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Original Article

Knowledge About Hypertensive Kidney Disease Among Adults: A Cross-sectional Study

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Abstract

Hypertensive kidney disease represents a growing public health concern, particularly in urban populations with high hypertension prevalence. Despite its preventable nature, limited awareness about this complication persists, contributing to delayed diagnosis and poor outcomes. This study aimed to assess knowledge levels about hypertensive kidney disease among adults in urban areas and identify associated demographic and health factors. A cross-sectional study was conducted with 95 participants aged 20-65 years, selected through convenience sampling. Knowledge was assessed using a structured questionnaire and categorized into good (≥70% correct answers), moderate (50-69%), and poor (<50%) levels. Data analysis examined associations between knowledge levels and demographic characteristics. The study revealed concerning knowledge gaps: only 32.6% of participants demonstrated good knowledge, while 45.3% had moderate understanding, and 22.1% showed poor knowledge. Significant associations were found between knowledge levels and education ($p<0.01$), hypertension history ($p<0.05$), and age ($p<0.05$). Participants with higher education and personal/family history of hypertension showed better knowledge. Younger adults (20-39 years) had significantly poorer understanding compared to older age groups. Substantial knowledge deficiencies exist regarding hypertensive kidney disease, particularly among younger individuals and those with lower education. These gaps highlight the urgent need for targeted educational interventions.

Background

Hypertension is a major global health concern, contributing significantly to cardiovascular and renal complications (World Health Organization, 2021). In Saudi Arabia, the prevalence of hypertension has been steadily increasing, with national surveys indicating a substantial burden on public health (Alenazi & Alqahtani, 2023). Despite widespread awareness campaigns, many individuals remain unaware of the long-term consequences of uncontrolled hypertension, including kidney disease (Ahmed et al., 2017). Studies have shown that poor knowledge about hypertension correlates with inadequate disease management and poor adherence to treatment (Algabbani & Algabbani, 2020). This gap in knowledge is particularly concerning given the rising incidence of hypertensive kidney disease, a severe complication of prolonged high blood pressure (Zhou et al., 2021). Therefore, understanding public awareness of hypertensive kidney disease is crucial for improving health outcomes.

The relationship between hypertension and kidney disease is well-documented, yet public awareness remains insufficient (Alshammari et al., 2021). Hypertensive kidney disease develops when prolonged high blood pressure damages renal vessels, leading to chronic kidney disease (CKD) or end-stage renal failure (World Health Organization, 2021). In Saudi Arabia, studies indicate that many hypertensive patients lack knowledge about how hypertension affects kidney function (Alharbi et al., 2017). This lack of awareness contributes to delayed diagnosis and poor disease management (Aldukhayel et al., 2022). Furthermore, poor medication adherence exacerbates the risk of kidney damage, highlighting the need for better patient education (Al Zahrani et al., 2019). Addressing this knowledge gap could reduce the burden of hypertensive kidney disease in high-risk populations.

Several studies have assessed hypertension knowledge in Saudi Arabia, but few focus specifically on kidney-related complications (Abualnaja & Alharbi, 2022). Research indicates that while some patients understand basic hypertension risks, their awareness of renal complications remains low (Al Zabadi et al., 2018). For instance, a study in Makkah found that only 30% of hypertensive patients could identify kidney disease as a potential

consequence of uncontrolled hypertension (Alharbi et al., 2017). Similar findings were reported in Palestine, where knowledge about hypertensive kidney damage was notably poor (Al Zabadi et al., 2018). These findings suggest that existing health education programs may not adequately emphasize renal risks. Strengthening educational efforts could improve early detection and prevention of hypertensive kidney disease.

The lack of knowledge about hypertensive kidney disease is concerning given the high prevalence of risk factors in Saudi Arabia (Ahmed et al., 2017). Obesity, sedentary lifestyles, and poor dietary habits contribute to rising hypertension rates, increasing the likelihood of kidney damage (Alenazi & Alqahtani, 2023). Additionally, cultural and socioeconomic factors influence health-seeking behaviors and adherence to treatment (Sharaf et al., 2021). Studies show that patients with higher education levels tend to have better hypertension knowledge, yet this does not always translate to improved kidney disease awareness (Alshammari et al., 2022). This discrepancy underscores the need for targeted interventions that address specific knowledge gaps related to renal health.

Medication adherence is another critical factor in preventing hypertensive kidney disease, yet many patients fail to follow prescribed treatments (Gaili et al., 2016). Research in Saudi Arabia indicates that poor adherence is often linked to insufficient knowledge about hypertension complications (Aldukhayel et al., 2022). A study in the Qassim region found that patients who understood the risks of kidney disease were more likely to adhere to antihypertensive therapy (Aldukhayel et al., 2022). Similar findings were reported in the UAE, where knowledge positively influenced medication compliance (Gaili et al., 2016). These results highlight the importance of integrating kidney health education into hypertension management programs.

Current hypertension management strategies in Saudi Arabia often overlook patient education on kidney disease (Shnaimer & Gosadi, 2020). Primary healthcare physicians play a key role in disseminating knowledge, yet many lack standardized guidelines for discussing renal risks (Shnaimer & Gosadi, 2020). A study in Southwest Saudi Arabia revealed that only 40% of physicians routinely educated patients about hypertensive kidney disease (Shnaimer & Gosadi, 2020). This gap in clinical practice may contribute to low public awareness and poor preventive behaviors (Elsheikh et al., 2021). Strengthening physician training and implementing structured patient education programs could enhance knowledge dissemination.

International studies emphasize the need for culturally tailored health education to improve hypertension-related knowledge (Boateng et al., 2017). In Saudi Arabia, religious and social norms influence health perceptions, requiring localized educational approaches (Moafa et al., 2021). For instance, community-based programs involving religious leaders have successfully improved awareness of other chronic diseases (Jastaniah, 2011). Applying similar strategies to hypertensive kidney disease could enhance engagement and knowledge retention (Boateng et al., 2017). Additionally, digital health tools, such as mobile apps, could facilitate widespread education, particularly among younger populations (Alshammari et al., 2022).

Given the growing burden of hypertensive kidney disease in Saudi Arabia, this study aims to assess knowledge levels among adults and identify associated factors. Previous research has primarily focused on general hypertension awareness, leaving gaps in understanding renal-specific knowledge (Al Zabadi et al., 2018). This study will evaluate demographic, socioeconomic, and health-related factors influencing knowledge about hypertensive kidney disease.

Methods

This cross-sectional study aimed to assess the level of knowledge regarding hypertensive kidney disease among adults aged 20–65 years residing in urban areas of Bangladesh. The study adhered to STROBE guidelines for observational studies. A total of 95 participants were recruited using convenience sampling. Eligibility criteria included willingness to participate, being within the age range, and absence of cognitive impairments that could affect questionnaire comprehension. Recruitment was conducted in densely populated urban neighborhoods where hypertension-related complications have been increasingly reported.

Data were collected using a structured questionnaire that had been pilot-tested for clarity and reliability. The questionnaire assessed respondents' knowledge of hypertensive kidney disease, covering topics such as risk factors, symptoms, prevention, and treatment. Based on the percentage of correct responses, participants were categorized into three knowledge levels: good knowledge (≥70% correct answers), moderate knowledge (50–69%), and poor knowledge (<50%). This classification facilitated interpretation and comparison across knowledge levels.

Data analysis was performed using SPSS. with a significance level set at $p < 0.05$. Ethical approval was obtained from the institutional ethics committee before the study commenced. All participants provided written informed consent. Confidentiality was maintained by anonymizing data with unique codes, and no personal identifiers were recorded. Upon survey completion, participants received educational materials about hypertensive kidney disease. Those with low knowledge scores were advised to consult healthcare professionals for further evaluation and support. All data were securely stored in password-protected systems and will be retained for five years in accordance with institutional policies..

Results

The majority of participants demonstrated a moderate level of knowledge about hypertensive kidney disease, with 45.3% answering 50-69% of the questions correctly. Meanwhile, 32.6% of participants had good knowledge (≥70% correct answers), while 22.1% fell into the low-knowledge category (<50% correct answers). These findings indicate that while a portion of respondents had adequate understanding, a significant proportion still had limited awareness of the condition. Significant associations were found between knowledge levels and education ($p<0.01$), hypertension history ($p<0.05$), and age ($p<0.05$), see Table 1 and Tabel 2.

Table 1. Distribution of Participants Based on Knowledge Levels about Hypertensive Kidney Disease

Knowlegde Level	Criteria (Correct Answers)	Frequency (n)	Percentage (%)
Good Knowledge	≥70%	31	32,6
Moderate Knowledge	50-69%	43	45,3
Poor Knowledge	<50%	21	22,1
Total		95	100

Further analysis revealed that education level and a history of hypertension were significantly associated with participants' knowledge. Respondents with higher education backgrounds tended to have better knowledge compared to those with lower education. Additionally, participants with a personal or family history of hypertension or kidney complications demonstrated greater understanding, suggesting that personal experience may enhance awareness of the disease.

Tabel 2. Association Between Participant Characteristics and Knowledge Levels

Variable	p-value	Significance
Education Level	<0,01	Significant
Hypertension History	<0,05	Significant
Age	<0,05	Significant

Variations in knowledge were also observed across age groups, with participants aged 40-65 years displaying better comprehension than younger adults (20-39 years). This difference may be attributed to longer exposure to health information or more frequent medical consultations among older individuals. However, no significant gender-based differences in knowledge levels were found, indicating that sociocultural factors did not

strongly influence understanding of hypertensive kidney disease in this study.

Overall, the findings highlight the need for improved public health education, particularly for low-knowledge groups and younger populations. Community-based interventions, such as awareness campaigns and health workshops, could help enhance understanding of hypertensive kidney disease risks and prevention. The results also emphasize the importance of personalized patient education, especially for individuals with a history of hypertension or related risk factors.

Discussion

The study findings demonstrate significant gaps in knowledge about hypertensive kidney disease, with only 32.6% of participants showing adequate understanding. This aligns with research by Al Zabadi et al. (2018) in Palestine, where hypertension knowledge among adults was similarly suboptimal. The predominance of moderate knowledge levels (45.3%) suggests partial awareness but insufficient depth of understanding regarding complications, mirroring results from Alharbi et al. (2017) in Saudi Arabia. The substantial proportion with poor knowledge (22.1%) is particularly concerning given the preventable nature of hypertensive kidney damage, supporting WHO (2021) warnings about global hypertension knowledge gaps. These findings emphasize the urgent need for improved public health education, especially in urban populations experiencing rapid epidemiological transitions (Zhou et al., 2021).

The strong association between education level and disease knowledge corroborates findings from multiple regional studies (Abualnaja & Alharbi, 2022; Alshammari et al., 2022). Higher education likely enables better access to and interpretation of health information, as suggested by Barreto et al. (2014). The link between personal/family hypertension history and better knowledge parallels observations by Ahmed et al. (2017) in their cardiovascular risk factor study. However, even participants with risk factors showed only moderate knowledge, indicating current patient education systems are inadequate, a concern raised by Shnaimer and Gosadi (2020) regarding physician adherence to hypertension guidelines. This knowledge deficit among at-risk individuals represents a critical missed opportunity for prevention (Algabbani & Algabbani, 2020).

Age-related knowledge differences align with Malik et al. (2014) findings in Uzbekistan, where older patients demonstrated better hypertension awareness. This may reflect accumulated health experiences and more frequent healthcare interactions among older adults (Aldukhayel et al., 2022). The poor knowledge among younger participants is alarming given the importance of early intervention, supporting Boateng et al. (2017) arguments for youth-focused cardiovascular education in similar settings. The absence of gender differences contrasts with Elsheikh et al. (2021) findings in Al-Ahsa, possibly indicating regional variations in health information access (Sharaf et al., 2021). This finding warrants further investigation to understand cultural influences on health knowledge acquisition.

The predominance of moderate knowledge suggests current health messaging is partially effective but inadequate, echoing Nutbeam's (2008) critique of oversimplified health communication. The substantial poor-knowledge group (22.1%) highlights vulnerable populations being left behind, consistent with Al Zahrani et al. (2019) observations about knowledge-adherence gaps. These disparities are particularly dangerous for hypertensive kidney disease where early behavioral changes can prevent progression (Jankowska-Polańska et al., 2016). The findings support calls by Alenazi and Alqahtani (2023) for tiered educational approaches addressing different literacy levels in Saudi populations.

Methodological limitations including convenience sampling may have introduced selection bias toward more health-conscious individuals, a challenge noted by Charan and Biswas (2013) in similar studies. The cross-sectional design prevents causal inferences, a limitation acknowledged by Von Elm et al. (2007) in observational research. However, the identified associations provide valuable

hypotheses for future research, particularly regarding urban-rural knowledge disparities highlighted in Bakhsh et al. (2017). The urban focus limits generalizability to rural populations where knowledge gaps may be more severe (Moafa et al., 2021).

These findings have important implications for Saudi Arabia's healthcare system facing rising CKD prevalence. The results support Gaili et al. (2016) recommendations for integrating kidney health education into hypertension programs. Community health workers could deliver simplified messages as suggested by Erkoc et al. (2012) knowledge scale studies. The poor knowledge among younger adults indicates schools should be targeted for prevention education, aligning with Jastaniah's (2011) life-course approach to chronic disease prevention.

The ethical provision of post-survey education addresses immediate gaps but underscores the need for sustained interventions, as advocated by World Health Organization (2021) hypertension guidelines. The physician referrals for low-knowledge participants follow best practices in transitional care (Alshammari et al., 2021). However, long-term solutions require systemic changes in health communication, moving beyond traditional methods to more engaging techniques (Algabbani & Algabbani, 2020).

Future research should explore effective knowledge delivery methods, potentially testing visual aids or culturally adapted tools (Alshammari et al., 2022). Comparative urban-rural studies could identify context-specific needs, building on Alenazi and Alqahtani's (2023) national survey. The development of validated local knowledge assessments would address current measurement limitations (Erkoc et al., 2012). Ultimately, these findings contribute to growing evidence that combating hypertensive kidney disease requires parallel improvements in awareness and healthcare access (Zhou et al., 2021).

Conclusion and Recommendation

This study reveals significant gaps in public knowledge about hypertensive kidney disease, with only 32.6% of participants demonstrating good understanding. The majority (45.3%) showed moderate knowledge levels, while a concerning 22.1% had poor knowledge. Key factors associated with better knowledge included higher education levels, personal/family history of hypertension, and older age. These findings highlight critical knowledge deficiencies, particularly among younger populations and those with lower education - groups that represent important targets for preventive interventions. The results align with previous studies across Middle Eastern populations regarding limited public awareness of hypertension-related complications. The identified knowledge gaps present a substantial public health challenge given the preventable nature of hypertensive kidney disease and its growing prevalence in urban communities

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