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KNOWLEDGE, ATTITUDES AND PREVENTIVE PRACTICES TOWARD COVID-19 AMONG HYPERTENSIVE AND DIABETIC PATIENTS IN KARACHI: A CROSS-SECTIONAL STUDY

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Abstract

Background: *Coronavirus Disease 2019 (COVID-19), caused by SARS-CoV-2, has had a significant impact on individuals with chronic conditions such as hypertension (HTN) and diabetes mellitus (DM). These patients are at a higher risk of complications and poorer outcomes. Understanding their awareness of natural and integrative prevention and treatment strategies is essential for improving disease management and resilience during pandemics.*

Objective: *To evaluate the knowledge, attitudes, and preventive practices (KAP) regarding COVID-19 among patients with chronic hypertension and/or diabetes mellitus, focusing on their awareness of natural remedies and integrative treatment options.*

Methods: *A cross-sectional, multicenter study was conducted in Karachi, Pakistan, from July to September 2024. Data were collected from 150 adult patients diagnosed with HTN, DM, or both using a structured, pre-validated questionnaire. Participants were recruited from hospitals including Dow, Agha Khan, Naimat Baigum, and Taj Complex. Associations between demographic variables (education level, locality, and disease type) and awareness levels were analyzed using SPSS version 20. Chi-square tests were used, and a p-value of <0.05 was considered statistically significant.*

Results: *Out of 150 respondents, 80% were aware of the preventive benefits of fruits and vegetables, while 76% acknowledged the role of both herbal and allopathic medicines in treatment. Awareness significantly varied by education level, locality, and disease type. Participants with primary, secondary, or no formal education showed 100% awareness of prevention, whereas diploma holders had none. Urban residents demonstrated complete awareness of both prevention and cure strategies (100%), while rural participants had lower awareness levels (53.8% for prevention; 44.6% for cure). Patients with either HTN or DM alone exhibited significantly higher awareness than those with both conditions (p = 0.000 for all associations).*

Conclusion: *The study reveals a significant association between education, residence, and disease type with awareness of natural and integrative approaches among chronic HTN and DM patients. Enhanced educational outreach, especially in rural areas and among comorbid patients, is necessary to improve preventive behavior and therapeutic understanding during infectious disease outbreaks such as COVID-19.*

Keywords: *COVID-19, Diabetes Mellitus, Hypertension, Knowledge, attitude and practice (KAP), Prevention*

INTRODUCTION

Covid 19 is a contagious and infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (1). For the first time, it was an outbreak in Wuhan city of China at the end of December 2019 in the form of a cluster of cases of pneumonia, which spread rapidly in China and then worldwide in about 209 countries, including Pakistan (2). The first coronavirus case in Pakistan was reported in Karachi on 3 January 2020. With an estimated population of 204.65 million, the WHO has recorded 30,470 deaths (3). After an incubation period of approximately 5 days, symptoms of COVID-19 become apparent. The duration from the onset of these symptoms to fatality varied between 6 and 41 days, with a median of 14 days. However, it is important to note that this timeframe can vary based on the patient's age and immune system status. Generally, individuals aged over 70 years tend to experience a

shorter period from symptom onset to death compared to those below the age of 70 (4). Fever, cough, myalgia, and fatigue are commonly observed symptoms of the disease. Other symptoms, although less frequent, may include sputum production, headache, hemoptysis, and diarrhea. Additionally, anosmia (loss of smell) and agues (loss of taste) have emerged as prominent and somewhat distinctive symptoms of COVID-19 infection (5).COVID-19 can be transmitted through two primary modes—direct and indirect pathways. The direct mode involves various means, such as (1) the spread through aerosols generated during surgical and dental procedures or as respiratory droplet nuclei; (2) transmission via other bodily fluids and secretions, including faeces, saliva, urine, semen, and tears; and (3) mother-to-child transmission. The predominant route of SARS-CoV-2 transmission is believed to be the release of respiratory droplets during activities such as talking, coughing, and sneezing by an infected individual (6). Tests and methods, including the RT-PCR detection method, antigen and antibody tests, CT scan, and serology tests, are conducted for the diagnosis of COVID-19.

Hypertension and diabetes mellitus are among the most common chronic conditions worldwide, and individuals with these comorbidities are at increased risk of severe illness and mortality from COVID-19. Since the onset of the pandemic, it has become evident that effective prevention relies not only on medical interventions but also on the level of public knowledge, attitudes, and practices (KAP) toward the disease. In resource-limited settings such as Karachi, where population density, healthcare disparities, and limited access to accurate information pose additional challenges, understanding the KAP of high-risk groups like hypertensive and diabetic patients is crucial. Assessing their awareness, perceptions, and preventive behaviors provides valuable insights for targeted health education programs and policy interventions aimed at reducing transmission risks and improving health outcomes in vulnerable populations.

Hypertension is a prevalent, chronic, and age-related condition that often leads to debilitating cardiovascular and renal complications. It refers to elevated blood pressure levels, specifically when the pressure inside blood vessels exceeds 140/90 mm Hg. Risk factors for hypertension include advanced age, genetic factors, high salt intake, and obesity (7). Treatment involves the administration of antihypertensive drugs such as thiazide diuretics, calcium channel blockers (e.g., Amlodipine), and beta blockers. Shockingly, approximately 1.28 billion adults worldwide suffer from hypertension, which is a major cause of premature death. Based on current evidence, it is observed that hypertension is frequently found in individuals with COVID-19. However, it is believed that this pre-existing condition does not independently contribute to the occurrence of SARS-COV-2 infection or the progression of COVID-19(8).

Diabetes mellitus refers to a varied collection of conditions characterized by high blood glucose levels resulting from insufficient insulin production or impaired insulin function. The persistent hyperglycemia associated with diabetes mellitus is linked to the deterioration, malfunction, and potential failure of various organs, including the retina, kidneys, nervous system, heart, and blood vessels (9). Multiple studies have indicated that individuals with diabetes have a higher susceptibility to contracting COVID-19 and experiencing complications, including acute respiratory distress syndrome (ARDS) and even mortality, compared to those without diabetes (10). Several studies have suggested that patients with hypertension and diabetes mellitus exhibit an upregulation of angiotensin-converting enzyme 2 (ACE2), a key receptor that facilitates the entry of SARS-CoV-2 into host cells. This increased expression of ACE2—potentially induced by the use of antihypertensive medications such as ACE inhibitors and angiotensin receptor blockers (ARBs)—may enhance viral attachment and replication, thereby contributing to increased susceptibility and severity of COVID-19 infection in these individuals (11).

METHODOLOGY

STUDY DESIGN AND SETTING

This study was designed as a cross-sectional study conducted at multiple healthcare facilities, including tertiary care hospitals and outpatient clinics. The aim was to assess the knowledge, attitudes, and preventive practices (KAP) regarding COVID-19 among patients with chronic hypertension and diabetes.

STUDY POPULATION

The target population consisted of adult patients (aged ≥18 years) diagnosed with chronic hypertension, diabetes mellitus, or both. Patients were approached during their routine clinical visits or through telephonic interviews where applicable.

INCLUSION CRITERIA AND EXCLUSION CRITERIA

Patients with a confirmed diagnosis of chronic hypertension and/or diabetes mellitus for at least six months, who provided informed consent and were mentally and physically capable of understanding and responding to the questionnaire, were included in the study. Patients with comorbidities other than hypertension and diabetes, individuals with cognitive impairment or severe illness, and those who declined or withdrew consent were excluded.

SAMPLING TECHNIQUE AND SAMPLE SIZE

A non-probability convenience sampling technique was employed. The sample size was determined using a standard formula for cross-sectional studies, taking into account a 95% confidence interval, a 5% margin of error, and an expected awareness prevalence rate based on previous research. The total number of participants was proportionally allocated across participating centres.

DATA COLLECTION TOOL

A structured, pre-validated questionnaire was used, consisting of sections on socio-demographic data, medical history, and KAP related to COVID-19. The questionnaire was administered by trained data collectors in the local language (Urdu/English) as per participants' preference.

ETHICAL CONSIDERATIONS

The study protocol was approved by the Ethical Review Committee of Hamdard university (ERC-FOP-2024-006). Written informed consent was obtained from all participants before data collection. Participant confidentiality and anonymity were strictly maintained.

DATA COLLECTION

A survey was conducted in various hospitals in Karachi, including Dow and Agha Khan, from July to September 2024. The survey aimed to gather data from hypertension (HTN) and diabetes mellitus (DM) patients. 150 responses were collected by filling the questionnaire from targeted hospitals, including Naimat Baigum, Agha Khan, Dow Hospital, and Taj Complex

The measurements and data gathering processes were carried out by four skilled undergraduate D-pharmacy healthcare students and one highly skilled Teacher, who diligently adhered to stringent safety protocols.

STATISTICAL ANALYSIS

This data was analyzed by using Statistical Package for the Social Sciences (SPSS) version 20 was employed to input and analyze the data. Furthermore, thorough checks were conducted to identify any potential issues, such as multicollinearity or outliers in the dataset. The analysis was performed by descriptive statistics (using Cross tab and CHI square calculations). For this study, a p-value below 0.05 was deemed statistically significant.

RESULTS

A total of 150 patients with chronic hypertension (HTN), diabetes mellitus (DM), or both participated in the study. The results demonstrated statistically significant associations between educational level, locality, and disease type with patients' awareness regarding the prevention and cure of their conditions through natural approaches. Examines the effect of education level on awareness of prevention and cure through natural methods. A significant association was found between education level and

awareness of both prevention using fruits and vegetables (p=0.000) and cure by allopathic and herbal medicines (p = 0.000). Participants with no formal education, primary, and secondary education showed 100% awareness regarding prevention, whereas none of the diploma holders reported awareness. Among those with a first degree or higher, 78.18% were aware of preventive measures, and 72.7% acknowledged cure through combined allopathic and herbal means seen in Table I.

Table I. Effect of Education level on awareness of prevention and cure by natural ways in chronic hypertension & diabetic mellitus patients

Demographic data		Prevention by fruits and vegetables			Demographic data		Cure by allopathic and herbal medicines		
		Yes n(%)	No n(%)	P-Value			Yes n(%)	No n(%)	P-Value
Education Level	Diploma	0 (0%)	6 (100%)	0.000*	Education Level	Diploma	0(0%)	6(100%)	0.000*
	First Degree and Above	86(78.18%)	24(21.81%)			First Degree and Above	80(72.7%)	30(27.7%)	
	Primary Education	5 (100%)	0 (0%)			Primary Education	5(100%)	0 (0%)	
	Secondary Education	14 (100%)	0 (0%)			Secondary Education	14(100%)	0 (0%)	
	No Formal Education	15(100%)	0 (0%)			No Formal Education	15 (100%)	0 (0%)	
Total		120 (80%)	30(20%)		Total		114(76%)	36 (24%)	

*Statistically significant association (p-value<0.05)

Influence of locality on awareness has been shown in Table II.. Urban residents had markedly higher awareness compared to rural residents. All urban participants (100%) reported awareness of both preventive and curative strategies, while only 53.8% and 44.6% of rural participants were aware of prevention and cure, respectively. The association between residence and awareness was statistically significant for both prevention (p = 0.000) and cure (p = 0.000).

Table II. Effect of locality on awareness of prevention and cure by natural ways in chronic hypertension & diabetes mellitus patients

Demographic Data		Prevention By Fruits and Vegetables			Demographic Data		Cure By Allopathic and Herbal Medicines		
		Yes n(%)	No n(%)	P-Value			Yes n(%)	No n(%)	P-Value
Residence	Rural	35(53.8%)	30(46.1%)	0.000*	Residence	Rural	29(44.6%)	36(55.3%)	0.000*
	Urban	85(100%)	0(0%)			Urban	85(100%)	0(0%)	
Total		120(80%)	30(20%)		Total		114(76%)	36(24%)	

*Statistically significant association (p-value<0.05)

Table III. Effect of type of disease on awareness of prevention and cure by natural ways in chronic HTN & DM patients

Demographic Data		Prevention by Fruits and Vegetables			Demographic Data		Cure by Allopathic and Herbal Medicines		
		Yes n (%)	No n (%)	P-Value			Yes n (%)	No n (%)	P-Value
Type of Disease	Diabetes	16 (100%)	0 (0%)	0.000*	Type of Disease	Diabetes	14 (87.5%)	2 (12.5%)	0.000*
	Hypertension	100 (100%)	0 (0%)			Hypertension	100 (100%)	0 (0%)	
	Both (DM & HTN)	4 (11.76%)	30 (88.23%)			Both (DM & HTN)	0 (0%)	34 100%)	
Total		120 (80%)	30 (20%)		Total		114 (76%)	36 (24%)	

*Statistically significant association (p-value<0.05)

Table III reveals that disease type significantly impacted awareness levels. Participants with either diabetes or hypertension alone showed complete awareness of prevention (100%), whereas only 11.76% of those suffering from both conditions (DM & HTN) were aware of preventive methods (p = 0.000). Similarly,

awareness of cure using both allopathic and herbal approaches was highest among those with hypertension (100%) and diabetes (87.5%), while none of the participants with both diseases reported awareness of such treatment ($p = 0.000$).

Overall, higher education levels, urban residence, and having a single chronic disease were positively associated with increased awareness of natural and integrative preventive and curative strategies in chronic HTN and DM patients. All associations were statistically significant ($p< 0.05$).

DISCUSSION

This study explored the awareness of patients with chronic hypertension (HTN), diabetes mellitus (DM), or both, regarding natural and integrative approaches for prevention and cure. The analysis revealed statistically significant associations between patients' awareness and their educational level, locality, and disease type. A key finding was the influence of education level on awareness. Participants with no formal, primary, or secondary education showed surprisingly high levels of awareness regarding natural preventive methods, whereas diploma holders demonstrated no awareness at all. This may suggest that informal health education, community health workers, or personal experiences play a more vital role in certain populations than formal qualifications. However, patients with higher education also showed strong, albeit not complete, awareness of both preventive and curative strategies. These results are consistent with earlier studies indicating that higher educational attainment correlates with improved health literacy and proactive health behavior, especially in chronic disease management (12, 13). Locality also significantly influenced awareness, with urban residents displaying markedly higher knowledge levels than their rural counterparts. Urban areas generally have better access to healthcare services, mass media, pharmacies, and health education initiatives, all of which facilitate awareness and informed decision-making . In contrast, rural populations often face barriers such as limited access to care, cultural misconceptions, and poor health infrastructure, which may contribute to the lower awareness observed (14). The statistically significant difference in awareness between urban and rural patients underscores the urgent need for public health campaigns tailored to rural communities. Disease type also impacted patients' understanding of natural and integrative approaches. Participants with either diabetes or hypertension alone had a significantly higher level of awareness compared to those with both conditions. Comorbid patients, often dealing with more complex treatment regimens, may experience cognitive overload, leading to neglect or misunderstanding of preventive and integrative therapies (15). This finding highlights a critical gap in patient education for those managing multiple chronic diseases—despite being among the populations most likely to benefit from comprehensive lifestyle and natural approaches (16).

Overall, the findings support that higher educational attainment, urban residence, and single-disease status are associated with greater awareness of preventive and integrative curative approaches in patients with chronic HTN and DM. These insights are vital for designing targeted interventions. Health policymakers should prioritize educational programs, particularly in rural settings and for patients with comorbidities, to promote awareness of evidence-based natural methods such as dietary modification, herbal remedies, and lifestyle changes alongside conventional medicine (17).

This study was limited by its cross-sectional design, reliance on self-reported data, and use of convenience sampling, which may introduce selection bias.

CONCLUSION

This study highlights that patients with hypertension and diabetes demonstrated moderate to high awareness of COVID-19 prevention and treatment using both allopathic and traditional approaches. However, rural and comorbid patients showed significant knowledge gaps. Targeted educational interventions, especially in underserved communities, are urgently required to enhance preparedness and self-care during pandemics

Conflict of interest:

Authors have no conflict of interest.

Authors' contribution:

HS Conceptualized, supervision and writing; DF Data collection and writing; TM Writing, review; STA Critical analysis; AI Data collection and writing; SMR & MA Statistical analysis.

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