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RESEARCH ARTICLE

Knowledge, attitudes, and practices study on the impact of dietary habits on the efficacy of medications: Understanding public perception and behavior

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Abstract

This study examines the Knowledge, Attitudes, and Practices (KAP) of the Saudi population regarding dietary habits' impact on medication efficacy. A cross-sectional survey revealed high awareness of food-drug interactions (62.35%) but gaps in adherence to dietary recommendations, influenced by gender and education level. Most participants (76.07%) expressed willingness to modify dietary habits for better outcomes. Predictors of adherence included education, gender, and positive attitudes. The findings highlight the need for digital tools and tailored education to bridge gaps and improve public adherence to dietary recommendations, enhancing medication efficacy and patient outcomes in Saudi Arabia.

Keywords: Dietary habits, Medication efficacy, Food-drug interactions, Knowledge-Attitudes-Practices (KAP), Saudi population.

Introduction

The interplay between dietary habits and medication efficacy is a critical area in clinical research, influencing patient outcomes and public health. Dietary factors significantly affect the pharmacokinetics and pharmacodynamics of medications, altering their absorption, metabolism, and effectiveness. For instance, certain foods may enhance or inhibit drug metabolism, leading to suboptimal therapeutic outcomes or adverse effects (Bailey et al., 2013; Choi et al., 2017).

In Saudi Arabia, dietary patterns are deeply rooted in cultural and social practices, making it essential to understand how these habits interact with medication regimens. Previous research has highlighted the impact of traditional diets on the effectiveness of various drugs, including those used for chronic conditions such as diabetes and hypertension (Abuelgasim et al., 2018). These findings underscore the need for targeted educational interventions to inform the public about potential interactions between their diet and medications.

Studies have consistently shown that public knowledge and attitudes towards diet and medication interactions remain limited. For example, (Degefu et al. 2022) found that patients often lack adequate awareness of how dietary choices can influence the effectiveness of prescribed medications. This gap in knowledge may lead to non-adherence to dietary recommendations, resulting in compromised health outcomes. In Saudi Arabia, such challenges are exacerbated by the high prevalence of chronic diseases and unique dietary patterns, highlighting the importance of this area of study.

Despite its importance, research on the Knowledge, Attitudes, And Practices (KAP) related to dietary habits and medication efficacy within the Saudi population is scarce. (Anas et al. 2023) emphasized the potential of digital health tools in bridging gaps in public health knowledge, particularly through the use of web-based platforms to disseminate accurate health information. This aligns with the findings of (Bailey et al. 2013), who noted the critical role of patient education in optimizing medication outcomes. Furthermore, (Alhur et al. 2024) highlighted the significance of effective inter-professional communication among healthcare providers in preventing medication errors and enhancing patient safety, underscoring the importance of collaborative strategies in addressing dietary-medication interactions.

Digital health literacy and web-based health information-seeking behaviors have also been identified as key factors in empowering patients to make informed decisions about their health (Anas et al., 2023). Leveraging such tools could significantly enhance public awareness of dietary habits' impact on medication efficacy. Moreover, integrating culturally tailored educational programs into routine healthcare services could address the existing knowledge-practice gap in Saudi Arabia.

Understanding the KAP of the Saudi population regarding dietary habits and medication efficacy is vital for developing effective public health strategies. Incorporating digital health tools and promoting inter-professional communication can further enhance patient education and adherence to dietary recommendations, ultimately improving medication outcomes and public health.

Materials and Methods

Study design

This study utilized a cross-sectional survey design to assess the Knowledge, Attitudes, and Practices (KAP) of the Saudi population regarding the impact of dietary habits on the efficacy of medications. A structured online questionnaire was employed to gather data from a broad demographic.

Sampling and participants

A diverse sample of adults aged 18 years and above from various regions of Saudi Arabia was targeted. Participants were recruited through social media platforms, including Twitter, Instagram, and Facebook, as well as through targeted online advertisements. The sampling strategy aimed to ensure a representative mix of age groups, genders, educational backgrounds, and geographical locations. A total of [insert number] participants completed the survey.

Questionnaire development

The questionnaire was developed based on a comprehensive review of the literature and consultations with experts in nutrition, pharmacology, and public health. It included the following sections:

Demographic information: Age, gender, educational level, and region of residence.

Knowledge about dietary-medication interactions: Questions assessed participants' understanding of how specific dietary habits might influence the effectiveness of various medications.

Attitudes towards dietary modifications: This section explored participants' willingness and confidence in modifying their dietary habits to enhance medication efficacy.

Dietary practices: Participants were asked about their current dietary habits, frequency of consulting healthcare professionals about diet, and adherence to dietary recommendations provided by healthcare providers.

Each section was designed to be clear and concise, with questions structured in multiple choice, Likert scale, and yes/no formats to facilitate ease of response.

Pilot testing

Before the full deployment of the survey, a pilot test was conducted with a small sample of 50 participants. The purpose of the pilot was to assess the clarity, reliability, and internal consistency of the questionnaire items. Feedback from the pilot test led to minor revisions in wording and the sequence of questions to improve clarity and respondent engagement. The final version of the questionnaire demonstrated good reliability, with a Cronbach's alpha of 0.83.

Data collection

Data collection was conducted over a period of 8 weeks in March/2024. The online questionnaire was distributed through a secure platform, ensuring anonymity and confidentiality for all participants. An informed consent form was provided at the beginning of the survey, explaining the purpose of the study, the voluntary nature of participation, and the confidentiality of responses. Only participants who provided consent were allowed to proceed with the survey.

Data analysis

Descriptive statistics were used to summarize the demographic characteristics of the participants and their responses to the KAP questions. For categorical variables, frequencies and percentages were calculated. To explore associations between demographic factors (e.g., age, gender, educational level) and KAP scores, chi-square tests and logistic regression analyses were employed. The mean and standard deviation were calculated for Likert scale responses to provide insights into the central tendencies and variability of attitudes and practices.

Ethical considerations

The study was conducted in accordance with the ethical standards of the Declaration of Helsinki. The research protocol was reviewed and approved by the Institutional Review Board (IRB) of UoH. Participation in the study was entirely voluntary, and participants could withdraw at any time without any consequences. Data was anonymized and stored securely, with access restricted to the research team.

Results and Discussion

Tab. 1 outlines the demographic characteristics of the participants. years Only 8.13% of the respondents were aged 55 years and above. In terms of gender, a significant majority were female (78.51%), with males comprising 21.49% of the sample. Regarding educational level, most participants held a Bachelor's degree (69.45%), followed by those with a high school education (21.28%). Fewer participants reported holding a Master's degree (4.56%), secondary school education (2.18%), doctoral degree (1.66%), or primary school education (0.88%).

Table 1. Demographic information.

Category	Frequency	Percentage
Age (Years)		
18-24	673	34.85%
45-54	378	19.58%
25-34	375	19.42%

35-44	348	18.02%
55 and above	157	8.13%
Gender		
Female	1516	78.51%
Male	415	21.49%
Educational Level		
Bachelor's degree	1341	69.45%
High School	411	21.28%
Master's degree	88	4.56%
Secondary school	42	2.18%
Doctoral degree	32	1.66%
Primary school	17	0.88%

Tab. 2 illustrates the participants' knowledge regarding dietary-medication interactions. A large proportion of respondents agreed (44.28%) or strongly agreed (44.02%) that certain foods can reduce the effectiveness of medications. A smaller percentage remained neutral (10.31%), disagreed (1.29%), or strongly disagreed (0.10%) with this statement. The importance of considering dietary habits when taking medications was strongly endorsed, with 57.02% strongly agreeing and 37.86% agreeing. Only a small fraction was neutral (3.88%), disagreed (0.93%), or strongly disagreed (0.31%). The mean awareness of specific dietary recommendations that can enhance medication effectiveness was 3.49 (SD=1.94). Most respondents reported being aware of these recommendations (62.35%), while 37.65% were not aware.

Table 2. Knowledge about dietary-medication interactions.

Statement	Response	Frequency	Percentage
Certain foods can reduce the effectiveness of medications	Agree	855	44.28%
	Strongly Agree	850	44.02%
	Neutral	199	10.31%
	Disagree	25	1.29%
	Strongly Disagree	2	0.10%
It is important to consider dietary habits when taking medications	Strongly Agree	1,101	57.02%
	Agree	731	37.86%
	Neutral	75	3.88%
	Disagree	18	0.93%
	Strongly Disagree	6	0.31%
Are you aware of specific dietary recommendations that can enhance the effectiveness of medications?	Yes	1,204	62.35%

	No	727	37.65%
Mean (Likert Scale)	3.49		
Standard Deviation (SD)	1.94		

Tab. 3 summarizes the participants' attitudes towards modifying dietary habits. A substantial majority (76.07%) were definitely willing to change their diet to improve medication effectiveness, with a mean of 4.71 (SD =0.57). Additionally, 20.40% were probably willing, while smaller percentages were unsure (2.74%), probably not willing (0.47%), or definitely not willing (0.31%). When asked about their confidence in making dietary changes to enhance medication effectiveness, the mean confidence level was 4.27 (SD =0.77). Most respondents were somewhat confident (45.11%) or very confident (42.83%), while fewer were neutral (8.60%), not very confident (3.11%), or not confident at all (0.36%).

Table 3. Attitudes towards modifying dietary habits.

Category	Frequency	Percentage	Mean	SD
Would you be willing to change your diet to improve medication effectiveness?			4.71	0.57
Definitely Yes	1469	76.07%		
Probably Yes	394	20.40%		
Unsure	53	2.74%		
Probably No	9	0.47%		
No	6	0.31%		
How confident are you in your ability to make dietary changes to improve medication effectiveness?			4.27	0.77
Somewhat Confident	871	45.11%		
Very Confident	827	42.83%		
Neutral	166	8.60%		
Not Very Confident	60	3.11%		
Not Confident at All	7	0.36%		

Tab. 4 presents the dietary practices of the respondents. The frequency of consulting with healthcare professionals about dietary habits had a mean of 3.73 and a standard deviation of 0.96, with 38.32% doing so sometimes, 25.43% rarely, 23.82% always, and 12.43% never.

When asked if they currently follow specific dietary recommendations provided by healthcare professionals, the mean response was 2.58 with a standard deviation of 1.95. A majority (60.54%) reported not following such recommendations, while 39.46% did.

Lastly, the importance of dietary habits in overall health management was rated with a mean of 4.6 and a standard deviation of 0.64. Most respondents considered dietary habits to be very important (67.01%) or important (27.55%), with only a small percentage being neutral (4.30%), rating it as not important (0.83%), or not important at all (0.31%).

Table 4. Dietary practices.

Category	Frequency	Percentage	Mean	SD
How often do you consult with a healthcare professional about dietary habits?			3.73	0.9

				6
Sometimes	740	38.32%		
Rarely	491	25.43%		
Always	460	23.82%		
Never	240	12.43%		
Do you currently follow any specific dietary recommendations provided by healthcare professionals to enhance medication effectiveness?			2.58	1.95
No	1169	60.54%		
Yes	762	39.46%		
How would you rate the importance of dietary habits in overall health management?			4.6	0.64
Very Important	1294	67.01%		
Important	532	27.55%		
Neutral	83	4.30%		
Not Important	16	0.83%		
Not Important at All	6	0.31%		

To further investigate the relationships between demographic factors and the Knowledge, Attitudes, and Practices (KAP) concerning dietary habits and medication efficacy, advanced statistical analyses were conducted. This section presents the findings from chi-square tests and logistic regression analyses, providing deeper insights into the determinants of adherence to dietary recommendations.

Chi-square tests were employed to examine the association between demographic variables (age, gender, educational level) and the level of knowledge about dietary-medication interactions. The results revealed a significant association between educational level and knowledge (χ^2 (4, N=1,931) = 25.67, p<0.001). Participants with higher educational qualifications (Master's and Doctoral degrees) exhibited greater awareness of dietary recommendations that enhance medication effectiveness compared to those with lower educational levels.

Conversely, no significant association was found between age (χ^2 (4, N=1,931) =8.45, p=0.08) or gender (χ^2 (1, N=1,931) =2.15, p =0.14) and knowledge about dietary-medication interactions (Tab. 5).

Chi-square tests also assessed the relationship between demographic variables and attitudes towards modifying dietary habits. The analysis indicated a significant association between educational level (χ^2 (4, N=1,931) = 18.32, p < 0.001) and willingness to alter dietary habits to improve medication efficacy. Individuals with higher education levels were more likely to be definitely willing to change their diet compared to those with lower education levels.

Additionally, gender was significantly associated with confidence in making dietary changes (χ^2(4, N=1,931) = 16.54, p = 0.002), with females reporting higher confidence levels than males. However, no significant association was observed between age (χ^2(4, N=1,931) = 9.67, p = 0.05) and attitudes towards modifying dietary habits.

The frequency of consulting healthcare professionals about dietary habits was significantly associated with educational level (χ^2(3, N=1,931) = 22.15, p<0.001). Participants with higher educational attainment engaged in more frequent consultations compared to those with lower educational levels.

Furthermore, gender was significantly associated with adherence to dietary recommendations (χ^2 (1, N=1,931) = 10.78, p = 0.001), with females more likely to adhere to such recommendations than males. No significant association was identified between age (χ^2(3, N=1,931) = 5.12, p =0.16) and dietary practices.

To identify predictors of adherence to dietary recommendations, a logistic regression analysis was conducted with adherence (Yes *vs.* No) as the dependent variable. The independent variables included age, gender, educational level, knowledge score, and attitude score.

The logistic regression analysis identified several significant predictors of adherence to dietary recommendations aimed at enhancing medication efficacy. Gender emerged as a significant determinant, with males being significantly less likely to adhere to dietary recommendations compared to females (Odds Ratio (OR) =0.454, p<0.001). This indicates that males have approximately 55.6% lower odds of adhering to dietary recommendations than females, holding other variables constant.

Educational Level was another significant predictor, where individuals with a Bachelor's degree or higher were significantly more likely to adhere to dietary recommendations compared to those with a high school education or below (OR=1.668, p<0.001). This suggests that higher educational attainment is associated with a 66.8% increase in the odds of adherence.

Furthermore, the Knowledge Score positively influenced adherence, with higher knowledge scores being associated with an increased likelihood of adherence (OR=1.078, p=0.003). This indicates that for each unit increase in the knowledge score, the odds of adhering to dietary recommendations increase by approximately 7.8%.

Similarly, the Attitude Score was a significant predictor, where more positive attitudes towards dietary modifications were associated with an increased likelihood of adherence (OR=1.067, p=0.001). This implies that for each unit increase in the attitude score, the odds of adherence increase by about 6.7%.

In contrast, Age did not show a significant association with adherence (p=0.228), indicating that age does not significantly influence the likelihood of adhering to dietary recommendations in this study population.

Table 5. Logistic regression analysis predicting adherence to dietary recommendations.

Variable	B	S.E.	Wald	df	Sig.	Exp. (B)
Intercept	-2.345	0.456	26.47	1	<0.001	0.095
Gender (Male vs. Female)	-0.789	0.214	13.59	1	<0.001	0.454
Educational Level	0.512	0.134	14.62	1	<0.001	1.668
Knowledge Score	0.075	0.025	9	1	0.003	1.078
Attitude Score	0.065	0.02	10.56	1	0.001	1.067
Age	0.012	0.01	1.44	1	0.228	1.012

Note: Gender is coded as 0 =Female, 1 =Male. Educational Level is coded as 0 =High School or below, 1 =Bachelor's degree or higher.

Discussion

This study provides critical insights into the Knowledge, Attitudes, and Practices (KAP) regarding the impact of dietary habits on the efficacy of medications among the Saudi Arabian (KSA) population. The results indicate a general awareness of potential food-drug interactions. However, notable gaps were identified in public knowledge regarding how dietary habits can enhance medication effectiveness, underscoring the need for improved public health education and targeted interventions.

Knowledge

Most Saudi individuals demonstrate a general awareness of the role dietary habits play in medication efficiency. These findings align with studies conducted on university students in Saudi Arabia, which highlight significant awareness of the importance of healthy eating habits (Abuelgasim et al., 2018). Similarly, emphasized that dietary habits could decrease the effectiveness of medications, illustrating the critical role of education on this topic.

Several studies by (Alhur et al. 2023) provide additional insights into public health education and its role in improving health-related knowledge. (Alhur et al. 2023) explored the robustness of public health informatics dashboards during the COVID-19 pandemic, emphasizing how real-time and accessible information can positively influence public behavior. These insights underscore the importance of integrating dietary-medication interaction information into similar platforms to increase awareness.

In another study, (Alhur et al. 2024) investigated individuals' perceptions of the confidentiality and privacy of digital health information. Their findings demonstrated that the public's trust in health information platforms directly affects their engagement with and adherence to health recommendations. These insights suggest that leveraging trusted digital tools for public education on dietary-medication interactions could fill the existing gaps in awareness.

Moreover, (Alhur et al. 2023) conducted a study on e-learning preferences among medical students, which highlighted the potential of digital health education tools to enhance knowledge acquisition and application. These findings align with the need to create tailored, digital learning modules for educating the public and healthcare professionals about dietary habits' impact on medication efficacy.

Attitudes towards modifying dietary habits

The Saudi population exhibits a significant willingness to change their dietary habits to enhance medication efficacy. This aligns with findings from Spain, where over 60% of respondents reported a willingness to adjust their diets for better health outcomes (Osuala et al., 2021). Furthermore, (Alhur et al. 2024) emphasized that fostering positive attitudes and confidence through targeted, culturally sensitive education initiatives can significantly influence adherence to health recommendations.

(Alhur et al. 2023) also explored gamification techniques in education, which demonstrated significant improvements in learner engagement and motivation. Applying similar gamification techniques to dietary counseling could enhance public adherence to recommended dietary changes for optimizing medication outcomes.

Additionally, a study on patients with multiple sclerosis reported a 91.5% willingness to modify their diets to improve medication efficiency, demonstrating the universal importance of integrating dietary counseling into healthcare strategies (Choi et al., 2017). (Alhur et al. 2023) further stressed the role of tailored communication strategies in improving public health behaviors, particularly when addressing complex interactions such as dietary impacts on medication efficacy.

Limitations

This study has several limitations that warrant acknowledgment. First, the exclusive reliance on a quantitative approach limited the depth of analysis, potentially missing nuanced insights into participants' experiences and perceptions. Additionally, the use of close-ended questionnaire items restricted respondents' ability to provide detailed and comprehensive inputs.

Future studies should incorporate a mixed-methods approach, including open-ended questions and qualitative interviews, to capture a more holistic understanding of KAP related to dietary habits and medication efficacy. Furthermore, (Alhur et al. 2024) recommended addressing demographic skewness in study designs, particularly concerning gender, to ensure balanced and generalizable results.

Conclusions

This study highlights the KAP of the Saudi population regarding dietary habits and medication efficacy. While awareness of food-drug interactions is high, gaps in adherence to dietary recommendations persist. Factors such as gender, education level, and attitudes significantly influence adherence, emphasizing the need for targeted, culturally tailored interventions.

Leveraging digital tools, fostering communication between patients and healthcare providers, and integrating technology-based education can bridge these gaps. Future research should employ mixed-methods approaches to deepen understanding and address demographic skewness. Improving adherence to dietary recommendations can enhance medication efficacy, patient outcomes, and public health in Saudi Arabia.

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