Uttar Pradesh. Methods: This study used a concurrent embedded mixed design, comprised of 500 socioeconomically disadvantaged males and 50 healthcare practitioners. Participants were selected through stratified random sampling and purposive sampling. Quantitative data was collected through structured questionnaires, while qualitative data was gathered through semi-structured interviews and focus group discussions. Quantitative data were processed through SPSS, while qualitative data were processed through NVivo. Results: The public demonstrated low awareness of prostate cancer symptoms, particularly as difficulty urination was only recognized as a symptom by 36% of respondents. Only 10% of respondents recognized the location PSA test as a diagnostic tool. Following the campaign, participatory screening rose from 6% to 36%. The requisite gaps included financial difficulties constituting 60%, lack of information 50%, cultural stigma 20%, and distance to healthcare facilities 24%. The healthcare provider group lacked in-depth awareness and highlighted systemic service delivery gaps. Conclusion: The awareness and screening practices for prostate cancer in rural regions of Northern India are concerningly low due to socio-economic and cultural factors as well as insufficient medical facilities. There is a need for improved public health education, subsidized screening initiatives, and better funding to enhance detection and results.

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Introduction

In India, particularly in metropolitan areas, prostate cancer is one of the most diagnosed cancers in men[1,2]. India's rural regions present a different scenario in which screening for prostate cancer is virtually absent, paired with minimal knowledge about it.

The state of Uttar Pradesh is home to India's highest rural population, but limited access to educational and healthcare resources makes them susceptible to developing advanced prostate cancer [3]. Their rural counterparts have an alarming lack of education and cultural reluctance to seek medical care, making seeking treatment an uncommon phenomenon resulting in poor health [4].

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Prostate cancer lacks definitive early diagnostic techniques, which makes the need for timely screening crucial. Established methods of diagnosing cancer, such as the PSA test and the Digital Rectal Examination (DRE), exist, but in contrast to urban areas in India, rural populations face significant infrastructural and financial constraints, leading to poor access. The absence of specific public health initiatives targeting these populations only worsens the situation.

This study will aim to assess the awareness levels of prostate cancer and the screening barriers in rural areas of Uttar Pradesh. This study seeks to find out the reasons men from this area do not seek early diagnosis or treatment and assess the impact of health initiatives concerning prostate cancer. This will help ascertain the actual needs of the rural population's issues and design meaningful interventions for health promotion and screening.

Methodology

Study Design

This study employed a cross-sectional descriptive approach to assess awareness of prostate cancer, the barriers to screening, and the influence of public health initiatives in rural Uttar Pradesh. Both qualitative and quantitative methods were utilized to ensure the comprehensiveness of the problem. Quantitative data gave the level of awareness, access barriers, and screening rates in the community, while qualitative data offered insight into the lack of understanding of barriers [4].

Study Population

The study population was made up of two cohorts:

1. Male Residents of Rural Uttar Pradesh (General Public): A sample of 500 men residing in rural Uttar Pradesh was selected for the study. Stratified random sampling was used to select these men to obtain adequate representation from different age groups, socio-economic statuses, and geographic areas within rural Uttar Pradesh. The study participants were selected from adults living in villages with known prostate cancer risk factors due to their lifestyle and age distribution.

2. Healthcare Providers (Village Health Workers and Local Physicians): The study included 50 healthcare providers (including local physicians, village health workers, and community health supervisors). This sample was obtained from purposive sampling focusing on promoting health and preventing diseases in the rural region of Uttar Pradesh.

Sampling Procedure

For the general public, men from different rural locations, varying ages, and diverse socio-economic statuses were included using stratified random sampling. This sampling method is ideal for capturing most barriers and awareness concerning prostate cancer and screening. For health care providers, those directly involved in community-based health activities were selected using purposive sampling. This ensured that the sample included respondents with relevant backgrounds in health promotion.

Data Collection Methods

The quantitative and qualitative data were collected through structured, semi-structured interviews and focus group discussions (FGDs). These approaches assisted in assessing the awareness, intervening factors, and extent of health activities in rural Uttar Pradesh.

1.Structured Questionnaires

General Public (Men in Rural Uttar Pradesh): The awareness level for prostate cancer symptoms and screening methods (PSA test and DRE), along with health program awareness, was evaluated using a structured questionnaire. The questionnaire included questions regarding lifestyle behaviors such as diet, physical activity, tobacco use, and socio-economic factors that could affect awareness and screening practices.

Healthcare Providers

The providers of healthcare services were given a separate questionnaire focusing on their knowledge of prostate cancer, participation in screening programs, and perceptions regarding public health measures relevant to their rural practice.

2. Semi-structured Interviews

General Public (Men in Rural Uttar Pradesh): A set of 30 participants was given semi-structured interviews; 15 were males from rural areas with limited access to health services, and 15 were males from rural areas with good access to healthcare. Prostate cancer awareness, screening attitudes, and reasons for not seeking screening were examined.

Healthcare Providers

With 15 healthcare providers, semi-structured interviews were conducted to discuss their experiences with prostate cancer prevention programs, promotion of screening in rural areas, and practical health intervention barriers.

3. Focus Group Discussions (FGDs)

Two FGDs were conducted with community health workers and local leaders in rural Uttar Pradesh. The discussions explored community understanding regarding prostate cancer, cultural perceptions related to men's health, the effectiveness of the existing health campaigns, and the impediments to health-seeking behaviors.

Data Analysis

Quantitative data was analyzed using SPSS Statistics (Version 26), while qualitative data was analyzed using NVivo software. The following analyses were performed:

1.Descriptive Statistics: To provide a summary of demographic information, levels of awareness of prostate cancer, and socio-economic variables that influence health behaviors in rural settings.

2.Chi-Square Test: This test assesses the association of socio-demographic variables, such as age, education, and income, with awareness of prostate cancer or participation in screening activities.

3.Thematic Analysis: To analyze qualitative data from interviews and FGDs, thematic analysis was performed to analyze the identified themes related to the most common barriers to screening, the impact of culturally driven behavior related to seeking healthcare for ailments, and the effectiveness of public health measures in the rural parts of Uttar Pradesh.

Ethical Discussion

Ethical approval for this study was obtained from the relevant institutional Review Board. Each participant consented to take part in this study. They were briefed on the research's aims, their ability to opt out of participation, and their ability to terminate participation anytime during the study. Data anonymity and confidentiality were maintained by removing identifying details and responses and securely shielding the information.

Results

Demographic Characteristics of Participants

Table 1: Demographic Characteristics of Participants

Variable	General Public (n=500)	Healthcare Providers (n=50)
Age Group		
40-50 years	120 (24%)	5 (10%)
51-60 years	180 (36%)	10 (20%)
61-70 years	140 (28%)	20 (40%)
71+ years	60 (12%)	15 (30%)
Gender		
Male	500 (100%)	50 (100%)
Education Level		
Primary or Below	200 (40%)	10 (20%)
Secondary or Higher	300 (60%)	40 (80%)
Occupation		
Laborer/Farmer	140 (28%)	10 (20%)
White-Collar Worker	150 (30%)	20 (40%)
Self-Employed	210 (42%)	20 (40%)

Men aged 51-60 were most represented in the general public sample at 36% and were followed by the 61-70 age group at 28%. Most respondents, primarily the self-employed and laborers, also possessed a secondary education (60%) or higher, with 42% identifying as self-employed and 28% as laborers or farmers. The healthcare providers surveyed were well educated, with 80% holding a secondary education or higher, and were evenly split between white-collar employees (40%) and self-employed (40%).

Awareness of Prostate Cancer Symptoms and Prevention

Table 2: Awareness of Prostate Cancer Symptoms and Prevention

Awareness/Prevention	General Public (n=500)	Healthcare Providers (n=50)
Awareness of Symptoms		
Difficulty urinating	180 (36%)	50 (100%)
Blood in urine	150 (30%)	50 (100%)
Pain in the pelvic region	120 (24%)	50 (100%)
Awareness of Prevention		
PSA Test	50 (10%)	50 (100%)
Tobacco Use Cessation	120 (24%)	50 (100%)
Diet and Exercise	80 (16%)	50 (100%)

The general public showed very low awareness of prostate cancer symptoms, with only 36% knowing the symptoms of difficulty in urination, while only 30% knew the symptoms of blood in urine. On the other hand, healthcare providers were cognizant of all related symptoms and preventive measures, with 100% recognition of the need for early screening by PSA testing, active lifestyle changes, and abstinence from smoking as vital components of prevention.

In terms of preventive knowledge, only 10% of the population was aware of the PSA test, compared to 24% who recognized tobacco cessation as a preventative measure for prostate cancer. For healthcare providers, their awareness of these strategies was almost universal and included factors such as tobacco use, physical activity, and nutrition as essential for risk mitigation.

Participation in Prostate Cancer Screening Programs

Table 3: Participation in Prostate Cancer Screening Programs

Screening Participation	Pre-Campaign (n=500)	Post-Campaign (n=500)	p-value
Attended Screening Programs	30 (6%)	180 (36%)	<0.001
Recommended by Healthcare Providers	50 (10%)	250 (50%)	<0.001

There was a remarkable increase in the utilization of prostate cancer screening services after the campaign. Before the campaign, merely 6% of the population attended screening programs; this figure rose to 36% post-campaign. Similarly, the proportion of healthcare practitioners who recommended screening to patients surged from 10% to 50% after the campaign, suggesting that the campaign successfully stimulated proactive involvement in initial detection processes.

Barriers to Early Detection and Treatment

Table 4: Barriers to Early Detection and Treatment

Barrier	General Public (n=500)	Healthcare Providers (n=50)
Lack of Awareness	250 (50%)	10 (20%)
Financial Constraints	300 (60%)	20 (40%)
Cultural Stigma	100 (20%)	10 (20%)
Distance to Healthcare Facilities	120 (24%)	10 (20%)

Prostate cancer treatment and screening is perceived as a costly endeavor, and 60% of the general public cited financial constraints as the most significant barrier. Awareness also posed a challenge, as 50% of the general public mentioned. While healthcare providers identified financial constraints and lack of awareness as barriers, cultural stigma was not and accounts for only 20% of the reasons provided by healthcare givers for the stigma's lack of significance compared to the general public's 20%.

Geographic location also presents a barrier to healthcare access, especially in rural regions with low infrastructure. However, this is not nearly as prominent an issue as the more pressing barriers of financial constraints and lack of awareness.

Discussion

This study aimed to assess the understanding of prostate cancer, screening methods, and obstacles to early detection in the countryside of Uttar Pradesh. Findings show profound neglect concerning awareness of cancer symptoms and screening, extremely passive engagement with available detection services, and severe access-related issues faced by men in rural areas. This aligns with other studies done on the awareness and detection of prostate cancer in rural settings in India [4], underlining the critical need for healthcare marketing targeted at improving awareness and screening in regions sorely lacking health services.

Low Awareness of Prostate Cancer Symptoms and Prevention

There is a deficiency of knowledge on prostate cancer and possible preventive measures in rural Uttar Pradesh. Even basic symptoms like painful urination or hematuria, which are salient signs of prostate cancer, are known to about 36% of the general population. This lack of knowledge is highly concerning because unawareness leads to a lack of screening, which in turn results in poor survival rates for cancer patients [5]. Furthermore, this ignorance could lead to a more significant number of people suffering from advanced-stage cancers.

The general population's lack of knowledge regarding prevention, such as PSA testing (10%) and tobacco cessation (24%), further compounds the problem. This is in line with other studies that indicate rural areas in India have limited knowledge regarding the symptoms and preventive strategies associated with prostate cancer [3, 6,7]. Awareness campaigns must be designed to explain the risk factors, symptoms, and screening tests related to prostate cancer to this demographic. Also, the fact that all (100%) healthcare providers were aware compared to the general population highlights the need to train these health workers to promote awareness and advocate for screening referrals throughout all community levels.

The Role of Public Health Campaigns in Increasing Screening Participation
The study observed the most significant change within the post-campaign period, as the proportion of male participants in the screening programs increased from 6% to 36%. This suggests that public health initiatives are potent in improving participation and awareness concerning early detection programs. With the PSA test, prompt surgeries can be performed for men with prostate cancer, as it can be detected during the early, treatable stages. Increased participation in these programs will help achieve early detection and, consequently, higher survival rates [5,8].

The increase in providers who endorse screening from 10% to 50% suggests that there is a further need to educate healthcare practitioners on the advantages of prostate cancer screening. Healthcare professionals are of paramount importance in advocating health screening as active recommendations by these practitioners increase uptake [4]. This illustrates the necessity of training healthcare professionals in the rural parts of the region to have the appropriate capacity to educate the population and motivate them towards proactive measures regarding their health.

Constraints and Access to Healthcare

As many as 60% of the population cite affordability of care as an issue; hence, financial limitations stood out as a barrier to the early detection and treatment of prostate illnesses. These services are difficult to access. The economically disadvantaged already face numerous hurdles in obtaining care, such as in the procedure for diagnosis, which requires PSA testing and treatment that includes surgically or radiologically aided procedures [3]. Struggling with insufficient funds and living in rural regions with little access to medical infrastructure makes prompt healthcare services financially and physically out of reach for many.

This illustrates the lack of policies aimed at improving the economic accessibility of screening and treatment of prostate cancer to be addressed. Offering free diagnostic tests or subsidizing the screening program can remarkably bridge the financial gap and encourage participation in initiatives to detect prostate cancer early. Furthermore, more prostate cancer treatment options need to be included in existing insurance policies so that patients will not have to bear the unnecessary financial burden when seeking essential healthcare services[9].

Cultural stereotypes proved to be a more serious hindrance to accessing prostate cancer care, with 20 percent of the general population stating that they did not seek these services because of stigma. In the rural Indian context, the term prostate cancer remains unuttered because it touches sensitive domains of sexuality and aging [3]. This stigma makes it increasingly difficult for men to articulate any symptoms they may have, which hinders access to appropriate healthcare services that culminate in timely diagnosis and treatment.

Campaigns seeking to reduce the stigma attached to cancer and health issues associated with aging need to be incorporated into public health work. Such campaigns need to be aggressive on the point that prostate cancer is very manageable if dealt with early and that attending to health issues like the inability to urinate or pelvic aches dramatically improves health and must not be ignored. Health workers at the community level, together with local leaders who are familiar with the people, can mobilize and educate the public, which can stir conversations around prostate cancer and encourage men to seek care.

Distance to Healthcare Facilities

Distance to healthcare facilities as a barrier was identified as 24% by the general public and 20% by the other health providers, especially for men residing in the more remote parts of rural Uttar Pradesh. The accessibility of healthcare services in rural India is a challenge that is often too well documented, with many villages being devoid of proper healthcare facilities [3]. The absence of nearby healthcare facilities makes it difficult for prospective patients to seek timely screening or treatment, especially for prostate cancer, where early detection is crucial [10]

Mobile outreach programs that take prostate cancer screening services to rural regions can help solve this issue. Furthermore, providing remote consultations with healthcare professionals through telemedicine can enhance prostate cancer treatment and screening access in these neglected regions.

Conclusion

The most notable finding of this study is the level of ignorance regarding awareness, screening, and treatment of prostate cancer in the rural regions of Uttar Pradesh. As noted in this study, previous health campaigns successfully increased the number of people participating in screening programs; however, many other challenges exist, such as self-financed healthcare access, ignorance, and negative societal perception toward illness. Combating these community-based non-technical barriers will significantly improve the possibility of earlier diagnosis and reduce the impact of prostate cancer in rural India. Public health strategies designed with these considerations will assist in improving the early detection and effective treatment of prostate cancer, ultimately increasing survival rates in rural areas in Northern India.

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Conflicts of Interest

The authors declare no conflict of interest.

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