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Coronavirus Pandemic

Novel coronavirus disease-related knowledge, attitudes, and practices among the residents of Al-Jouf region in Saudi Arabia

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Abstract

Introduction: Efforts have been made to contain COVID-19. Human behavior, affected by knowledge and perceptions, may influence the course of disease.

Methodology: A structured questionnaire was used to collect data from 422 participants. It consisted of 28 questions in four sections; seven questions about sociodemographic characteristics of participants, 12 questions to estimate level of knowledge about COVID-19, six questions to evaluate attitudes toward disease, and three questions to assess practices to prevent disease transmission.

Results: Their overall understanding of COVID-19 was satisfactory. 69% of the participants had satisfactory levels of knowledge, and the main sources of information were social media platforms (79.70%) and television (70.90%). There was a significant difference in knowledge as a function of gender ($p = 0.50$), occupation ($p = 0.012$), and smoking ($p = 0.041$). The participants held optimistic attitudes and adopted appropriate protective measures. Most participants agreed that COVID-19 can cause death (64.7%), poses greater risks to elderly (93.4%) and those with chronic diseases (96.7%), it is mandatory to quarantine infected individuals (98.1%), preventive health measures are important (97.6%), and health authorities will succeed in controlling the pandemic (67.5%). There was a statistically significant association between satisfactory levels of knowledge and the practice of wearing masks and the adoption of protective measures (avoiding crowded places, frequent hand washing).

Conclusions: Residents of Al-Jouf region in Saudi Arabia have satisfactory levels of knowledge, optimistic attitudes, and good practice during the rapid rise period of the pandemic. Awareness campaigns will improve any misbeliefs and risky behaviors.

Key words: Awareness; Coronavirus; infection prevention; pandemic; questionnaire; SARS-CoV2.

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Introduction

In December 2019, a novel beta coronavirus was linked to a group of respiratory tract symptoms that had been reported in Wuhan, Hubei Province, China. It was originally named "2019 novel coronavirus" and subsequently renamed "severe acute respiratory syndrome coronavirus 2" (SARS-CoV-2) by the International Committee on Taxonomy of Viruses. On February 11, 2020, the World Health Organization (WHO) named the associated condition "coronavirus disease" (COVID-19). COVID-19 cases have been reported in most countries, including Saudi Arabia. The early cases of infection were linked to a single local fish and wild animal market, and this was suggestive of the possibility of animal-to-human transmission. Bats were considered to be the source of SARS-CoV-2. A recent review reported a high rate of human-to-human transmission through respiratory droplets and/or direct contact [1].

By March 11, 2020, the number of COVID-19 cases outside China had increased dramatically. Based on the spread and severity of this disease, the WHO declared the COVID-19 situation a pandemic [2]. The incubation period of SARS-CoV-2 ranges from 1 to 14 days.

The clinical manifestations of COVID-19 vary. Some carriers are asymptomatic, but others experience dry cough, fever, acute respiratory distress syndrome, and pneumonia to varying degrees of severity. Patients

with severe COVID-19 are more likely to be older adults or have comorbidities such as cardiovascular diseases [3]. On March 3, 2020, the WHO reported that the case fatality ratio was 3.4% (i.e., number of deaths/numbers of infected cases). The COVID-19 pandemic is the first pandemic to have occurred during the 21st century, and it has exerted unprecedented pressure on communities and healthcare systems worldwide. The main public health preventive measures focus on the practice of hand hygiene, social distancing, and strict respiratory precautions [4,5].

Knowledge influences attitudes and practices. In response to the current COVID-19 pandemic, the WHO has recommended several measures to curb the spread of this disease around the world [6]. Efforts to prevent and control COVID-19 are currently underway all over the world. A first significant step toward containing the pandemic, Saudi Arabia and its neighboring countries implemented extreme measures to curb the spread of COVID-19 as early as possible (e.g., closing educational institutions, suspending air travel, enforcing curfews and quarantines, and testing thousands of individuals) [7,8]. In order for such governmental efforts to be effective, the general public should adhere to the recommended infection control measures, especially the practice of strict respiratory precautions to prevent viral transmission [9,10].

Objectives

This study aimed to assess COVID-19-related knowledge, attitudes, and practices (KAPs) among the residents of Al-Jouf region in Saudi Arabia to facilitate disease management. The findings of our study are expected to facilitate the development of awareness campaigns that dispel misbeliefs and impart appropriate behaviors to curb the spread of COVID-19 and contain the pandemic.

Methodology

Study design and selection of participants

This cross-sectional study aimed to examine COVID-19-related KAPs among the residents of the Al-Jouf region. Al-Jouf is located in the northern region of Saudi Arabia. The 2018 census reported that its total population was 520,737.

Given the ongoing COVID-19 pandemic, community-based surveys and individual interviews could not be conducted. Therefore, data were collected anonymously using an online questionnaire, which was created using Google Forms. The link was shared on social networking sites between May 10 and 17, 2020.

Inclusion criteria

Adult (≥ 18 years) men and women who were living in Al-Jouf region in Saudi Arabia, could read and understand Arabic, were familiar with the use of selected social networking sites, and were willing to participate in the study were eligible for inclusion.

Exclusion criteria

Those who were younger than 18 years or illiterate, refused to participate in the study, responded after the study period had ended, or were not residents of the Al-Jouf region in Saudi Arabia were excluded.

Sample size

The required sample size was estimated using the following specifications:

$$n = P(1 - P)Z2/d2 \quad [11]$$

(assuming an unknown prevalence of 50%), Z = 1.96, d = 0.05, confidence level = 95% (margin of error = 5%), and power = 80%. The required sample size was 384. As the nonresponse rate was expected to be 10%, the required sample size was redefined as 422.

Sampling technique

Using convenience sampling, eligible and consenting members of the general population were recruited until the required sample size was reached. The survey webpage presented a brief introduction to the background and objectives of the study and assured the participants of the confidentiality of their data and anonymity of participation before they could respond to the questionnaire. The participants were free to withdraw their participation at any time without providing a reason.

Data collection tool

The used questionnaire was partially adapted from a previously published study in China [12]. The original questionnaire, which was in English, was translated into Arabic. Subsequently, it was validated by a team of public health and microbiology experts. The questionnaire was back-translated into English to ensure that their purposes were similar and the meaning of their items was equivalent. The Arabic version of the questionnaire was reviewed by a team of experts prior to administration. This 28-item questionnaire consisted of four sections. The first section assessed seven sociodemographic characteristics: age, sex, marital status, educational level, occupation, smoking status, and history of chronic diseases. The second section consisted of 12 questions and assessed their level of knowledge about the following aspects of COVID-19:

basic information, clinical presentations, modes of transmission, measures to prevent transmission, and prevention and treatment strategies. Correct responses were assigned a score of one, whereas no and I don't know responses were assigned a score of zero. These scores were converted into percentages. Percentages ≥ 50% and < 50% were considered to be indicative of satisfactory and unsatisfactory levels of knowledge, respectively. The third section consisted of six questions, which assessed participant attitudes toward COVID-19. The participants were asked about possibility of COVID-19 to cause death, to be more risky in older adults and those with chronic diseases. Moreover, they were asked about importance of quarantine of infected individuals and preventive health measures and their trust that the health authorities will succeed in controlling the pandemic. The response options were agree, don't know, and disagree. The fourth section assessed the practice of measures that prevent transmission. It consisted of three questions, which assessed whether they had recently visited crowded places, had been using masks, and had been washing their hands frequently. The response options were yes and no. In order to troubleshoot the questionnaire on the ground of estimated time required for its completion, its quality, and possible difficulties during its filling, it was piloted on 30 participants from the target population, and then they were omitted from the data analysis.

Table 1. Sociodemographic characteristics of the study participants (n = 422).

Sociodemographic characteristic	n (%)
Age (years)	
18–30	123 (29.1)
31–50	164 (38.9)
51–60	105 (24.9)
> 60	30 (7.1)
Sex	
Male	124 (29.4)
Female	298 (70.6)
Marital status	
Married	327 (77.5)
Unmarried	95 (22.5)
Education level	
School	114 (27)
University	273 (64.7)
Postgraduate	35 (8.3)
Occupation	
Health professional	55 (13)
Non-health professional	367 (87)
Smoking status	
Smoker	37 (8.8)
Nonsmoker	385 (91.2)
Chronic diseases	
Yes	128 (30.8)
No	294 (69.7)

Statistical analysis

Statistical Package for the Social Sciences (version 21) was used to conduct data analysis. Categorical variables were examined by computing frequencies and percentages, and group differences in these variables were examined using the chi-squared test. When the expected value in one or more cells was less than five, Fisher's exact test was used. A p-value < 0.05 was considered to be statistically significant.

Ethical considerations

Ethical approval was obtained from the Local Committee of Bioethics of Jouf University, Saudi Arabia (approval no: 11-08/41). Online informed consent was obtained from all the participants. Participant responses were entered into a secure Excel spreadsheet prior to analysis. Data were collected anonymously and stored confidentially.

Results

The demographic characteristics and COVID-19-related KAPs of the 422 participants who completed the questionnaire were examined. Table 1 presents their sociodemographic characteristics. A majority of them were aged 31–50 years (38.9%, n = 164). Whereas 70.6% (n = 298) of them were women, 29.4% (n = 124) of them were men. With regard to marital status, 77.5% (n = 327) of them were married, and 22.5% (n = 95) of them were unmarried. Their educational levels were as follows: university graduates = 64.7% (n = 237), school graduates = 27% (n = 14), and postgraduates 8.3% (n = 35). Health professionals constituted 13% (n = 55) of the sample. Moreover, 8.8% (n = 37) of the participants were smokers, and 30.8% (n = 128) of them had chronic diseases.

Sixty-nine percent (n = 291) of participants had satisfactory level of knowledge about COVID-19 and 31% (n = 131) possessed unsatisfactory levels of knowledge. Their overall understanding of COVID-19 was adequate (Figure 1).

Table 2 details the relationship between participant demographic characteristics and their level of knowledge about COVID-19. There was a significant difference in knowledge about COVID-19 as a function of sex (p = 0.50), occupation (p = 0.012), and smoking status (p = 0.041).

Figure 1. Proportion of participants who possessed satisfactory and unsatisfactory levels of knowledge about the coronavirus disease pandemic (n = 422). It shows that 69% (n = 291) and 31% (n = 131) of the participants possessed satisfactory and unsatisfactory levels of knowledge about COVID-19, respectively. Their overall understanding of COVID-19 was adequate.

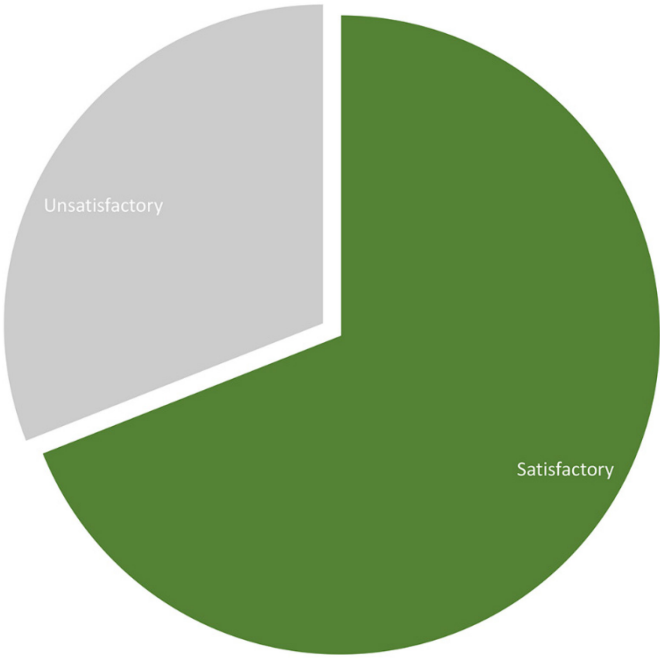

Figure 2. Sources from which the participants acquired knowledge about the coronavirus disease pandemic. (Note: The participants could select more than one option). It shows that the main sources from which they retrieved reliable information about COVID-19 were social media platforms (79.70%), followed by television (70.90%), the internet (60%), their relatives (38.10%), and newspapers (20.10%).

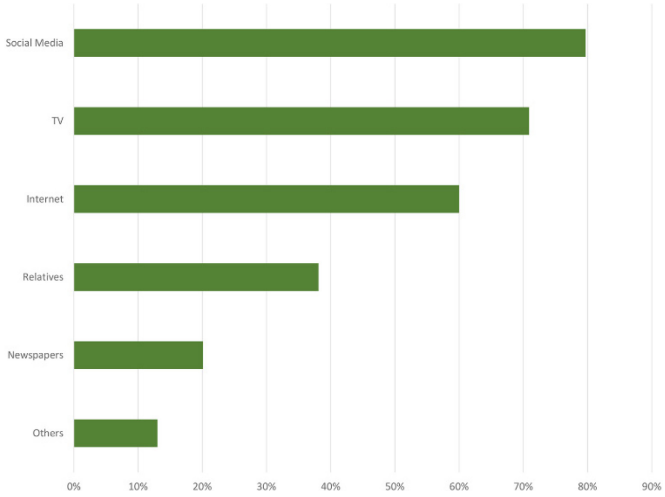

Table 2. Association between demographic characteristics and knowledge about coronavirus disease (n = 422).

Sociodemographic characteristic	Satisfactory level of knowledge n (%)	Unsatisfactory level of knowledge n (%)	P
Age (years)			
18–30	91 (74.0%)	32 (26.0%)	
31–50	117 (71.3%)	47 (28.7%)	0.142
51–60	65 (61.9%)	40 (38.1%)	
> 60	18 (60.0%)	12 (40.0%)	
Sex			
Male	94 (75.8%)	30 (24.2%)	0.050*
Female	197 (66.1%)	101 (33.9%)	
Marital status			
Married	219 (67.0%)	108 (33.0%)	0.102
Unmarried	72 (75.8%)	23 (24.2%)	
Education level			
School	75 (65.8%)	39 (34.2%)	
University	188 (68.9%)	85 (31.1%)	0.282
Postgraduate	28 (80.0%)	7 (20.0%)	
Occupation			
Health professional	46 (83.6%)	9 (16.4%)	0.012*
Non-health professional	245 (66.8%)	122 (33.2%)	
Smoking status			
Smoker	31 (83.8%)	6 (16.2%)	0.041*
Nonsmoker	260 (67.5%)	125 (32.5%)	
Chronic diseases			
Yes	88 (68.8%)	40 (31.3%0	0.952
No	203 (69.0%)	91 (31.0%)	

*P-values < 0.05 were considered to be significant.

Table 3. Attitudes toward COVID-19 among the participants (n = 422).

Item	Agree	Disagree	Don't know
COVID-19 can cause death.	273 (64.7%)	30 (7.1%)	119 (28.2%)
COVID-19 poses greater risks to older adults.	394 (93.4%)	7 (1.7%)	21 (5.0%)
COVID-19 poses greater risks to those with chronic diseases.	408 (96.7%)	2 (0.5%)	12 (2.8%)
COVID-19 will be successfully controlled.	285 (67.5%)	5 (1.2%)	132 (31.3%)
It is important to adopt preventive health measures.	412 (97.6%)	3 (0.7%)	7 (1.7%)
It is important to quarantine infected individuals.	414 (98.1%)	2 (0.5%)	6 (1.4%)

High levels of knowledge were more likely to be demonstrated by 18–30-year-old participants (74%), men (75.8%) (Significant sex difference: p = 0.05), unmarried participants (75.8%), those who held postgraduate degrees (80.0%), health professionals (83.6%) (Significant sex difference: p = 0.012), and smokers (83.8%) (Significant difference between smokers and nonsmokers: p = 0.041).

The main sources from which participants retrieved reliable information about COVID-19 were social media platforms (79.70%), followed by television (70.90%), the internet (60%), their relatives (38.10%), and newspapers (20.10%) (Figure 2).

Participants' attitudes toward COVID-19 are summarized in Table 3. Most participants agreed that COVID-19 could cause death (64.7%) and poses greater risks to older adults (93.4%) and those with chronic diseases (96.7%). Most participants (97.6%) agreed that preventive health measures are important (rates of reporting: disagree = 0.7% and I don't know = 1.7%). Further, 98.1% (n = 414) of them agreed that it is important to quarantine those who have contracted COVID-19 (rates of reporting: disagree = 0.5% and I don't know = 1.4%). Most participants believed that the pandemic will be successfully controlled (67.5%).

Table 4. Relationship between sociodemographic characteristics and the practice of protective measures (n = 422).

Sociodemographic characteristic	Practice 1: Avoiding crowded places		Practice 2: Mask wearing		Practice 3: Frequent handwashing	
	Yes	No	Yes	No	Yes	No
Age						
18–30	34 (27.6%)	89 (72.4%)	104 (84.6%)	19 (15.4%)	118 (95.9%)	5 (4.1%)*
31–50	53 (32.3%)	111 (67.7%)	147 (89.6%)	17 (10.4%)	154 (93.9%)	10 (6.1%)
51–60	40 (38.1%)	65 (61.9%)	94 (89.5%)	11 (10.5%)	97 (92.4%)	8 (7.6%)
> 60	11 (36.7%)	19 (63.3%)	25 (83.3%)	5 (16.7%)	24 (80.0%)	6 (20.0%)
Sex						
Male	29 (23.4%)	95 (76.6%)	100 (80.6%)	24 (19.4%)	118 (95.2%)	6 (4.8%)
Female	109 (36.6%)	189 (63.4%)*	270 (90.6%)	28 (99.4%)*	275 (92.3%)	23 (7.7%)*
Marital status						
Married	110 (33.6%)	217 (66.4%)	292 (89.3%)	35 (10.7%)	303 (92.7%)	24 (7.3%)
Unmarried	28 (29.5%)	67 (70.5%)	78 (82.1%)	17 (17.9%)	90 (94.7%)	5 (5.3%)
Education level						
School	33 (28.9%)	81 (71.1%)	96 (84.2%)	18 (15.8%)	109 (95.6%)	5 (4.4%)
University	92 (33.7%)	181 (66.3%)	241(88.3%)	32 (11.7%)	251 (91.9%)	22 (8.1%)
Postgraduate	13 (37.1%0	22 (62.9%)	33 (94.3%)	2 (5.7%)	33 (94.3%)	2 (5.7%)
Occupation						
Health professional	16 (29.1%)	39 (70.9%)	46 (83.6%)	9 (16.4%)	52 (94.5%)	3 (5.5%)
Non-health professional	122 (33.2%)	245 (66.8%)	324 (88.3%)	43 (11.7%)	341 (92.9%)	26 (7.1%)
Smoking status						
Smoker	8 (21.6%)	29 (78.4%)	26 (70.3%)	11 (29.7%)	35 (94.6%)	2 (5.4%)
Nonsmoker	130 (33.8%)	255 (66.2%)	344 (89.4%)	41(10.6%)**	358 (93.0%)	27 (7.0%)
Chronic diseases						
Yes	48 (37.5%)	80 (62.5%)	115 (89.8%)	13 (10.2%)	121 (94.5%0	7 (5.5%)
No	90 (30.6%)	204 (69.4%)	255(86.7%)	39 (13.3%)	272 (92.5%)	22 (7.5%)
Knowledge						
Satisfactory	71 (24.4%)	220 (75.6%)**	262(90.0%)	29(10.0%)*	282(96.9%)	9(3.1%)**
Unsatisfactory	67 (51.1%)	64 (48.9%)	108(82.4%)	23(17.6%)	111(84.7%)	20 (15.3%)

*p < 0.05, **p < 0.001.

Table 4 presents the association between participant demographic characteristics and the practice of preventive measures. A vast majority of 18–30-year-old (95.9%) participants reported that they had been washing their hands frequently. The rate of compliance was significantly higher within this age group. The female sex was significantly associated with frequent hand washing, mask wearing, and the avoidance of visits to crowded places ($p < 0.05$). A significantly higher number of nonsmokers reported wearing masks ($p < 0.001$).

There was a statistically significant ($p < 0.05$) association between satisfactory levels of knowledge and the practice of wearing masks. A strong statistically significant association emerged between satisfactory levels of knowledge and the adoption of preventive measures, i.e., visiting crowded places and frequent handwashing, ($p< 0.001$).

Discussion

The literature on COVID-19-related KAPs is constantly growing. KAPs related to a certain infectious disease are influenced by several factors, including its severity, fatality rate, and rate of spread. To date, no specific COVID-19 vaccine or antiviral drug has been approved [13]. Many antiviral and antimalarial drugs are currently being tested in clinical trials [14-16]. The complete pathogenesis of this fatal viral disease requires further investigation. Nevertheless, cough, fever, dyspnea, and pneumonia have been identified as the most common clinical symptoms of this disease [3].

To the best of our knowledge, this study is the first to have examined COVID-19-related KAPs among the residents of Al-Jouf region in Saudi Arabia. We examined the relationship between demographic characteristics and COVID-19-related KAPs. Health workers and public health policymakers can use these findings to identify the subgroups that are likely to benefit from COVID-19-related health education and awareness campaigns.

In this study, 69% (n = 291) of the participants possessed adequate levels of knowledge about COVID-19, especially its symptoms and the unavailability of specific antiviral therapies and vaccines. Their overall understanding of COVID-19 was satisfactory. This important finding may be attributable to the fact that health authorities, social media platforms, and television channels have been disseminating information about the gravity of this disease, especially after the WHO declared the COVID-19 situation a pandemic [2]. Furthermore, this trend is consistent with the WHO recommendations about how one should cope with the COVID-19 pandemic [17]. Indeed, many patients had already been diagnosed with COVID-19 in Saudi Arabia when we conducted this study and this supported the awareness campaigns to be more effective [18]. The present findings contradict those of past studies in which low levels of awareness about emerging infectious diseases were observed among Saudi participants [19].

Surprisingly, some participants incorrectly believed that taking antibiotics would protect them from COVID-19. This finding is indicative of poor awareness about COVID-19 prevention and treatment strategies. Therefore, awareness campaigns should address this misbelief to prevent the misuse of antibiotics, which can result in the emergence of multidrug-resistant organisms [20].

The participants largely reported optimistic attitudes toward COVID-19 and the adoption of appropriate COVID-19 prevention and management strategies. Most participants agreed that (a) COVID-19 can cause death and poses greater risks to older adults and those with chronic diseases, (b) it is important to adopt preventive health measures and quarantine infected patients, and (c) this fatal viral infection will be successfully controlled. Their positive attitudes were indicative of a satisfactory level of understanding about COVID-19 preventive measures, especially washing hands, using alcohol-based hand sanitizers, avoiding handshakes, wearing masks, and following respiratory etiquette when sneezing and coughing. These measures can prevent and control the transmission of several respiratory droplet-transmitted fatal infections such as COVID-19 [21-23].

A high percentage of the participants, especially female participants, reported that they washed their hands frequently, wore masks, and avoided going to crowded places. This finding may be attributable to the large amounts of information that were circulated within the community (including among the participants). Nevertheless, awareness campaigns are needed to minimize panic among the general public and prevent the misuse of these practices. Unfortunately, however, some participants reported that they had visited crowded places, did not wash their hands frequently, and did not wear masks when they left their homes. Failure to use protective measures against Covid-19 may cause transmission chain continuity and great problems to public health. Awareness campaigns should address these risky behaviors. The present findings are consistent with the results of a cross-sectional study on COVID-19-related KAPs that has been conducted in China [24].

Conclusions

Our findings suggest that the residents of Al-Jouf region in Saudi Arabia possess satisfactory levels of knowledge, hold optimistic attitudes, and have been practicing appropriate protective measures during the rapid rise period of the pandemic. In this study, there was an association between satisfactory levels of knowledge, optimistic attitudes, and the practice of appropriate preventive measures. This finding indicates that health education and awareness campaigns that aim to improve COVID-19-related knowledge will be effective in fostering optimistic attitudes and protective practices. The combined efforts of Saudi health authorities and residents will help Saudi Arabia win its battle against the COVID-19 pandemic.

The present findings underscore the need for more efforts to educate the general people about COVID-19 through social media platforms and television channels, which were the main sources from which our participants acquired information about COVID-19. Providing reliable information about COVID-19 to large groups of individuals will correct misbeliefs. Indeed, in this study, a few participants believed that smoking is not dangerous, it is not important to quarantine infected persons, antibiotics will protect them from contracting COVID-19, and preventive health measures are not important. These individuals may serve as dangerous sources of infection and increase COVID-19 morbidity and mortality rates. Therefore, there is an urgent need for additional health education and awareness campaigns that target such individuals. The present findings can be used to design and conduct additional research studies that focus on improving the containment of COVID-19.

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