



A Cross-Sectional Survey of Knowledge, Attitude, and Practices Regarding Influenza Vaccination Among Jordanians Aged 18-64 Years with Chronic Diseases

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ABSTRACT

Objectives: Influenza is a frequent infectious disease that can be prevented and is associated with significant mortality and morbidity. The most economical way to prevent influenza is through vaccination, although this method is not widely used. This study aimed to assess the seasonal influenza vaccination rates and the knowledge and attitudes of Jordanian adults with chronic illnesses toward the influenza vaccine.

Materials and Methods: A cross-sectional design was employed. A 26-item online survey was used to gather data about patients' knowledge of and attitudes toward the influenza vaccine as well as their status as influenza vaccine recipients.

Results: A total of 19% of the 564 study participants received an influenza vaccination. Most (81%) of individuals reported inconsistent vaccination uptake. The most important factor affecting vaccination is the belief that the flu is not a threat (39%) and that their doctors did not advise them about the vaccination (32%). Participants with no health insurance and those with public insurance had a lower level of vaccination than those with private insurance ($p=0.008$).

Conclusion: The adult population of Jordan with chronic diseases has subpar immunization rates. What is also revealed is a blatant misunderstanding about the value of routine influenza vaccination. These findings emphasize how urgently the public needs to be made aware of the effectiveness of the influenza vaccine.

Key words: Influenza, vaccination, chronic disease, Jordan

INTRODUCTION

Influenza is a contagious viral respiratory infection; up to 5 million people worldwide suffer from the severe influenza-related illness each year, and 645,000 people die as a result.^{1,2} The seasonal influenza vaccine is the most efficient method of preventing infection and lowering influenza-related morbidity,

death, and hospitalization, as it is with most infectious diseases.³⁻⁵ For instance, it has been demonstrated that immunization in the elderly reduces the danger of death from influenza-related problems by 80%.⁶

To boost the proportion of individuals protected from the flu, the World Health Organization (WHO) and the United States Centers

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for Disease Control and Prevention (CDC) recommend that anyone aged 6 months and older obtain influenza vaccination. To reduce the risk of thoughtful consequences, those in high-risk groups must receive a once-a-year influenza vaccination.¹ High-risk patients include expectant mothers, children, the elderly, people with chronic heart or pulmonary diseases, and people with immunosuppressed situations.^{1,7,8} Despite abundant evidence of the benefits of the influenza vaccine, only a minimal proportion of people follow the provided advice.^{9,10} Based on data from several locally representative surveys, the CDC makes an educated projection of the yearly influenza vaccination exposure in the United States. Nearly half of the Americans had yet to receive the advised influenza vaccination as of the beginning of November for the 2020-2021 flu season.¹¹ In December 2019, a novel virus that caused coronavirus disease-19 (COVID-19), is known as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).^{12,13} SARS-CoV-2, which spread quickly and was deemed a pandemic on March 11, 2020.¹⁴ The COVID-19 pandemic is currently a significant global community health issue. More than 500,000 cases and more than 8,000 fatalities have occurred in Jordan.¹⁵

Seasonal influenza viruses and COVID-19 exhibit comparable illness symptoms.¹⁶ Two viruses generate respiratory signs, which can indicate a variety of disorders ranging from asymptomatic to fatal. Acute respiratory distress syndrome, multi-organ failure, pneumonia, and even mortality are devastating illnesses that certain COVID-19 patients may get.¹⁷ Elderly patients and those with comorbid conditions, particularly those with diabetes, cardiovascular diseases, and chronic pulmonary diseases, had higher death rates and a higher hazard to emerging series problems.^{18,19}

A number of studies have evaluated the relationship between the coverage rate of seasonal vaccination against influenza and COVID-19 mortality.²⁰⁻²² The rationale for the significance of raising the exposure rate of influenza vaccine has appeared as a result of the resemblance in signs and symptoms of two infectious diseases and the strong evidence of reduction of COVID-19 disease mortality rate in influenza-vaccinated persons.²³ The burden that seasonal influenza infections place on medical institutions could be reduced by increasing the use of the influenza vaccine, which could also lower COVID-19 death rates.^{23,24}

Most Jordanians' insurance policies do not cover influenza vaccination, and the country's mandatory immunization program excludes it.^{25,26} Prior calculations of the influenza vaccination rate in Jordan revealed that the percentage rate of immunization is much below ideal (9.9% to 27.5%).²⁵

It is always important to have up-to-date information about Jordanians' awareness of, attitudes toward, and use of the influenza vaccine. Therefore, determining vaccination exposure rates and comprehending the views of Jordanians with chronic illnesses on the influenza vaccine is a crucial first step in developing methods to increase uptake. Because patients with chronic illnesses are more likely to develop influenza

complications, the goal of this study was to assess the seasonal influenza vaccination uptake among Jordanians with chronic diseases and identify the factors influencing such behavior. In addition, it assesses the same patients' knowledge about and attitudes toward the seasonal flu vaccine.

MATERIALS AND METHODS

Study design

A cross-sectional plan was established to study the rate of influenza vaccination among the Jordanian population who suffer from chronic diseases aged 18-64 years, whose attitudes and knowledge regarding the influenza vaccine were evaluated. The survey was conducted among all target patients at the beginning of the influenza season.

Sample

The participants for this study were the patients with chronic diseases. The sample was recruited using a non-probability convenience sampling procedure through an electronic survey. Patients were considered suitable for this study, if they had chronic diseases, were 18-65 years old, could read and comprehend survey questions in Arabic, and agreed to participate. The sample size was determined using power analysis, yielding approximately 400 participants. To be more conservative and compensate for the non-response rate, the authors collected 564 respondents.

Ethical considerations

Ethical approval was obtained from Al-Balqa Applied University's Institutional Review (approval no: 26/3/2/213). To protect the persons' anonymity, no personal data were collected. All participants knew that the participation was completely voluntary, and they had the option to withdraw at any time without facing potential risks. All patient details were saved in electronic versions on the corresponding computer.

Instrument

Based on the current literature, a 26-point questionnaire was developed. The questionnaire was used to document influenza vaccination history and medical status. Knowledge and attitudes concerning the vaccine were also gathered among Jordanians aged 18-64 who suffer from chronic diseases. The questionnaire consisted of six sections: socio-demographics (gender, age, educational level, health insurance, smoking, and physical activity), medical history (frequency of medical visits, medical conditions, and the number of medicinal drugs taken daily), vaccination status (received or did not receive the influenza vaccine), and general knowledge about the influenza vaccine. As binary outcomes, awareness variables were evaluated. Willingness to be vaccinated, perceived hurdles to vaccination, and vaccine information sources (physician, pharmacist, family and friends, media, organizational foundations) were also described. A test study on 20 candidates was conducted to examine the clarity of the survey questions. Because of the volunteers' feedback, minor changes were made to the survey questions' language and design.

Statistical Analysis

To achieve the objectives of the study, data were entered and analyzed using the SPSS statistical program, and descriptive statistics were used to estimate arithmetic averages, frequencies, and percentages of the demographic variables of the sample, such as age, gender, and education level, as well as for the variables describing the social habits of the sample, such as smoking, exercise, and statistical comparisons chi-square tests: to detect the statistical significance of the correlations, the Pearson correlation coefficient and a multivariate logistic regression were used to predict the variables associated with the regular use of influenza vaccine among the study sample as dependent variables with independent variables. The study dealt with it, and the statistical significance value (α : 0.05) or less was adopted so that the correlations could be considered statistically significant.

RESULTS

Sample

Five hundred forty six respondents completed the questionnaire. Among the 564 study participants, (35%, n: 199) were males vs. females (65%, n: 365). Almost all participants had university-grade education (46.3%, n: 261), and 31.6% (n: 178) had a diploma degree, while 125 (22.2%) had low levels of education. More than two-thirds of the participants were not smokers (64.2%, n: 362), and the remaining were either not smokers (28.9, n: 163) or previously smokers (6.9%, n: 39). In Table 1, the socio-demographic information of the participants is described.

Rates of influenza vaccine uptake

In this survey, the total 2018-2019 influenza vaccination rate for 2018-2019 was 19%. Most participants (81%) reported irregular uptake of the vaccine. Most of the respondents did not report getting immunizations against influenza. For example, 86% of patients with cardiovascular diseases, 85% with diabetes, 71% with respiratory diseases, and 76% of patients on chronic steroid management did not receive the annual influenza vaccine.

Association of patients' socio-demographic, lifestyle features, and annual influenza vaccine uptakes

The correlations that associate socio-demographic and lifestyle features and regular uptake of influenza vaccine are summarized in Table 2. There is no significant effect of socio-demographic and lifestyle characteristics on the vaccination rate. However, patients without health insurance and those with public health insurance had a lower level of vaccination compared with private ones ($p= 0.008$). Table 2 displays the socio-demographic and lifestyle features and influenza vaccination.

Relationship between chronic disease type and influenza vaccination

When detecting the rates of vaccination uptake among participants with definite comorbidities, a significant association was observed between chronic disease conditions and influenza vaccination. Subjects who suffer from respiratory diseases were found to have nearly a two-fold rate of periodic influenza vaccination compared to people without this situation (50% vs. 26.3%, $p= 0.001$), as shown in Table 3.

Knowledge, attitude and practice of influenza vaccination

Table 4 shows associations between knowledge, attitude, and practice of influenza vaccination. Nine of ten factors are significantly associated with vaccination. Better knowledge about the risk of influenza is linked with a higher regular vaccination rate ($p= 0.01$). When evaluating the reason for refusing to take the vaccine, we found that most unvaccinated participants did not feel a risk (39%) or were not recommended by their physician (32%). When evaluating the vaccine source of information, we found that the physicians and the pharmacists are accompanied by higher regular vaccination rates. The government was shown to play the lowest role in publicizing information on the influenza vaccine. On the other hand, the majority of participants who were not vaccinated did not have information about the vaccine (23%). Table 4 presents the knowledge, attitude, and practice of influenza vaccination.

Multivariate analysis and correlations of regular influenza vaccination

The findings presented in Table 5 displayed the variance values expressed by (R) and the explanatory variance expressed by (R square) in the predicted dependent variable (the use of influenza vaccine), note that all¹⁷ variables were entered. The regression

Table 1. Demographic and clinical characteristics of respondents (n: 564)

Variable	Frequency (n)	Percentage (%)
Gender		
Male	199	35%
Female	365	65%
Age (years)		
18-30	182	32.3%
31-40	98	17.4%
41-50	120	21.3%
51-64	164	29.1%
Educational level		
High school or less	125	22.2%
Diploma	178	31.6%
University level	180	31.9%
Postgraduate	81	14.4%
Smoking status		
Non-smoker	362	64.2%
Smoker	163	28.9%
Previously smoker	39	6.9%
Exercise		
Never	335	59.4%
Less than twice/week	139	24.6%
2-3 times/week	44	7.8%
More than 3 times/week	46	8.2%

Table 2. Sociodemographic, lifestyle characteristics, and influenza vaccination

	Characteristic	Regular influenza virus vaccination n: 108 (19%)	Irregular influenza virus vaccination n: 456 (81%)	p value
Gender	Male	42 (39%)	157 (34%)	0.223
	Female	66 (61%)	299 (66%)	
Age	18-30 years	41 (38%)	141 (31%)	0.328
	31-40 years	20 (19%)	78 (17%)	
	41-50 years	17 (16%)	103 (23%)	
	51-64 years	30 (28%)	134 (29%)	
Education level	High school or less	26 (24%)	99 (22%)	0.365
	Diploma	28 (26%)	150 (33%)	
	University level	34 (31%)	146 (32%)	
	Postgraduate	20 (19%)	61 (13%)	
Smoking status	Non-smoker	69 (64%)	293 (64%)	0.121
	Smoker	36 (33%)	127 (28%)	
	Previously smoker	3 (3%)	36 (8%)	
Exercise	Never	67 (62%)	268 (59%)	0.296
	Less than twice/week	29 (27%)	110 (24%)	
	2-3 times/week	8 (7%)	36 (8%)	
	More than 3 times/week	4 (4%)	42 (9%)	
Medical visit	Routinely	34 (31%)	122 (27%)	0.378
	When needed	64 (60%)	302 (66%)	
	Once/year	10 (9%)	32 (7%)	

Table 3. Chronic disease conditions and influenza vaccination

Characteristic		Regular influenza virus vaccination n: 108 (19%)	Irregular influenza virus vaccination n: 456 (81%)	p value
Heart diseases	Yes	18 (14%)	113 (86%)	0.01*
	No	90 (21%)	343 (77%)	
Respiratory disease	Yes	30 (29%)	74 (71%)	0.03*
	No	78 (17%)	382 (83%)	
Gastrointestinal disease	Yes	2 (11%)	16 (89%)	0.00*
	No	106 (19%)	440 (81%)	
Diabetes mellitus	Yes	25 (15%)	144 (85%)	0.01*
	No	83 (21%)	312 (79%)	
Disease requiring steroids treatment	Yes	8 (24%)	25 (76%)	0.03*
	No	100 (19%)	431 (81%)	

*Significant at ≤ 0.05

analysis model and the (Stepwise) method of analysis were chosen, which is the most appropriate method to determine the factors that explain the most significant possible amount of

variation in the dependent variable. (Doctor's advice), this factor alone explained (0.161) of the variance, (belief that the vaccine is safe) with the previous factor (doctor's advice) explained

Table 4. Knowledge, attitude, and practice of influenza vaccination

Characteristic		Regular influenza virus vaccination n: 108 (19%)	Irregular influenza virus vaccination n: 456 (81%)	p value
What is the reason to refuse taking the vaccine?	The physician is not recommended	37 (34%)	148 (32%)	0.00*
	I don't feel I have a risk	26 (24%)	180 (39%)	
	Vaccine is not effective	11 (10%)	25 (5%)	
	Vaccine is expensive	19 (18%)	21 (5%)	
	Vaccine is not safe	15 (14%)	82 (18%)	
The vaccine should be taken at a specific time	Yes	71 (66%)	173 (38%)	0.00*
	No	5 (5%)	42 (9%)	
	I don't know	32 (30%)	241 (53%)	
Have medical insurance	Yes	94 (87%)	350 (77%)	0.01*
	No	14 (13%)	106 (23%)	
Your medical insurance covers the price of the influenza vaccine	Yes	37 (34%)	104 (23%)	0.01*
	No	48 (44%)	196 (43%)	
	I don't know	23 (21%)	156 (34%)	
Aware of vaccination needs/ availability	Yes	81 (75%)	200 (44%)	0.00*
	No	14 (13%)	85 (19%)	
	I don't know	13 (12%)	171 (38%)	
Do you think, presence of chronic disease increases the risk of influenza?	Yes	76 (70%)	268 (59%)	0.01*
	No	17 (16%)	61 (13%)	
	I don't know	15 (14%)	127 (28%)	
Your physician advises you about vaccine	Yes	70 (65%)	87 (19%)	0.00*
	No	38 (35%)	369 (81%)	
Source of information about influenza vaccine	Don't have information	10 (9%)	104 (23%)	0.00*
	Family	13 (12%)	56 (12%)	
	Pharmacist	19 (18%)	69 (15%)	
	Physician	42 (39%)	63 (14%)	
	Government	10 (9%)	59 (13%)	
	Media	14 (13%)	105 (23%)	
Are you ready to take vaccine if we provide you?	Yes	96 (89%)	227 (50%)	0.00*
	No	12 (11%)	229 (50%)	
What are the reasons to refused to take vaccine in case its available?	Not safe	25 (23%)	76 (17%)	0.15
	I think I don't need it	46 (43%)	237 (52%)	
	Not recommended by physician	37 (34%)	143 (31%)	

*Significant at ≤ 0.05

(0.200) of the variance (readiness to take the vaccine if you are provided with it in the next times). It was explained with the previous two factors (doctor's advice and belief that the vaccine is safe) (0.221) from the variance in the dependent variable.

The remaining variables were excluded from the regression equation because they were not good predictors and did not explain significant values of the variance.

Table 5. Multivariate analysis: correlates of regular influenza vaccination

The predictor	R	R square	Adjusted R square	Standard error of prediction	p value
Physician advise	0.402	0.161	0.160	0.361	0.00*
+ Physician advise Thinks the vaccine is safe	0.448	0.200	0.198	0.353	0.00*
Physician advise + thinks the vaccine is safe + readiness to take vaccine if we supplied you next time	0.470	0.221	0.217	0.348	0.00*

*Significant at ≤ 0.05

DISCUSSION

Diverse opinions and attitudes are present among Jordanian adults about influenza vaccination. Our study aimed to measure the knowledge, attitude, and practice of adults in Jordan who suffer from chronic diseases toward influenza vaccine and the readiness of adults to take influenza vaccine. Results of this analysis are created for a specific sample of the Jordanian population based on the sample size determined to be satisfactory by statistical analysis. The findings of this study may help with broad immunization tactics in the future.

Rates of influenza vaccine uptake

Our findings indicated a 19% overall vaccination rate. Because our participants completed the questionnaire on their own, the reported prevalence of vaccination among Jordanian adult subjects may be overstated. A major problem for worldwide community health is low immunization rates. Continuous research is being conducted across nations to project and apply useful treatments for raising the rates of influenza vaccinations. Each strategy needed to be more creative to overcome this problem, from patient reminders and memory systems to posters in doctor clinics tracking vaccination success.²⁴ Indeed, according to the CDC-sponsored National Internet Flu Survey, 48.4% of adults in the United States will be immunized against the flu during the 2019-2020 influenza season.¹¹ The recommended targets for influenza vaccination in European nations are likewise difficult to meet.²⁷ In high-risk groups, low vaccination coverage is especially alarming. Patients with chronic diseases, *e.g.* cardiovascular disease, cancer, or diabetes, or immunosuppressed states had inadequate immunization rates in our study, which ranged from 14% to 29%. According to the European CDC, immunization rates for older adults and people with chronic conditions should reach a target of 75% coverage by the 2014-15 winter season.²⁷

Factors affecting the acceptance of seasonal influenza vaccines

Future immunization campaigns must focus especially on populations with low vaccine acceptance. Therefore, it is crucial to identify people, who refuse to receive the vaccine or are against it. The availability of vaccinations is a significant contributing factor. In fact, the majority of unvaccinated patients believed the vaccination was pricey and did not have medical insurance for the flu shot.

Analysis of patients with chronic illnesses revealed that a statistically significant fraction of them were immunized against

the influenza virus, although a significant number of patients were still unvaccinated. Given that influenza vaccination has been shown to decrease hospitalization, morbidity, and death in both the elderly and chronically ill patients, these studies emphasize the need to boost immunization energies in the individual, who suffers from chronic disease.³⁻⁵ Again, immunization has been demonstrated to reduce mortality from influenza-related complications and pneumococcal illnesses in the elderly by 50% and 80%, respectively.⁶ Additionally, it has been demonstrated that routine vaccinations given to diabetic children and adults reduce hospital admissions due to diabetes by about 79%.²⁸

Knowledge and attitude toward vaccination

Despite a high level of education among the responders, most did not receive an influenza vaccination. Vaccinations were administered to 19% of the subjects. These results are consistent with those of a previous study conducted in Jordan, which showed that 20.4% of the subjects had ever received the vaccine.²⁹ The study by Zalloum et al.³⁰ revealed that the COVID-19 pandemic did not boost Jordanians' acceptance of vaccination.

According to the study's findings, 39% of participants do not think influenza is a serious problem, while the remaining participants have concerns about the vaccine's safety. These results are consistent with a recent survey conducted in Jordan, which discovered that 22%, 19.4%, and 18.9% of respondents, respectively, did not consider influenza to be a threat, had doubts about the vaccine's effectiveness, and had misgivings about the vaccine's safety.²⁹ Similar hurdles have been seen in many places throughout the world; for instance, in the United States, one study found that worries about the safety and effectiveness of the influenza vaccine were the most often cited reasons for vaccination refusal.³¹ Additional research revealed justifications for vaccine refusal, including concerns about vaccine-related infections, doubts about its effectiveness, and conviction that the vaccine is unnecessary. In the UK, where safety concerns and fear of side effects were the biggest obstacles to getting the vaccine among competent nurses, similar results were also attained in an earlier study.³²

Surprisingly, most individuals do not perceive influenza as a threat. This belief is risky because there is a greater chance of infection, especially from aggressive influenza viruses.^{33,34} Although most participants were not yet ready for vaccination, they generally had respectable opinions regarding the value

of becoming vaccinated against influenza. This is a key notion since it would be conceivable to encourage them to receive the influenza vaccine to raise Jordan's coverage rate. Because there is a correlation between influenza vaccination rates and influenza mortality rates, encouraging these individuals to get the vaccine could help reduce influenza mortality in high-risk patients.^{10,22,23,35} In Italy, a study demonstrated that general practitioners are the most reliable source of information on the yearly influenza vaccination. The current study results display that pharmacists and doctors play a poor role in providing patients with vaccination information. As a result, campaigns should encourage pharmacists and doctors to play an important part in spreading the word about the value of influenza vaccination, particularly considering the COVID-19 pandemic. In addition, the government should make a concerted effort to direct citizens to sources of information about influenza vaccines and emphasize the importance of doctors and pharmacists in educating the public about the vaccine. Campaigns on media to provide the public with information related to the importance of the influenza vaccine are crucial.

Awareness of the influenza vaccine is not sufficient; 18% of unvaccinated participants think that the vaccine is unsafe. Consequently, there should be a harder work to be done to improve awareness and clarify the picture about the safety and efficacy of influenza vaccine. Social media is a platform where portion of people acquire vaccine information. Owing to the inadequate roles played by pharmacists and doctors, this is a genuine reason why some patients experience anxiety after receiving vaccinations. In addition, health care professionals play a very small part in informing the public about the advantages of receiving an influenza vaccination. Physicians in Italy are the most reliable source of information regarding influenza vaccination, in contrast to the situation in Jordan.

The significance of pharmacists' and doctors' roles in educating the public about the value of the influenza vaccine should be emphasized. Furthermore, because Jordan has no national influenza vaccination programs, it is advised to create a financed government program for influenza vaccines.

Source of vaccine information

The primary sources of vaccination information for all study participants were their doctors and pharmacies. This observation emphasizes the importance of healthcare workers in encouraging and reinforcing vaccination faithfulness. Other studies found that healthcare practitioners' instructions for routine immunization were favorable predictors of adherence.^{29,36} As a result, physicians, pharmacists, and other healthcare workers are being asked to establish their understanding of the present immunization procedures and recommendations. Surprisingly, the government's function as a foundation of information was discovered to be minor in society.

Jordan's health ministry should be urged to teach the people the value of vaccination and to remove obstacles to vaccine access. Accepting the influenza vaccine as part of the countrywide immunization program, creating awareness operations, and assigning general finances to support it are critical stages.

Study limitations

Our study has interesting results; however, it may have certain limitations. Contributors self-reported their data as in all patient-directed surveys, and vaccination statuses and awareness criteria were scored using binary outcomes. The time of the study may have also influenced the outcomes, as subjects may have been more aware of the importance of the influenza vaccine following a coronavirus attack and during the winter. The study sample was drawn from social media, which may have introduced bias into excluding persons, who have difficulty using electronic devices. Despite the limitations highlighted, the most essential strength of our study is that it was oriented to general adult populations suffering from chronic diseases throughout the kingdom and reported on their periodic vaccination knowledge, attitudes, and practices.

CONCLUSION

To the best of our knowledge, the current survey is the first to document immunization rates between a specified population of Jordanian adults with chronic illnesses. The immunization rates for seasonal flu were relatively low. Chronic disease patients receive subpar vaccinations. The vaccine was considered unnecessary, which is the main obstacle to vaccination abstinence. The recent findings thus highlight the urgent need to increase public awareness of the effectiveness and advantages of seasonal influenza vaccination in Jordan. Enhancing immunization possibilities requires regular interaction with medical professionals. In addition, it is advised that governmental entities and healthcare professionals work together to enhance immunization practices through professional and public awareness initiatives.

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Ethics

Ethics Committee Approval: Ethical approval was obtained from Al-Balqa Applied University's Institutional Review (approval date: 26/3/2/213).

Informed Consent: Participants provided electronic informed consent to participate in the study.

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: O.A.B., Design: O.A.B, I.A.B., Data Collection or Processing: O.A.B., E.G., O.A-F., M.A., F.A-T, R.B., Analysis or Interpretation: O.A.B, I.A.B., R.B, F.A-T, M.A., Literature Search: O.A.B, I.A.B., E.G., Writing: O.A.B., I.B, O.A-F.

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