



Evaluation of Effective Factors on the Knowledge, Attitude, and Practice (KAP) about COVID-19 in Patients with Chronic Diseases Referred to Teaching Hospitals in Iraq and Iran

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Abstract

Background: A key component of effective disease prevention and control programs is improving public knowledge, attitudes, and practices (KAP). This study aims to investigate factors influencing KAP about COVID-19 in patients with chronic diseases attending clinics affiliated with teaching hospitals in Iran and Iraq.

Materials and Methods: This cross-sectional study, designed to determine the prevalence of KAP in the study sample, was conducted in 2021 on 1000 patients over 18 years of age with chronic diseases. Five hundred participants were Iraqi patients referred to Baghdad Medical City (مدينة الطب) in Baghdad, Iraq, and the remaining five hundred were Iranian patients from Imam Reza and Ghaem Hospitals in Mashhad, Iran. Available sampling was used. Data were collected using the standard Akalu knowledge, attitude, and practice questionnaire and analyzed using SPSS software (version 16.0).

Results: The mean KAP scores in both groups were low, but the performance level of Iranian patients was significantly better than that of Iraqi patients ($p < 0.05$). A two-way ANOVA revealed no significant association between KAP scores and baseline or intervening variables (e.g., gender, marital status, education, income) in either the Iranian or Iraqi patients ($p > 0.05$). However, Pearson's correlation coefficient test indicated a significant inverse correlation between patients' age and their knowledge and practice scores regarding COVID-19 ($p < 0.05$).

Conclusion: An inverse correlation was observed between patients' age and their knowledge and practice regarding COVID-19, indicating that higher age was associated with significantly lower knowledge and poorer practices. No significant relationship was found between baseline or intervening variables and patients' knowledge, attitudes, and practices.

Key Words: Attitude, Effective factors, Knowledge, Practice, Iran, Iraq.

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1- INTRODUCTION

COVID-19 presents with a wide range of severity, from mild respiratory symptoms to severe complications including acute respiratory distress syndrome (ARDS), septic shock, and death (1). Individuals with underlying medical conditions are at a higher risk of experiencing severe outcomes from COVID-19 (1). Common chronic diseases, such as cardiovascular diseases, cancer, diabetes, and chronic respiratory and kidney diseases, are significant contributors to global mortality (2). Studies indicate that individuals with pre-existing conditions like hypertension, diabetes, cardiovascular diseases, and respiratory system diseases are particularly vulnerable to severe COVID-19 (1). Reports from Iraq indicate an increasing prevalence of chronic diseases such as diabetes, stroke, and hypertension within the country (3).

Individuals with chronic conditions such as heart disease, diabetes, hypertension, and respiratory diseases are at greater risk of contracting COVID-19 and experiencing severe outcomes (4). Studies indicate that a significant proportion of people with chronic diseases have poor knowledge and practices regarding COVID-19 (5). The highly contagious nature of COVID-19 has led to its rapid global spread, resulting in an unprecedented pandemic (6). Preventative measures are crucial in controlling COVID-19 infection (7). Limited understanding and recognition of the disease, particularly among high-risk groups, contribute to its prevalence and associated mortality (7, 8). Behavior change, influenced by public knowledge and perception, is necessary to control COVID-19, especially within high-risk groups (8). People with chronic diseases are recognized as a high-risk group for COVID-19 (9). Assessing the Knowledge, Attitude, and Practice (KAP) of patients

with chronic diseases helps identify preventative behaviors against COVID-19 (5). The risk of severe disease and mortality from COVID-19 is higher in individuals with non-communicable diseases (e.g., diabetes, cardiovascular diseases, cancers, and chronic lung diseases) compared to the general population (5, 10). Public commitment to preventative measures is essential for success against COVID-19 (11). According to KAP theory, knowledge, attitude, and practices regarding COVID-19 influence this commitment (12). A study in Iran revealed that a substantial portion of the population had average knowledge of the disease and a positive attitude toward prevention (10).

Effective control and mortality reduction for COVID-19 necessitate behavior change, particularly among high-risk groups, which is primarily driven by their knowledge and understanding of the disease (8). Given the elevated risk of COVID-19 in patients with chronic diseases, the crucial role of KAP in preventive behaviors (5), and the inconsistencies observed in previous studies, the present study aimed to investigate the factors influencing the knowledge, attitudes, and practices (KAP) of patients with chronic diseases concerning COVID-19, specifically those referred to clinics affiliated with teaching hospitals in Iran and Iraq.

2- MATERIALS AND METHODS

2-1. Study Design and Population

This analytical cross-sectional study, designed to explore associations between variables, was conducted in 2021 on 1000 patients with chronic diseases. The participants were recruited from three hospitals: Baghdad Medical City (مدينة الطب) in Baghdad, Iraq (n=500), and Imam Reza and Ghaem teaching hospitals in Mashhad, Iran (n=500). To ensure standardized data collection, research

assistants in Iran (undergraduate nursing students) and Iraq (Chronic Diseases Clinic of Medina Hospital staff) received a one-hour training session from the researcher outlining the study objectives. Data collection was performed by assistant researchers in the evening shifts, dedicated to chronically ill patients, using available sampling methods.

2-2. Method

In this study, a non-random, convenience sampling method was employed. To determine an appropriate sample size, data from a pilot study were utilized. Specifically, the mean and standard deviation (SD) of knowledge, attitude, and practice scores related to COVID-19 were obtained from 40 patients (20 Iranian and 20 Iraqi participants). These values were then used in a sample size calculation formula:

$$N = [(Z_{(1-\alpha/2)} + Z_{(1-\beta)})^2 \times (s_1^2 + s_2^2)] / (m_1 - m_2)^2$$

$Z_{(1-\alpha/2)} = 1.96$ (Critical value for 95% confidence interval for two-domain study).

$Z_{(1-\beta)} = 1.28$ (Critical value for test power 80%).

$S_1 =$ Awareness score in Iranian patients .

$S_2 =$ Awareness score in Iraqi patients.

$m_1 =$ Mean knowledge score in Iranian patients.

$m_2 =$ Mean knowledge score in Iraqi patients.

$n = 1000$

After providing a thorough explanation of the study, written informed consent was obtained from eligible patients in the outpatient clinic. Participants were then given a questionnaire to complete within 20-30 minutes, with research staff available to answer questions and address any difficulties. Upon completion of the questionnaire, each participant received an educational pamphlet about COVID-19.

2-3. Measuring tools

2-3-1. Baseline characteristics

A demographic information questionnaire was used to collect data on nationality,

age, gender, level of education, marital status, employment status, income level, place of residence, type of chronic disease, history of COVID-19, source of healthcare information, access to healthcare equipment, and the name of the hospital. These questions were developed based on a review of previous studies and in consultation with nursing professors.

2-3-2. KAP Questionnaire on COVID-19

The questionnaire consisted of 45 questions designed to assess three areas: knowledge, attitudes, and practices of individuals regarding COVID-19 (5).

Questions 1 through 16 evaluated knowledge about COVID-19. Each question had three response options: "correct" (1 point), "incorrect" (0 points), and "I don't know" (0 points). The total knowledge score ranged from 0 to 16, with scores categorized as follows: Good Knowledge (12.16 - 16 points), Average Knowledge (9.6 - 12.15 points), and Poor Knowledge (Less than 9.6 points).

Fourteen questions assessed participants' attitudes toward COVID-19 using a Likert scale, with responses ranging from "very low" (1 point) to "high" (4 points). The total attitude score ranged from 14 to 56, with higher scores indicating more positive attitudes toward COVID-19.

Fifteen questions evaluated participants' practices related to COVID-19 prevention. Responses were binary ("yes" or "no"), with correct responses scored as 1 point and incorrect responses as 0 points. Total practice scores ranged from 0 to 15 and were categorized as follows: Good Practice (12 - 15 points), Moderate Practice (9 - 11.9 points), and Poor Practice (Less than 9 points).

To establish the validity of the questionnaire, content validity was assessed. Feedback was obtained from seven faculty members of the School of Nursing and Midwifery, and the

instrument was adapted to align with the objectives of the study. Necessary corrections were made based on this feedback. To assess reliability, Cronbach's alpha was calculated. In this study, the questionnaire was administered to 40 patients (20 in Iran and 20 in Iraq), yielding Cronbach's alpha coefficients of 0.78, 0.81, and 0.78 for knowledge, attitude, and practice, respectively, demonstrating acceptable internal consistency. In the study by Akalu et al. (2020), the Cronbach's alpha coefficients for knowledge, attitude, and practice were reported as 0.79, 0.79, and 0.85, respectively (5). The questionnaire was translated from English to Persian by a language expert. Subsequently, an English language expert in Iraq translated the questionnaire into Arabic. Concurrently, an Arabic language expert translated the Persian version into Arabic. The translations were then compared, reconciled, and approved by nursing and English professors to ensure accuracy and equivalence.

2-4. Ethical consideration

This study, conducted as part of a master's thesis in nursing, received ethical approval from the Ethics Committee of Mashhad University of Medical Sciences (IR.MUMS.NURSE.REC.1400.007) and was conducted in accordance with established global ethical standards. These standards included the Committee on Publication Ethics (COPE) guidelines for publication ethics (13), the Declaration of Helsinki (14), and the Belmont Report (15). To ensure ethical conduct, the study design addressed autonomy, beneficence, and justice. Participants' autonomy was respected through informed consent, obtained after providing a comprehensive explanation of the research, emphasizing their right to voluntary participation and withdrawal without consequence. Beneficence was prioritized by maximizing potential benefits while

minimizing harm; the KAP questionnaire was used to assess COVID-19 knowledge without causing undue distress. Justice was upheld by using fair participant selection criteria based on predefined inclusion criteria rather than vulnerability or accessibility. Furthermore, cultural differences were carefully considered to promote inclusivity and sensitivity throughout the research process.

2-5. Data analysis

Descriptive statistics, including means, standard deviations, and frequency distributions (frequencies and percentages), were calculated separately for the Iranian and Iraqi patient groups to describe the characteristics of the research sample and to evaluate and summarize the data. In the analytical statistics section, the normality of quantitative variables was first assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests.

The homogeneity of the two groups regarding intervening and contextual variables was then examined using the Chi-square test and Fisher's exact test (for qualitative variables), the independent t-test (for normally distributed quantitative variables), and the Mann-Whitney U test (for non-normally distributed quantitative variables). For intergroup comparisons, either the independent t-test or the Mann-Whitney U test was used, depending on normality. A two-way ANOVA was used to determine the effect of intervening and contextual variables on the dependent variables (i.e., knowledge, attitude, and practice scores regarding COVID-19 in patients).

The Pearson correlation coefficient was used to determine the correlation between patients' age and knowledge scores regarding COVID-19. Data analysis was performed using SPSS version 16.0, with a p-value of less than 0.05 considered statistically significant.

3- RESULTS

A total of 1000 patients with chronic diseases (500 Iranian patients and 500 Iraqi patients) participated in this study. The average age was 53.73 ± 10.66 years for Iraqi patients and 54.31 ± 11.24 years for Iranian patients ($p = 0.41$). Among Iraqi patients, 42.4% were male, compared to 41% of Iranian patients ($p = 0.20$). Additionally, 36.2% of Iraqi patients and 35.2% of Iranian patients held a diploma degree ($p = 0.08$). Regarding prior COVID-19 infection, 80.4% of Iraqi patients and 67% of Iranian patients

reported no previous infection ($p = 0.001$). The mean knowledge, attitude, and practice (KAP) scores of patients regarding COVID-19 are presented in **Table 1**. In the majority of patients, the KAP scores were below average. The results of the two-way ANOVA indicated no statistically significant association between baseline and intervening variables and the KAP scores of patients with chronic diseases attending clinics affiliated with teaching hospitals in Iran and Iraq ($p > 0.05$). Therefore, none of the baseline and intervening variables acted as confounders in this study (**Tables 2-4**).

Table-1: Mean COVID-19 Knowledge, Attitude, and Practice (KAP) Scores among Chronic Disease Patients in Iranian and Iraqi Teaching Hospitals (n = 1000).

KAP Component	Country	n	Mean ± SD	P-value*	Test Statistic
Knowledge	Iranian Patients	500	7.40 ± 1.54	0.63	T = 0.41
	Iraqi Patients	500	7.03 ± 1.79		
Attitude	Iranian Patients	500	27.30 ± 3.58	0.36	T = 1.12
	Iraqi Patients	500	26.62 ± 6.72		
Practice	Iranian Patients	500	4.31 ± 1.03	0.03	Z = 2.89
	Iraqi Patients	500	3.67 ± 1.32		

*Independent t-test, SD: Standard deviation.

Table 2: Relationship between Baseline/Intervening Variables and Knowledge Scores in Chronic Disease Patients at Iranian and Iraqi Teaching Hospital Clinics (n = 1000)

Variables	General Effect	Group Effect	Variable Effect	Interaction Effect
Gender	0.001	0.001	0.64	0.19
Age, year	0.001	0.001	0.40	0.62
Marital status	0.001	0.001	0.34	0.74
Educational level	0.001	0.001	0.25	0.62
Job status	0.001	0.001	0.56	0.84
Income status	0.001	0.001	0.21	0.84
Type of chronic disease	0.001	0.001	0.36	0.73
History of covid-19	0.001	0.001	0.17	0.53
Sources of information	0.001	0.001	0.63	0.29

Table-3: Relationship between Baseline and Intervening Variables and Attitude Scores in Chronic Disease Patients at Clinics Affiliated with Teaching Hospitals in Iran and Iraq (n = 1000)

Variables	General Effect	Group Effect	Variable Effect	Interaction Effect
Gender	0.001	0.001	0.38	0.49
Age (years)	0.001	0.001	0.80	0.77
Marital status	0.001	0.001	0.15	0.58
Educational level	0.001	0.001	0.43	0.29
Job status	0.001	0.001	0.16	0.54
Income status	0.001	0.001	0.71	0.14

Type of chronic disease	0.001	0.001	0.16	0.07
History of covid-19	0.001	0.001	0.50	0.42
Sources of information	0.001	0.001	0.64	0.19

Table-4: Relationship between Baseline and Intervening Variables and Practice Scores in Chronic Disease Patients at Clinics Affiliated with Teaching Hospitals in Iran and Iraq (n = 1000)

Variables	General Effect	Group Effect	Variable Effect	Interaction Effect
Gender	0.001	0.001	0.73	0.38
Age (years)	0.001	0.001	0.24	0.34
Marital status	0.001	0.001	0.32	0.09
Educational level	0.001	0.001	0.89	0.43
Job status	0.001	0.001	0.38	0.49
Income status	0.001	0.001	0.86	0.71
Type of chronic disease	0.001	0.001	0.16	0.58
History of covid-19	0.001	0.001	0.72	0.14
Sources of information	0.001	0.001	0.41	0.74

The Pearson correlation coefficient test revealed a significant inverse correlation between patient age and knowledge scores regarding COVID-19 ($p < 0.001$, $r = -0.46$). Specifically, as patient age increased, knowledge scores regarding COVID-19 significantly decreased ($p < 0.001$) (**Figure 1**). The Pearson correlation also showed no significant correlation

between patient age and attitude scores regarding COVID-19 ($p = 0.28$, $r = 0.05$) (**Figure 2**). However, it indicated a significant inverse correlation between patient age and practice scores regarding COVID-19 ($p < 0.001$, $r = -0.29$). Thus, as patient age increased, practice scores regarding COVID-19 significantly decreased (**Figure 3**).

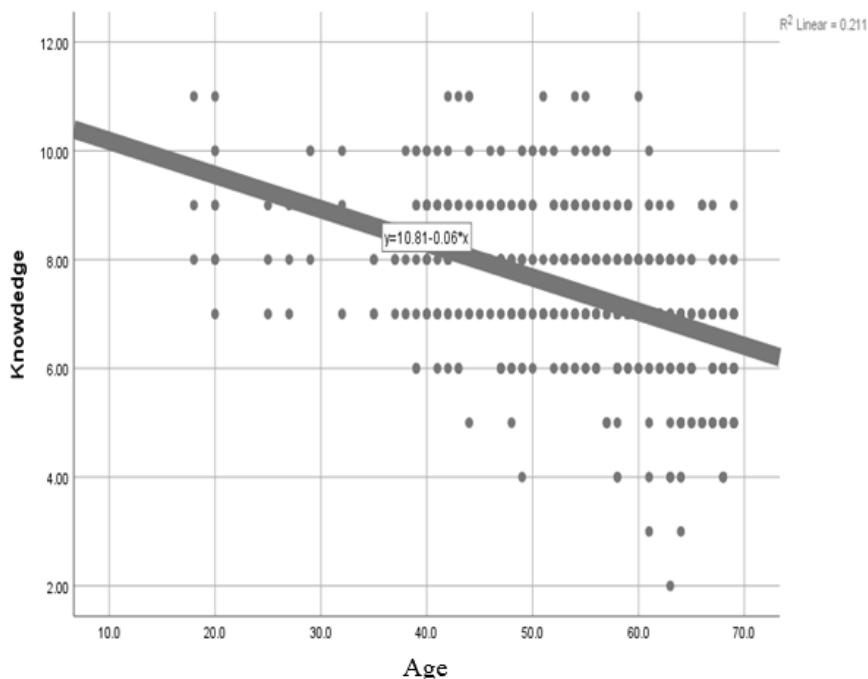


Fig.1:Correlation between Patient Age and Knowledge Scores Regarding COVID-19.

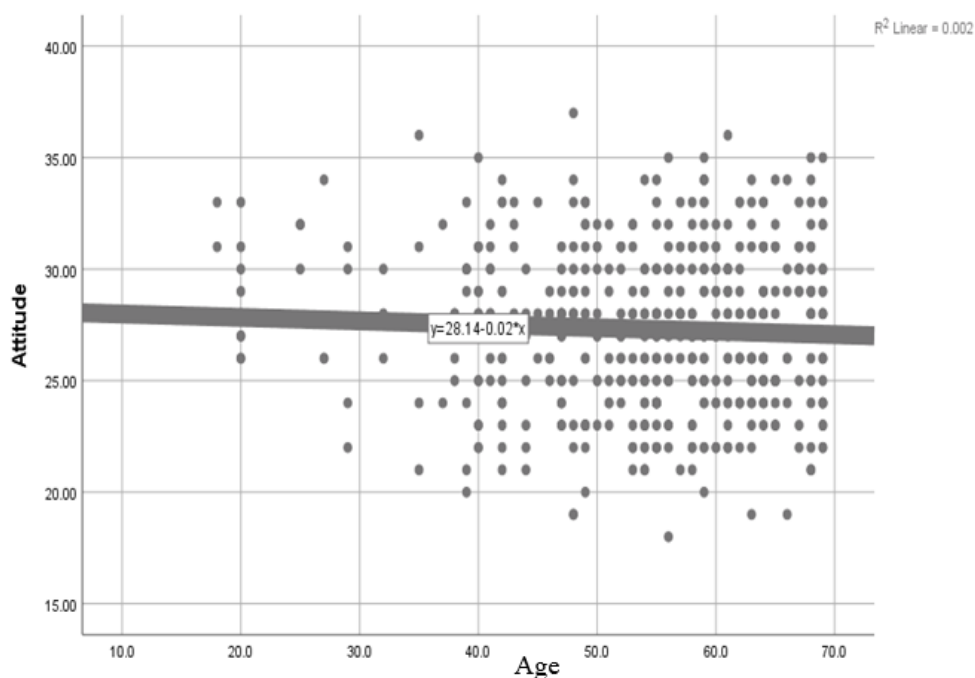


Fig.2: Correlation between Patient Age and Attitude Scores Regarding COVID-19 (n = 1000).

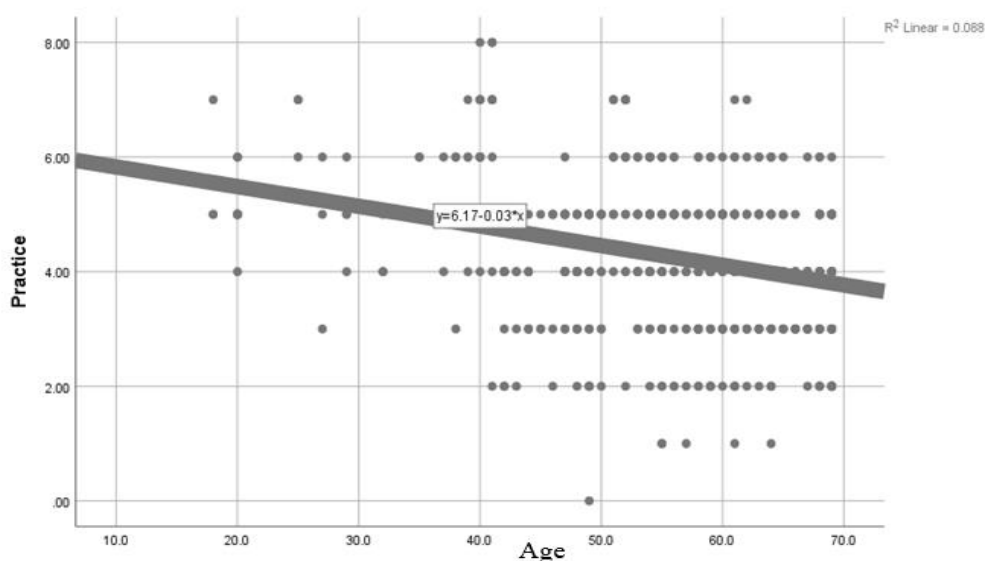


Fig.3: Correlation between Patient Age and Practice Scores Regarding COVID-19 (n = 1000).

4- DISCUSSION

This study explored factors influencing COVID-19 knowledge, attitudes, and practices (KAP) among chronic disease patients attending teaching hospital clinics in Iran and Iraq. Consistent with previous research, the findings revealed that the

average KAP scores in both groups were unfavorable. No significant relationship was observed between baseline or intervening variables (e.g., gender, income, education) and KAP scores. However, a significant inverse correlation was identified between patient age and

both knowledge and practice scores, while attitude scores remained stable across age groups.

These findings suggest that although demographic factors may not directly influence KAP, age plays a critical role, with older patients demonstrating lower knowledge and practice scores. This decline may be attributed to reduced access to updated information (2) and difficulties in adapting to rapidly evolving health guidelines (4). For instance, many older adults lack proficiency in using smartphones, a skill that younger generations often take for granted. A decline in practice is also likely with age, and while this can be delayed through interventions, it is generally inevitable (1). In contrast, attitudes are often rooted in long-held beliefs and values, making them less susceptible to change compared to knowledge and practices. Given that personal values and belief systems tend to remain stable over time, it is reasonable to expect attitudes to be the least variable of the KAP components (7).

Interestingly, a significantly greater proportion of Iraqi patients (80.4%) reported no prior COVID-19 infection compared to Iranian patients (67%) ($p=0.001$). Despite this difference in infection history, the two-way ANOVA results revealed no significant association between KAP scores and baseline or intervening variables ($p > 0.05$). While overall KAP scores were unfavorable in both groups, Iranian patients demonstrated better practice levels than their Iraqi counterparts. Specifically, the mean practice score for Iranian patients was 4.31 ± 1.03 compared to 3.67 ± 1.32 for Iraqi patients, a statistically significant difference ($p < 0.05$).

These findings align with studies reporting generally low KAP levels regarding COVID-19 among patients with chronic diseases (3-6). This underscores the urgent need for targeted interventions such as

behavioral change programs and tailored health education to improve KAP levels, particularly among older individuals. Such programs should prioritize providing accessible and up-to-date information while promoting practical preventive behaviors.

A review of relevant studies highlights conflicting findings regarding KAP among chronic disease patients during the COVID-19 pandemic. Some studies report generally low levels of KAP (5, 6), while others indicate high knowledge but poor practice and preventive behaviors (3, 7). Notably, all three KAP components in this study were below average, posing potential challenges to the effective control and management of COVID-19 in both countries. It is important to emphasize that this study specifically focused on chronic disease patients—a high-risk group for severe COVID-19 outcomes. At the outset, the research team hypothesized that individuals with chronic conditions would exhibit superior precautionary measures and higher overall KAP levels due to their heightened vulnerability (4). However, the findings revealed suboptimal KAP scores across both Iranian and Iraqi populations.

The focus on chronic disease patients is particularly critical because this population is more vulnerable to COVID-19 complications (1, 8). The suboptimal KAP levels observed in this study highlight an urgent need for interventions tailored to this high-risk group. Future research should investigate specific barriers to knowledge acquisition and preventive practices among older adults with chronic diseases. Additionally, studies should evaluate the effectiveness of various intervention strategies aimed at improving KAP levels and promoting better health outcomes.

While this study provides valuable insights into the factors influencing KAP among chronic disease patients during the COVID-19 pandemic, several limitations

should be acknowledged. The cross-sectional design limits the ability to infer causality between variables. Furthermore, as the study was conducted in specific hospitals in Iran and Iraq, its findings may not be generalizable to broader populations. Future research should include larger and more diverse samples across multiple settings and employ longitudinal designs to better understand changes in KAP over time.

Finally, some studies suffer from limitations in generalizability due to methodological constraints, while few have directly compared groups of chronic disease patients across distinct communities (5, 16-23). Addressing these gaps will provide a more comprehensive understanding of how demographic and contextual factors influence KAP levels among vulnerable populations.

5- CONCLUSION

This study of 1000 Iranian and Iraqi patients with chronic diseases revealed suboptimal knowledge, attitudes, and practices (KAP) regarding COVID-19, especially among older individuals. While demographic factors were not significantly associated with KAP scores, age negatively correlated with both knowledge and practice. This underscores the urgent need for targeted, accessible education and behavioral interventions designed to improve COVID-19 awareness and promote preventative behaviors among older, high-risk patients with chronic conditions. Future research should focus on effective strategies for translating knowledge into improved practices in this vulnerable population.

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7- CONFLICT OF INTEREST: None.

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