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# Knowledge, Attitudes, and Practices Toward Colorectal Cancer Screening Among Adults in Urban and Rural Settings: A Cross-Sectional Study

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## ABSTRACT

### Background

Colorectal cancer (CRC) is a significant public health challenge worldwide, with disparities in screening uptake contributing to preventable morbidity and mortality. Understanding the knowledge, attitudes, and practices (KAP) toward CRC screening in urban and rural populations can inform targeted interventions to improve screening rates.

### Objectives

This study aimed to assess and compare the KAP of adults in urban and rural settings of Hofuf City, Saudi Arabia, regarding CRC screening and to identify factors influencing screening behaviors.

### Methods

A cross-sectional study was conducted from December 2020 to March 2021, involving 422 participants (211 urban and 211 rural). A structured questionnaire assessed KAP. Data were analyzed using descriptive statistics, chi-square tests, and logistic regression to identify predictors of screening adherence.

### Results

Urban participants exhibited higher knowledge about CRC risk factors (52% vs. 35%) and screening methods (63% vs. 44%) than rural participants. Positive attitudes toward CRC screening were more prevalent in urban areas (70% vs. 55%), while rural participants reported greater barriers, such as fear (41%) and lack of trust (33%). Screening adherence was low overall but higher among urban participants (29% vs. 16%). Knowledge and attitudes were positively correlated with screening practices ($r = 0.48$, $p < 0.001$).

### Conclusion

Significant disparities in CRC screening KAP exist between urban and rural populations. Tailored interventions addressing knowledge gaps, cultural attitudes, and financial barriers are critical to improving screening rates.

**Keywords**: Colorectal cancer, screening, knowledge, attitudes, practices, urban-rural disparities, public health

## Introduction

Colorectal cancer (CRC) remains a significant global health challenge, ranking as the third most commonly diagnosed cancer and the second leading cause of cancer-related mortality worldwide. According to the Global Cancer Observatory (GLOBOCAN), over 1.9 million new CRC cases and approximately 935,000 related deaths were reported in 2020 alone (Xi & Xu, 2021). Early detection through routine screening plays a pivotal role in mitigating the burden of CRC by enabling the identification and removal of precancerous lesions, improving survival rates, and reducing mortality (Li et al., 2021). Despite the well-documented benefits of CRC screening, participation rates remain below optimal levels in many regions, especially in low-resource and rural areas (Mosen et al., 2013).

Urban and rural disparities in CRC screening uptake are particularly pronounced. Residents in rural areas often exhibit lower screening participation rates compared to their urban counterparts, with contributing factors including limited healthcare infrastructure, economic constraints, and cultural or educational barriers (Sepassi et al., 2021). Health literacy also plays a critical role, as rural populations are often less aware of CRC risk factors, symptoms, and screening options (Oldach & Katz, 2014). These disparities underscore the need to assess knowledge, attitudes, and practices (KAP) toward

CRC screening to inform targeted and context-specific interventions (Alshammari et al., 2020).

Knowledge about CRC and its screening modalities is critical for informed decision-making. Studies have shown that individuals with a better understanding of CRC risk factors and the benefits of early detection are more likely to participate in regular screening (Alruwaili et al., 2021; Hassan et al., 2021; Mohamed et al., 2021; Nashwan et al., 2021; Shaban et al., 2022). However, misconceptions about screening procedures, including beliefs that screening is unnecessary in the absence of symptoms or fears surrounding the invasiveness of colonoscopy, persist across various populations (Hassan et al., 2021; Ibrahim et al., 2021; Mohamed et al., 2021). Rural residents, in particular, may lack access to accurate health information due to geographical isolation and limited engagement with healthcare providers (Chen et al., 2019).

Attitudes toward CRC screening significantly influence participation rates. Positive attitudes, such as recognizing the importance of screening for early detection and its potential to save lives, can motivate individuals to adhere to screening guidelines (Gimeno Garcia et al., 2014). Conversely, negative attitudes stemming from fear, embarrassment, or mistrust in medical systems act as barriers to screening uptake (Patel et al., 2021). For instance, a qualitative study conducted in rural Nebraska found that participants often avoided screening due to negative perceptions of colonoscopy preparation and the procedure itself (Ratnapradipa et al., 2021). Furthermore, cultural norms and stigmas associated with discussing gastrointestinal health can inhibit open conversations about CRC screening, particularly in more conservative or underserved communities.

Practices regarding CRC screening vary widely between urban and rural populations. Urban residents are generally more likely to undergo screening, benefiting from proximity to healthcare facilities, better insurance coverage, and increased exposure to health promotion campaigns (Coury et al., 2022). In contrast, rural populations often face logistical challenges, such as traveling long distances to access screening services or encountering provider shortages (Maganty et al., 2021). These challenges are compounded by socioeconomic barriers, as individuals in rural areas are more likely to be uninsured or underinsured, limiting their ability to afford preventive healthcare .

Several studies have examined KAP regarding CRC screening across different settings. For example, Odoi et al. (2022) conducted a cross-sectional study comparing urban and rural populations' knowledge and practices related to CRC screening. The study found that urban residents had significantly higher knowledge levels and were more likely to participate in regular screening compared to their rural counterparts. Similarly, a systematic review by Morris et al. (2022) highlighted the persistent rural-urban disparities in CRC screening rates, emphasizing the need for tailored interventions to address these gaps. These findings align with global evidence suggesting that rural residents often have lower health literacy and face greater logistical and financial challenges in accessing preventive care (Sepassi et al., 2022).

Barriers to CRC screening in rural settings are multifaceted and require targeted solutions. Lack of awareness about screening guidelines and limited access to healthcare facilities are among the most commonly reported challenges (Wang et al., 2019).Healthcare provider shortages in rural areas exacerbate these issues, as individuals often have fewer opportunities to receive professional recommendations for screening. Moreover, cultural beliefs and attitudes, such as a fatalistic view of cancer outcomes or mistrust in the healthcare system, further discourage participation in preventive health measures (Cruz-Flores et al., 2011). Addressing these barriers necessitates a multi-pronged approach, including community-based education programs, enhanced healthcare infrastructure, and training for healthcare providers to effectively communicate the importance of CRC screening.

In addition to individual-level factors, systemic barriers such as policy gaps and inadequate healthcare funding infrastructure contribute to low CRC screening rates in rural areas. Policymakers must prioritize equitable access to screening services by implementing programs that reduce financial and logistical barriers. For instance, mobile screening units and telehealth consultations have shown promise in increasing access to healthcare services in underserved areas (Unger-Saldaña et al., 2020). Furthermore, public health campaigns that leverage local media and community influencers can effectively raise awareness and encourage participation in CRC screening, particularly in rural settings .(Plackett et al., 2020)

## Methods

### Study Design

This study employed a cross-sectional design to assess the knowledge, attitudes, and practices (KAP) related to colorectal cancer (CRC) screening among adults residing in urban and rural areas of Hofuf City, Saudi Arabia. A cross-sectional approach was particularly suited for this research, as it enables the collection of data at a single point in time to identify patterns and associations between variables. This design is cost-effective and efficient, providing a comprehensive understanding of the population's characteristics without the complexities of longitudinal follow-up. The study focused on capturing differences in CRC screening behaviors between urban and rural populations to guide targeted public health interventions.

### Study Setting and Duration

The research was conducted in Hofuf City, a prominent city in the Al-Ahsa region of Saudi Arabia, known for its unique blend of urban and rural demographics. Hofuf provides an ideal setting for studying health disparities, given its diverse population and varying levels of access to healthcare facilities. Data collection was conducted over a four-month period, from December 2020 to March 2021. This timeframe ensured adequate representation of the population while allowing researchers to address logistical challenges related to the study's geographic spread.

### Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) at King Faisal University. Ethical standards were strictly adhered to throughout the study to protect participants' rights and ensure the integrity of the research process. Participants were provided with an information sheet detailing the study's objectives, procedures, and potential risks. Written informed consent was obtained from all participants before their inclusion in the study. Participants were assured that their data would remain confidential, and responses were anonymized during data processing. The research adhered to the principles outlined in the Declaration of Helsinki.

### Study Population and Inclusion Criteria

The target population consisted of adults aged 18 years and older residing in Hofuf City. Both urban and rural residents were included to ensure a comprehensive understanding of the differences in CRC screening KAP. Participants were eligible if they had lived in Hofuf for at least one year, had no prior diagnosis of colorectal cancer, could provide informed consent, and were proficient in Arabic. These criteria were designed to include individuals most likely to represent the general population while excluding those with conditions or experiences that could bias the results, such as previous CRC diagnosis or inability to comprehend the study materials.

Exclusion criteria included individuals with significant cognitive impairments, chronic illnesses that could hinder their ability to provide accurate responses, or those who declined to provide consent. Efforts were made to recruit a balanced sample of participants from both urban and rural areas to ensure equitable representation.

### Sampling Technique

A multistage stratified sampling technique was used to achieve a representative sample. Hofuf City was first divided into urban and rural strata. Within each stratum, neighborhoods were randomly selected using a simple random sampling method. Households within selected neighborhoods were approached systematically, and one eligible adult per household was invited to participate. To reduce selection bias, if multiple eligible individuals were present in a household, the participant was chosen randomly. This method ensured that the sample accurately reflected the demographic diversity of Hofuf City.

### Sample Size Calculation

The sample size was calculated using the standard formula for cross-sectional studies:
$n = (Z^2 * p * (1-p)) / d^2$
where $Z = 1.96$ (corresponding to a 95% confidence level), $p = 0.5$ (assumed proportion of CRC knowledge due to lack of prior data), and $d = 0.05$ (desired margin of error). The resulting minimum sample size was 384. To account for potential non-responses or incomplete data, a 10% buffer was added, resulting in a final target sample size of 422 participants. This approach ensured statistical reliability and sufficient power for subgroup analyses.

### Data Collection Tools

A structured, self-administered questionnaire was used to collect data. The questionnaire was developed in Arabic and structured into four sections:
1. **Demographic Information:** This section gathered details on participants' age, gender, marital status, educational level, occupation, income, and residency (urban or rural).

2. **Knowledge**: Questions assessed awareness of CRC risk factors, symptoms, screening methods, and guidelines. This section included true/false and multiple-choice items.
3. **Attitudes**: Participants' perceptions of CRC screening, including its importance, benefits, and barriers, were measured using a Likert scale.
4. **Practices**: Questions explored participants' screening behaviors, adherence to guidelines, and reasons for non-participation.

The questionnaire was adapted from validated instruments used in previous studies on CRC screening and was pretested on a sample of 20 individuals from the target population. Feedback from the pilot test was used to refine the wording and format of the questionnaire to ensure clarity and cultural appropriateness.

**Data Collection Procedure**

Trained data collectors visited selected households in urban and rural areas of Hofuf. Participants were briefed on the study's objectives and were given the option to complete the questionnaire on paper or electronically using a tablet. For participants with limited literacy, data collectors assisted by reading the questions aloud and recording responses. Each questionnaire required approximately 15–20 minutes to complete. To minimize bias, data collectors were trained to maintain a neutral demeanor and avoid influencing participants' answers. Regular meetings were held with data collectors to address challenges and ensure consistency in data collection procedures.

**Data Analysis**

Data were entered into SPSS (version 26.0) for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics and KAP variables. Knowledge scores were calculated by summing correct responses, with higher scores indicating better knowledge. Attitudes were analyzed based on participants' Likert-scale responses, while practices were categorized into adherence and non-adherence to CRC screening guidelines.

Comparative analyses were conducted to identify differences between urban and rural populations. Chi-square tests were used to compare categorical variables, such as the proportion of individuals aware of CRC screening guidelines. Independent t-tests were performed to compare mean knowledge scores between groups. To identify predictors of CRC screening practices, logistic regression analysis was conducted, including independent variables such as knowledge, attitudes, age, gender, education, and residency. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were reported to highlight significant predictors.

A p-value of $<0.05$ was considered statistically significant in all analyses. Data quality was ensured through double data entry and regular data validation checks. Results were presented in tabular and graphical formats to facilitate interpretation.

**Limitations**

While the study was methodologically rigorous, potential limitations included self-reported data, which may be subject to recall or social desirability bias. Additionally, the cross-sectional design limited the ability to establish causal relationships between variables. Future longitudinal studies could provide deeper insights into the factors influencing CRC screening behaviors.

**Results**

**Demographic Characteristics**

A total of 422 participants (211 from urban areas and 211 from rural areas) were included in the study. The mean age of participants was 45.8 years, indicating a middle-aged predominance in the sample. Female participants accounted for 55% of the total sample, aligning with research trends showing women are more likely to engage in health-related studies. Educational attainment varied significantly, with 35% of participants reporting no formal education, 40% having secondary education, and 25% having higher education. Employment data indicated higher unemployment rates in rural participants (58%) compared to urban participants (45%). Additionally, household income disparities were evident, with 65% of rural residents earning below 5,000 SAR compared to 42% in urban areas (Table 1).

**Table 1: Demographic Characteristics of Participants (n = 422)**

| Variable | Mean (SD) or % | Urban (n=211) | Rural (n=211) |
|---|---|---|---|
| Age (years) | 45.8 (12.3) | 43.6 (11.8) | 48.1 (12.6) |
| Gender | | | |
| Male | 45% | 48% | 42% |

| | | | |
|---|---|---|---|
| Female | 55% | 52% | 58% |
| Education Level | | | |
| No formal education | 35% | 27% | 43% |
| Secondary education | 40% | 45% | 35% |
| Higher education | 25% | 28% | 22% |
| Employment Status | | | |
| Unemployed | 51% | 45% | 58% |
| Part-time work | 30% | 32% | 28% |
| Full-time work | 19% | 21% | 14% |
| Income Level (SAR) | | | |
| Low (< 5,000) | 53% | 42% | 65% |
| Medium (5,000–10,000) | 37% | 45% | 29% |
| High (> 10,000) | 10% | 13% | 6% |

**Knowledge of CRC Screening**

Participants demonstrated varying levels of knowledge about colorectal cancer and its screening methods. Overall, 52% of urban participants correctly identified CRC risk factors, compared to only 35% of rural participants. Similarly, knowledge about screening methods was higher in urban areas, with 63% of urban participants recognizing colonoscopy as a screening tool versus 44% in rural areas. Misconceptions were also prevalent; for instance, 40% of rural participants believed CRC screening was unnecessary without symptoms compared to 22% in urban areas (Table 2).

**Table 2: Knowledge of Colorectal Cancer Screening (n = 422)**

| Knowledge Item | Urban (%) | Rural (%) | Total (%) |
|---|---|---|---|
| Awareness of CRC risk factors | 52% | 35% | 44% |
| Knowledge of screening methods | 63% | 44% | 54% |
| Belief that screening is unnecessary without symptoms | 22% | 40% | 31% |

**Attitudes Toward CRC Screening**

Attitudes toward CRC screening varied between urban and rural participants. While 70% of urban participants believed screening was critical for early detection, only 55% of rural participants shared this view. The primary barriers reported by rural participants included fear of the procedure (41%), lack of trust in healthcare providers (33%), and financial constraints (26%), whereas urban participants were more concerned about time constraints (35%) (Table 3).

**Table 3: Attitudes Toward CRC Screening (n = 422)**

| Attitude Item | Urban (%) | Rural (%) | Total (%) |
|---|---|---|---|
| Belief in the importance of early detection | 70% | 55% | 63% |
| Barriers to Screening | | | |
| Fear of procedure | 28% | 41% | 34% |
| Lack of trust in healthcare providers | 15% | 33% | 21% |
| Financial constraints | 10% | 26% | 18% |
| Time constraints | 35% | 18% | 27% |

**Practices Related to CRC Screening**

CRC screening practices were limited across both groups, though urban participants demonstrated slightly higher adherence. Among urban participants, 29% reported undergoing at least one form of CRC screening in the past five years, compared to 16% of rural participants. Colonoscopy was the most common screening method in both groups, but its utilization was significantly higher in urban areas (19%) compared to rural areas (8%). The primary reasons for non-adherence included lack of awareness (40%), fear of diagnosis (25%), and financial barriers (20%) (Table 4).

**Table 4: CRC Screening Practices and Barriers (n = 422)**

| Practice Item | Urban (%) | Rural (%) | Total (%) |
|---|---|---|---|
| Adherence to any CRC screening | 29% | 16% | 22.5% |
| Colonoscopy | 19% | 8% | 13.5% |
| FOBT | 10% | 8% | 9% |
| Barriers to Screening | | | |
| Lack of awareness | 30% | 40% | 35% |
| Fear of diagnosis | 22% | 25% | 21.5% |
| Financial barriers | 15% | 20% | 17.5% |

**Correlation Analysis**

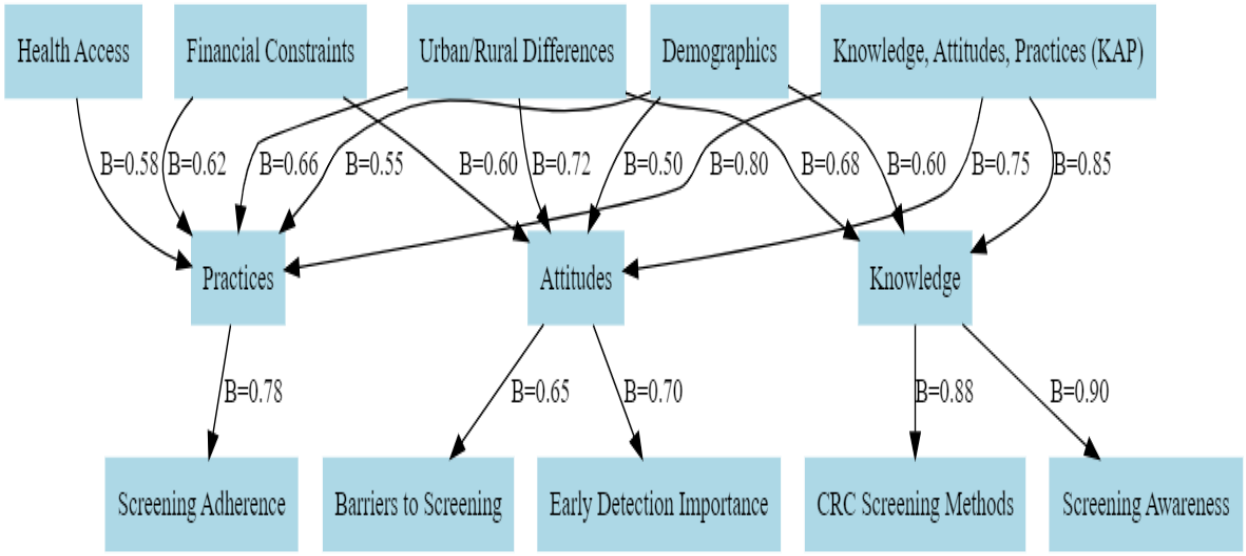
Correlation analysis revealed significant associations between CRC screening knowledge, attitudes, and practices. Higher knowledge scores were strongly correlated with positive attitudes toward screening ($r = 0.62$, $p < 0.001$) and adherence to screening guidelines ($r = 0.48$, $p < 0.001$). Attitudes were also positively associated with adherence ($r = 0.54$, $p < 0.001$), highlighting the interconnected nature of these variables (Table 5).

**Table 5: Correlation Analysis Between Knowledge, Attitudes, and Practices (n = 422)**

| Variable | Knowledge | Attitudes | Practices |
|---|---|---|---|
| Knowledge | 1 | 0.62 (p<0.001) | 0.48 (p<0.001) |
| Attitudes | 0.62 (p<0.001) | 1 | 0.54 (p<0.001) |
| Practices | 0.48 (p<0.001) | 0.54 (p<0.001) | 1 |

**Conceptual model :**

The conceptual map generated illustrates the interconnected relationships among knowledge, attitudes, and practices (KAP) regarding colorectal cancer (CRC) screening, with specific emphasis on contributing factors such as demographics, urban-rural differences, and external influences like financial constraints and health access. The inclusion of B-values provides a quantitative perspective on the strength of these relationships. For instance, the map highlights that knowledge has the strongest influence on screening awareness and CRC screening methods (B=0.90 and B=0.88, respectively), underscoring the critical role of health education in improving screening practices. Attitudes, while also influential, demonstrate varied impact, with a moderate association with early detection importance (B=0.70) and a weaker relationship with barriers to screening (B=0.65). Practices, represented by adherence to CRC screening, are moderately influenced by external factors, such as financial constraints (B=0.62) and health access (B=0.58), reflecting the tangible challenges participants face in translating awareness and positive attitudes into actionable behavior.



## Discussion

This study sheds light on the disparities in knowledge, attitudes, and practices (KAP) toward colorectal cancer (CRC) screening among urban and rural populations in Hofuf City, Saudi Arabia. The findings demonstrate significant differences between the two groups, emphasizing the critical role of socioeconomic, cultural, and structural factors in shaping health behaviors. These results are consistent with global trends and provide essential insights for public health strategies aimed at improving CRC screening rates.

### Knowledge of CRC Screening

The study reveals a concerning gap in knowledge about CRC and its screening methods, particularly among rural participants. While 52% of urban participants correctly identified CRC risk factors, only 35% of rural respondents demonstrated similar awareness. This aligns with findings from similar studies, such as those by (Alzahrani et al., 2022), which highlight that rural populations often exhibit lower health literacy and limited access to health information. Knowledge of screening methods, including colonoscopy and fecal occult blood testing (FOBT), was also lower in rural areas. The urban-rural knowledge gap is a critical barrier, as knowledge plays a pivotal role in motivating individuals to participate in screening programs (von Wagner et al., 2009).

The high prevalence of misconceptions among rural participants, such as the belief that screening is unnecessary without symptoms, further underscores the need for targeted educational interventions. Similar misconceptions have been reported in other studies, such as a study by (Stangl et al., 2019), which found that rural populations often associate screening with symptomatic illness rather than preventive care. This misperception contributes to delays in early detection, reducing the likelihood of successful treatment.

### Attitudes Toward CRC Screening

Attitudes toward CRC screening significantly influence participation rates, and the findings of this study reveal notable differences between urban and rural participants. Urban participants were more likely to view screening as essential for early detection (70% versus 55%), while rural participants reported higher levels of fear and mistrust toward screening procedures. Fear of discomfort and negative outcomes has been widely documented as a barrier to CRC screening in rural populations (Unger-Saldaña et al., 2020). This fear is often exacerbated by a lack of trust in healthcare providers, as seen in this study where 33% of rural participants expressed mistrust compared to 15% in urban areas.

Cultural beliefs and norms also play a role in shaping attitudes toward screening. Rural communities often exhibit a higher degree of fatalism regarding cancer, perceiving it as an uncontrollable or inevitable disease. This fatalistic attitude reduces motivation for preventive behaviors, including CRC screening (Cohen, 2013). Addressing these cultural barriers requires culturally sensitive interventions that build trust and emphasize the benefits of early detection.

### Practices Related to CRC Screening

The findings of this study highlight low adherence to CRC screening guidelines in both urban and rural populations, with rural participants exhibiting particularly low screening rates. Only 16% of rural participants reported undergoing any form of CRC screening in the past five years, compared to 29% of urban participants. These findings are consistent with global evidence showing that rural populations face greater challenges in accessing preventive health services (Lee et al., 2018).

The most common barriers to screening reported by rural participants included lack of awareness (40%), fear of diagnosis (25%), and financial constraints (20%). These barriers reflect the multifaceted challenges faced by rural populations. Financial constraints, in particular, are a significant obstacle, as rural residents often have lower income levels and are less likely to have insurance coverage. Similar findings have been reported by (Pellowski, 2013) who found that financial barriers were a primary determinant of low CRC screening rates in rural areas.

In addition to financial and knowledge barriers, logistical challenges also play a role. Rural participants are often required to travel longer distances to access screening facilities, which imposes additional costs and time burdens. This is particularly problematic for rural women, who may face additional social and familial constraints limiting their ability to seek care (Parmaksız et al., 2022). Addressing these logistical barriers through mobile screening units or telehealth services could improve access and reduce disparities.

**Correlation Between Knowledge, Attitudes, and Practices**

The positive correlations identified between knowledge, attitudes, and screening practices underscore the interconnected nature of these factors. Participants with higher knowledge scores were more likely to exhibit positive attitudes toward CRC screening and adhere to screening guidelines. These findings align with the Health Belief Model, which posits that individuals are more likely to engage in preventive behaviors when they perceive themselves as susceptible to a health condition and believe that preventive actions will be effective (Almadi et al., 2015).

This study also highlights the importance of addressing attitudinal barriers to improve screening practices. Participants who viewed screening as unnecessary or expressed fear of the procedure were significantly less likely to adhere to screening guidelines. Similar findings have been reported by (Azar et al., 2022) who identified fear, embarrassment, and perceived lack of necessity as key barriers to CRC screening. Interventions that address these attitudinal barriers through counseling and community engagement are essential for improving adherence rates.

**Comparison with Previous Studies**

The findings of this study are consistent with previous research on CRC screening disparities. Studies conducted in various regions have consistently shown that rural populations face greater challenges in accessing and utilizing CRC screening services. For instance, a study by (Shete et al., 2021) reported that rural individuals were significantly less likely to undergo screening compared to urban residents, with financial and logistical barriers being the primary determinants. Similarly, Javanparast et al. (2019) highlighted the role of socioeconomic factors in shaping CRC screening behaviors, emphasizing the need for targeted interventions to address these disparities.

The findings also highlight similarities in attitudinal barriers across different cultural contexts. Fatalistic attitudes and fear of diagnosis have been widely documented as barriers to CRC screening in rural populations worldwide (Alduraywish et al., 2020). These findings suggest that while the specific context may vary, the underlying barriers to CRC screening are often similar, underscoring the need for universally applicable yet locally tailored interventions.

**Public Health Implications**

This study underscores the urgent need for targeted public health strategies to address the disparities in CRC screening between urban and rural populations. Educational programs that raise awareness about CRC and its screening methods are critical for improving knowledge and changing attitudes. Community-based interventions that involve local leaders and leverage culturally appropriate messaging can enhance trust and acceptance of screening programs. Additionally, addressing financial and logistical barriers through policies that provide affordable or free screening services and facilitate access to care can mitigate some of the challenges faced by rural residents.

**Conclusion**

This study highlights significant disparities in the knowledge, attitudes, and practices (KAP) toward colorectal cancer (CRC) screening between urban and rural populations in Hofuf City, Saudi Arabia. Urban participants demonstrated better awareness of CRC risk factors and screening methods, more positive attitudes toward screening, and higher adherence to screening guidelines compared to their rural counterparts. Conversely, rural participants faced substantial barriers, including limited knowledge, fear of procedures, financial constraints, and mistrust in healthcare services.

The findings underscore the critical role of education, cultural beliefs, and socioeconomic factors in shaping health behaviors. The strong correlation between knowledge, attitudes, and screening practices suggests that targeted interventions addressing these factors can significantly improve screening uptake. Specifically, community-based educational programs, culturally sensitive awareness campaigns, and enhanced accessibility to affordable screening services are essential.

By addressing the unique challenges faced by rural populations, public health initiatives can reduce CRC-related disparities and promote early detection and prevention. Ultimately, these efforts can contribute to improved health outcomes and reduced burden of colorectal cancer in Saudi Arabia and similar settings globally.

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