Early Detection of Prostate Cancer Among Men in the Middle Region of Syria: A Cross-Sectional Study Protocol

Abstract

Prostate cancer represents a significant health burden in the Middle East, with Syria experiencing particularly concerning trends in late-stage diagnoses and mortality. This cross-sectional study aims to assess the awareness, attitudes, and practices regarding prostate cancer screening among men in the middle region of Syria. Approximately 1,000 men aged 40 years and older will be recruited through online platforms and community health centers. Data will be collected using a structured questionnaire covering demographic information, awareness of prostate cancer symptoms and risk factors, knowledge of screening methods (particularly PSA testing), history of professional screenings, and perceived barriers to seeking medical help. Statistical analysis will be performed to identify associations between awareness levels and demographic factors. The findings from this study will provide crucial insights into the current state of prostate cancer awareness and screening practices in the region, informing the development of targeted public health interventions aimed at improving early detection rates and, consequently, survival outcomes among Syrian men. This study has been registered on ClinicalTrials.gov as an observational study focusing on awareness levels, screening practices, and barriers to early detection of prostate cancer in the Middle East.

Introduction

Prostate cancer represents a significant global health concern, ranking as the second most commonly diagnosed cancer and the fifth leading cause of cancer-related mortality among men worldwide. The Global Cancer Observatory estimates that approximately 1.4 million men are diagnosed with prostate cancer annually, with mortality rates being disproportionately higher in regions with limited healthcare resources and awareness (GLOBOCAN, 2023).

In the Middle East, including Syria, the burden of prostate cancer has been steadily increasing, with alarming trends in late-stage diagnoses. The mortality-to-incidence ratio for prostate cancer in the region is significantly higher than in developed countries, indicating substantial gaps in early detection and treatment. This disparity is particularly

concerning in Syria, where the ongoing humanitarian crisis has severely disrupted healthcare infrastructure and services, potentially exacerbating challenges in cancer care.

The middle region of Syria, encompassing several governorates including Homs and Hama, has been particularly affected by these disruptions, potentially leading to delayed diagnoses and poorer outcomes for prostate cancer patients. The limited availability of specialized urological services, coupled with cultural barriers and low awareness, creates a complex environment that hinders effective early detection efforts.

Early detection of prostate cancer is crucial for improving survival rates and reducing the burden of advanced disease. When detected at an early stage, prostate cancer has a five-year survival rate exceeding 95%, compared to less than 30% when diagnosed at advanced stages (American Cancer Society, 2023). Early detection strategies include prostate-specific antigen (PSA) testing and digital rectal examination (DRE), both of which require adequate awareness and willingness among men to undergo screening.

Recent studies have highlighted the low levels of awareness about prostate cancer and its screening among men in the Middle East. For instance, a survey indicated that while many men had heard of prostate cancer, only a small percentage understood the importance of screening methods such as the PSA test. This lack of knowledge contributes to late-stage diagnoses, which are associated with poorer outcomes. Additionally, cultural factors, misconceptions, and stigma surrounding prostate examinations may further impede screening practices in this region.

The present study aims to address these critical gaps by assessing the awareness, attitudes, and practices related to prostate cancer screening among men in the middle region of Syria. By identifying barriers to effective screening and intervention, this research will contribute to the development of targeted public health strategies that can enhance early detection efforts, ultimately improving health outcomes for men in this region.

Methods

Study Design and Setting

This research will employ a cross-sectional study design to evaluate prostate cancer awareness and screening practices among men in the middle region of Syria. The cross-sectional approach allows for the assessment of prevalence and associated factors at a specific point in time, providing a snapshot of the current situation. The study will be conducted in both urban and rural areas within the middle region of Syria, encompassing the governorates of Homs, Hama, and surrounding areas. Data collection

will occur over a six-month period, tentatively scheduled from September 2025 to February 2026.

Study Population and Sampling

Inclusion and Exclusion Criteria

The study population will consist of men aged 40 years and older residing in the middle region of Syria. This age threshold was selected based on international guidelines that recommend prostate cancer screening discussions beginning at age 40-45 for men at average risk. Men with a previous diagnosis of prostate cancer will be excluded from the study, as their knowledge and practices may be influenced by their experience with the disease, potentially introducing bias into the results.

Sample Size Determination

A target sample size of approximately 1,000 participants will be established to ensure statistical significance and representativeness. This sample size was calculated using the formula for cross-sectional studies with a 95% confidence interval, 3% margin of error, and an estimated prevalence of prostate cancer awareness of 50% (to maximize sample size). The sample size was further adjusted to account for a potential non-response rate of 15%.

Sampling Technique

A multi-stage sampling technique will be employed to select participants. First, districts within each governorate will be randomly selected. Within each selected district, communities will be randomly chosen. Finally, eligible men from these communities will be invited to participate through various recruitment channels, including community health centers, men's gatherings, and online platforms.

Data Collection Instruments and Procedures

Data will be collected through a structured questionnaire that has been developed based on a comprehensive literature review and adapted to the Syrian context. The questionnaire will be translated into Arabic and back-translated to ensure accuracy and cultural appropriateness. It will be pre-tested on a sample of 50 men who will not be included in the final study.

The questionnaire will consist of the following sections:

1. **Demographic Information**: This section will gather data on age, education level, marital status, occupation, income level, place of residence (urban/rural), and access to healthcare services.

2. **Awareness of Prostate Cancer**: This section will assess knowledge about prostate cancer symptoms, risk factors, and warning signs. Participants will be asked to identify common symptoms and risk factors from a list, and their responses will be scored to determine their level of awareness.

3. **Knowledge of Screening Methods**: Questions in this section will evaluate participants' knowledge of prostate cancer screening methods, particularly PSA testing and digital rectal examination, including understanding of the purpose, procedure, and recommended frequency.

4. **Screening History**: This section will gather information on participants' history of prostate cancer screenings, including PSA tests and digital rectal examinations, frequency, most recent screening, and factors influencing their decision to undergo screening.

5. **Barriers to Screening**: This section will identify perceived barriers to seeking prostate cancer screening, including financial constraints, accessibility issues, cultural factors, knowledge gaps, and psychological barriers such as fear and embarrassment.

The questionnaire will be administered through two main channels:

1. **Online Survey**: An electronic version of the questionnaire will be distributed through social media platforms, email lists of men's health organizations, and other online channels to reach a diverse audience.

2. **In-person Data Collection**: Trained male research assistants will administer the questionnaire at community health centers, men's gatherings, and other community settings to ensure inclusion of men with limited internet access.

Ethical Considerations

The study protocol will be submitted for approval to the relevant ethical review committees. Informed consent will be obtained from all participants before data collection. Participants will be assured of confidentiality and anonymity, and they will have the right to withdraw from the study at any time without consequences. All data will be stored securely with password protection, and only the research team will have access to the raw data.

Given the sensitive nature of the topic, special attention will be paid to ensuring privacy during data collection, particularly for in-person interviews. Male research assistants will be trained to approach the subject with cultural sensitivity and to provide basic information about prostate cancer and screening options to participants after completion of the questionnaire.

Data Analysis Plan

Data will be analyzed using Statistical Package for Social Sciences (SPSS) version 27.0. The analysis will proceed as follows:

1. **Data Cleaning and Preparation**: The dataset will be checked for completeness, consistency, and accuracy. Missing data will be handled according to appropriate statistical methods.

2. **Descriptive Statistics**: Demographic characteristics of the participants will be summarized using frequencies, percentages, means, and standard deviations as appropriate. Levels of awareness, knowledge, and practices related to prostate cancer screening will be presented using similar descriptive statistics.

3. **Inferential Statistics**: Chi-square tests will be used to assess associations between categorical variables, such as the relationship between education level and awareness of prostate cancer symptoms. For continuous variables, t-tests or ANOVA will be employed as appropriate. Multivariate logistic regression analysis will be conducted to identify factors independently associated with prostate cancer awareness and screening practices, controlling for potential confounders.

4. **Thematic Analysis**: Responses to open-ended questions about barriers to seeking screening will be analyzed using thematic analysis to identify common themes and patterns.

A p-value of less than 0.05 will be considered statistically significant for all analyses.

Study Registration

This study has been registered on ClinicalTrials.gov (Registration ID: [Placeholder for actual registration number]) to ensure compliance with federal regulations and to promote transparency in research. The registration includes detailed information about the study design, objectives, outcome measures, and ethical considerations.

Anticipated Results

While the actual results will be determined following data collection and analysis, several anticipated outcomes can be projected based on existing literature and the Syrian context:

Demographic Distribution

It is anticipated that the study sample will reflect the demographic diversity of the middle region of Syria, with variations in age, education level, and socioeconomic status. Given the current situation in Syria, a significant proportion of participants may be internally displaced persons, which could influence their access to healthcare services and information.

Awareness and Knowledge Levels

Based on previous studies in similar contexts, it is expected that overall awareness of prostate cancer symptoms and risk factors may be low to moderate, with significant variations based on education level, urban/rural residence, and age. Younger, more educated men from urban areas are likely to demonstrate higher levels of awareness compared to older, less educated men from rural areas.

Specific knowledge gaps may be identified regarding: - Early symptoms of prostate cancer, which are often subtle or absent - Risk factors such as age, family history, and ethnicity - The purpose and procedure of PSA testing and digital rectal examination - Recommended screening guidelines and frequency

Screening Practices

It is anticipated that the rate of prostate cancer screening will be low, with a small percentage of participants reporting having undergone PSA testing or digital rectal examination. Factors associated with higher screening rates may include higher education, higher income, urban residence, and having a family history of prostate cancer.

The study may reveal that many men delay seeking medical attention until symptoms become severe, contributing to late-stage diagnoses. This pattern is consistent with findings from other Middle Eastern countries where preventive healthcare practices are often underutilized.

Barriers to Screening

Multiple barriers to prostate cancer screening are likely to be identified, including:

1. **Structural Barriers**: Limited availability of screening services, geographical distance to healthcare facilities, cost of services, and lack of health insurance coverage.
2. **Knowledge-Related Barriers**: Insufficient awareness of prostate cancer symptoms and the importance of early detection, misconceptions about the disease and screening procedures, and lack of knowledge about screening recommendations.
3. **Psychosocial Barriers**: Fear of diagnosis, embarrassment about the digital rectal examination, concerns about privacy, and anxiety about potential sexual dysfunction following treatment.
4. **Cultural Barriers**: Traditional beliefs, masculinity norms that discourage seeking healthcare, stigma associated with cancer, and cultural taboos surrounding discussions of reproductive health.
5. **Healthcare System Barriers**: Lack of physician recommendation for screening, limited time during consultations, and inadequate communication about the benefits and limitations of screening.

Associations Between Variables

Significant associations may be found between: - Education level and prostate cancer awareness - Socioeconomic status and utilization of screening services - Urban/rural residence and knowledge of screening methods - Age and perceived barriers to seeking screening - Family history of prostate cancer and screening practices - Marital status and willingness to undergo digital rectal examination

These anticipated results will provide a foundation for the development of targeted interventions to address specific gaps in awareness and barriers to screening.

Discussion

The findings of this study will provide valuable insights into the current state of prostate cancer awareness and screening practices among men in the middle region of Syria. These insights are particularly important given the context of the ongoing humanitarian crisis, which has significantly impacted healthcare delivery and access to information.

Implications for Public Health Practice

The results of this study will have several important implications for public health practice in Syria:

1. **Targeted Educational Interventions**: By identifying specific knowledge gaps and misconceptions about prostate cancer, this study will inform the development of educational materials and campaigns that address these gaps. These interventions can be tailored to different demographic groups based on their specific needs and barriers.

2. **Healthcare Service Improvements**: Understanding the barriers to prostate cancer screening will help healthcare providers and policymakers develop strategies to improve access to and utilization of screening services. This may include mobile screening units to reach rural areas, training more healthcare providers in prostate cancer detection, or implementing subsidized screening programs for vulnerable populations.

3. **Community-Based Approaches**: The findings may support the development of community-based approaches to prostate cancer awareness and early detection, such as peer education programs or community health worker initiatives, which can be particularly effective in contexts where formal healthcare systems are strained.

4. **Policy Recommendations**: The study results can inform policy recommendations for the Syrian health authorities and international organizations working in the region, highlighting the need for prioritizing prostate cancer early detection within the broader healthcare agenda.

5. **Cultural Sensitivity Training**: Healthcare providers may benefit from training in culturally sensitive approaches to discussing prostate cancer screening, particularly the digital rectal examination, which may be subject to cultural taboos and embarrassment.

Comparison with Existing Literature

The anticipated findings of this study will be discussed in relation to existing literature on prostate cancer awareness and screening in similar contexts, particularly in conflict-affected settings and other Middle Eastern countries. This comparison will help identify whether the patterns observed in Syria are unique to its specific context or reflect broader regional or global trends.

For instance, studies from neighboring countries like Jordan, Lebanon, and Turkey have reported varying levels of prostate cancer awareness and screening practices, influenced by factors such as education, socioeconomic status, and cultural beliefs. The extent to which these factors play a similar role in the Syrian context will be explored.

Additionally, the study will consider how the findings align with or differ from research conducted in other conflict-affected regions, where healthcare systems face similar challenges in delivering preventive services.

Strengths and Limitations

Strengths

1. **Comprehensive Assessment**: This study will provide a comprehensive assessment of prostate cancer awareness, knowledge, practices, and barriers in a population that has been understudied due to the ongoing conflict.
2. **Mixed Recruitment Strategy**: The use of both online and in-person data collection methods will help reach a diverse sample of men, including those with limited internet access.
3. **Contextual Relevance**: The study design and instruments have been adapted to the specific context of Syria, enhancing the relevance and applicability of the findings.
4. **Registration on ClinicalTrials.gov**: The registration of this study promotes transparency and adherence to international research standards, enhancing the credibility of the findings.

Limitations

1. **Cross-Sectional Design**: The cross-sectional nature of the study limits the ability to establish causal relationships between variables. Future longitudinal studies may be needed to track changes in awareness and practices over time.
2. **Self-Reported Data**: The reliance on self-reported data may introduce recall bias or social desirability bias, particularly regarding screening practices and barriers.
3. **Sampling Challenges**: The ongoing conflict and population displacement may pose challenges to achieving a truly representative sample, potentially limiting the generalizability of the findings.
4. **Security Concerns**: Security issues in certain areas may restrict access to some populations, potentially introducing selection bias.

These limitations will be acknowledged and addressed to the extent possible in the study design and implementation.

Future Research Directions

Based on the anticipated findings, several directions for future research can be identified:

1. **Intervention Studies**: Developing and evaluating the effectiveness of interventions aimed at improving prostate cancer awareness and screening practices based on the identified barriers and facilitators.
2. **Healthcare Provider Perspectives**: Investigating the knowledge, attitudes, and practices of healthcare providers regarding prostate cancer screening, as they play a crucial role in recommending and performing screening tests.
3. **Qualitative Exploration**: Conducting in-depth qualitative studies to better understand the cultural, psychological, and social factors influencing men's decisions regarding prostate cancer screening.
4. **Health System Analysis**: Assessing the capacity of the Syrian health system to provide prostate cancer screening and diagnostic services, identifying gaps and opportunities for improvement.
5. **Longitudinal Studies**: Implementing longitudinal studies to track changes in awareness and practices as the situation in Syria evolves and as interventions are implemented.
6. **Cost-Effectiveness Analysis**: Evaluating the cost-effectiveness of different screening strategies in the Syrian context to inform resource allocation decisions.

Conclusion

The early detection of prostate cancer is vital for reducing mortality rates and improving the quality of life for men affected by this disease. This study will provide essential data to guide public health initiatives and enhance awareness and screening practices in the middle region of Syria, where healthcare resources are limited and the population faces numerous challenges due to the ongoing conflict.

By identifying gaps in knowledge and barriers to screening, the study aims to support the development of targeted interventions that can enhance early detection efforts, ultimately improving health outcomes for men in Syria. Through effective education and

intervention, we can work towards reducing the impact of prostate cancer on men's health in this region, even in the face of challenging circumstances.

The findings of this study will not only contribute to the understanding of prostate cancer awareness in Syria but may also provide insights relevant to other conflict-affected settings where healthcare systems are strained and populations face similar barriers to accessing preventive services.

The registration of this study on ClinicalTrials.gov further underscores our commitment to conducting rigorous, transparent research that adheres to international standards and contributes to the global body of knowledge on prostate cancer early detection in resource-limited settings.

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