



Research article

Attitudes toward COVID-19 vaccination among urogynecology patients^{☆, ☆ ☆}Sean Spector^{a, *}, Shanaya Shah^b, Muhammad Haseeb ul Rasool^a, Elizabeth Hilt^b, Howard Goldstein^c, Jason Meade^d, Electra Korn^e, Lioudmila Lipetskaia^{a, b}^a Department of Obstetrics and Gynecology, Cooper University Healthcare, Camden, NJ, USA^b Cooper Medical School of Rowan University, Camden, NJ, USA^c Center for Urogynecology and Pelvic Surgery, Christiana Care Health System, Newark, DE, USA^d Urogynecology Specialty Center, Fresno, CA, USA^e Mount Sinai South Nassau, Oceanside, NY, USA

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ABSTRACT

Objective: Urogynecology patients skew older and often require intimate exams to treat non-life-threatening conditions, thus making care particularly susceptible to the effects of COVID-19. We aim to understand COVID-19 vaccination attitudes amongst urogynecology patients during the pandemic, which has adversely affected healthcare delivery, to identify measures that can be undertaken to improve care going forward.

Study design: Cross-sectional surveys of urogynecology patients were conducted in three different states (Delaware, New Jersey, and Pennsylvania) between March and August 2021. Demographics, vaccination status, and COVID-19 attitudes were analyzed. Chi-square tests investigated group differences between vaccine-hesitant and unhesitant subjects.

Results: Out of 158 surveys, eighty-three percent of respondents were vaccinated or planning to get vaccinated. Older age and regular flu vaccination predicted COVID-19 vaccination. Ninety-three percent of subjects were comfortable attending in-person visits. However, vaccine-hesitant individuals were less comfortable attending in-person and were significantly less likely to be comforted by clinic interventions, such as masking. Hesitant and unhesitant groups trusted doctors or medical professionals most for their source of COVID-19 information.

Conclusions: Urogynecology patients mirror the general older population's COVID-19 vaccination attitudes, with distinct differences between hesitant and unhesitant groups. Vaccine-hesitant subjects appear less comfortable coming to in-person visits and less comforted by possible interventions, posing a difficult obstacle for clinics to overcome. High levels of patient trust suggest healthcare providers can play a crucial role in encouraging COVID-19 vaccination and combating misinformation.

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1. Introduction

Over the last 24 months, multiple measures have been implemented to decrease the spread of COVID-19, including lockdowns, social distancing, mask mandates, and vaccines [1]. In-person visits to primary care and specialty offices dropped by almost 60 % at the start of the pandemic [2], as patients weighed the risks of contracting COVID-19 against the risk of delaying treatment [3]. Though many specialties utilized telemedicine early on in the pandemic, this was a particularly undesirable option for Obstetrics and Gynecology patients [4]. Urogynecology care often requires pelvic exams and treats many non-life-threatening conditions [5]. Furthermore, many urogynecology patients are females aged 65 and older [6]. These aspects may make urogynecology care and patients particularly susceptible to the effects of COVID-19. At the time of the survey, there were no published articles addressing the urogynecology population.

Despite multiple vaccines becoming available, vaccine adoption in the United States has not been as swift as in other comparable countries and has stalled in recent months [7]. In part, this is due to the differences in accessibility to the vaccine in the US, which was difficult to obtain in clinics and outpatient settings. Vaccines were initially restricted by age and occupation but were widely available by the time our study was conducted. High rates of vaccination hesitancy have been linked to easily-accessible conspiracy theories and a lack of public awareness regarding efficacy [8]. In the eight months between March and October 2020, vaccine acceptance saw an alarming drop from >70 % to less than 50 % amongst adults eligible to receive the vaccine [9]. The skepticism is not unique to the unvaccinated, as many fully vaccinated people have concerns about the long-term effects and the vaccine's ability to protect them against new viral variants [10]. COVID-19 is speculated to become an endemic disease with increasing population-based immunity, thus emphasizing the importance of vaccination uptake and developing and implementing more permanent safety measures to increase patient comfort while receiving in-person care [11].

We wanted to assess the perspectives of urogynecology patients towards this public health crisis. For other vaccines, such as the influenza vaccine, older adults have higher rates of uptake [12]. This pattern has not been shown in COVID-19 vaccination rates [13]. Similar to the general US population, we hypothesize that urogynecology patients will be dichotomous in their attitudes towards the COVID-19 vaccine. Our primary objective was to identify demographic and baseline differences between patients who are either hesitant or unhesitant toward vaccination. Our secondary objectives were to understand the origin of such differences, how they influence in-clinic care, and identify potential strategies to increase vaccine uptake and reduce concerns about the risks of receiving in-clinic care.

2. Materials and methods

We performed a cross-sectional survey of urogynecology patients. The survey received an exemption from the institutional review boards of our hospitals. Surveys were conducted in two ways; over the phone, which involved the investigators calling subjects, and via paper surveys upon presentation to clinic appointments. Surveys were conducted in English and contained 20 items with multiple sub-items.

Participants were recruited from three urogynecology clinics across three U.S. States: two academic centers in New Jersey and Delaware and one private clinic in California. In March of 2021, investigators began calling patients of the New Jersey site from a roster of completed clinical visits in 2018. The urogynecology clinics in Delaware and California were added to improve generalizability. Investigators offered paper surveys at all three sites between July 2021 and August 2021. Subjects were eligible if they spoke English and were patients of a urogynecology clinic at one of the three sites. There were no other inclusion or exclusion criteria. This data from the initial round of vaccines, before any booster dose authorization, gives insight into the original attitudes of patients without the influence of additional COVID-19 information fatigue. In the United States, approximately 15 % of individuals are hesitant to COVID-19 vaccination [14]. Therefore, a sample size of approximately 200 patients would be necessary to obtain survey responses from 30 vaccine-hesitant individuals, allowing for a more robust statistical analysis.

The survey included two main sections: Demographics and COVID-19. See Appendix A to view the survey. The Demographics section assessed baseline information, including patient age, race, ethnicity, education, employment, the primary reason for urogynecology care, and a self-rating of overall health.

The COVID-19 section assessed COVID 19 vaccination status, opinion towards the vaccination, and flu vaccination history. Patients were also asked whether they had contracted COVID-19 and their degree of worry about themselves or their family member getting sick from COVID-19. Impact on care was assessed by asking patients whether they felt their medical or urogynecology care quality decreased and whether they had postponed or canceled office visits or surgery due to the pandemic. Subjects were also asked about their level of comfort attending in-person visits, their willingness to participate in telemedicine, and their opinions regarding interventions the clinic could implement to increase their comfort. Finally, the survey assessed sources of COVID-19 information and which sources were most trusted.

In order to meet reasonable standards for Chi-square testing, a count of at least five subjects in greater than eighty percent of cells in the Chi-square table is recommended [15]. To accommodate this guideline, categories that fell below the minimum cell count standards were transformed into binary outcomes as appropriate (see Appendix B).

2.1. Statistical analyses

Survey data was analyzed with SPSS (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp). Eighty-eight percent of all survey items were completed; missing items were treated as random for analysis. See Appendix C for

missing data. Descriptive analyses were carried out for the entire survey population. Subjects who were vaccinated or planning to get vaccinated were categorized as unhesitant to vaccination. Subjects who were not vaccinated and were unsure or not planning to get vaccinated were categorized as hesitant to vaccination. Chi-square analysis was carried out to identify and explore trends in differences between the unhesitant and hesitant groups.

3. Results

One hundred and fifty-eight surveys were completed across the three locations: New Jersey $N = 84$ (62 phone and 22 paper), Delaware $N = 23$ paper, and California 3 $N = 51$ paper. One hundred and thirty-two (83 %) respondents were categorized as unhesitant, with 123 having already been vaccinated and a further nine reporting they were planning to get vaccinated. Twenty-five (16 %) respondents were categorized as hesitant, with 17 reporting that they were not planning to get vaccinated and eight unsure. Twenty-one (14 %) respondents reported having received a previous diagnosis of a COVID-19 infection; none reported hospitalization. There was no significant difference in the proportion of hesitant and unhesitant respondents across the three clinical sites.

Baseline demographics revealed that respondents had a median age range of 60–69 years old. Thirteen (8 %) were Black or African American, 125 respondents (77 %) were White, and twenty-six (16 %) were Hispanic or Latino. Regarding education and job status, 110 (71 %) had completed some college or greater, and 71 (46 %) were currently retired. A substantial majority, 126 (81 %), reported getting the flu shot every year or most years, and 122 (78.8 %) considered themselves in good health. See Appendix D for complete demographic data.

Table 1 presents the findings from the initial Chi-square analysis. The results showed that patients 60 years or older were significantly more likely to be unhesitant towards vaccines compared to younger subjects, $X^2(1, N = 156) = 4.312, p = 0.038$. In addition, those who reported good overall health were significantly more likely to be unhesitant towards vaccination than patients who reported poor overall health, $X^2(1, N = 155) = 6.227, p = 0.013$. Notably, unhesitant patients were significantly more likely to get the flu shot every year or most years than hesitant patients, $X^2(1, N = 155) = 42.941, p < 0.001$. No significant difference in education level was found between hesitant and unhesitant subjects.

Table 2 compares hesitant and unhesitant patient responses to the COVID-19 survey questions. Most notably, 143 (93.5 %) respondents said they were comfortable attending in-person visits. The vaccine unhesitant group was significantly more comfortable attending in-person visits than the hesitant group, $X^2(1, N = 153) = 15.89, p < 0.001$. More than two-thirds, 98 (71 %), reported that they would be at least moderately likely to attend a telemedicine visit.

Investigators explored possible reasons for vaccine hesitancy. Fig. 1 shows the percentage of subjects across hesitant and unhesitant groups that agreed with a series of potential vaccine hesitancy statements. Responding that a statement was a “Minor Reason” or “Major Reason” to avoid vaccination was considered agreement. Across all statements, the hesitant subjects were more likely to agree (all p values < 0.05).

Investigators explored possible interventions to increase in-person patient comfort. Fig. 2 shows the percentage of subjects across hesitant and unhesitant groups who felt the clinical intervention would provide “Major Comfort” or “Minor Comfort” compared to those who reported “No Impact” on their level of comfort. For all interventions, the unhesitant group was significantly more likely to be comforted (all p values < 0.05).

To further our understanding of factors influencing hesitancy status, researchers investigated which informational sources subjects relied on for COVID-19 information and which were most trusted (see Fig. 3). Across all subjects, the most frequently used sources were the newspaper ($N = 107$), followed by doctors ($N = 94$), and the government ($N = 89$). Hesitant individuals were significantly less likely to identify the government as a source for their COVID-19 information, $X^2(1, N = 126) = 10.757, p = 0.001$. Subjects across both groups rated doctors and the government as the most and second most trusted sources of COVID-19 information. However, individuals in the unhesitant group were twice as likely to identify the government as a trusted source compared to hesitant subjects.

4. Discussion

The urogynecology population comprises a unique demographic of women across the United States. Our survey cohort was similar

Table 1
Factors affecting vaccine hesitancy.

Variable	Category or Response	Total n(%)	Unhesitant n(%)	Hesitant n(%)	p -Value
Age	≥ 60	103 (66.0 %)	91 (70.0 %)	12 (46.2 %)	0.019^a
	< 60	53 (33.9 %)	39 (30.0 %)	14 (53.8 %)	
Ethnicity	Hispanic	26 (16.6 %)	19 (14.5 %)	7 (26.9 %)	0.120
	Not Hispanic	131 (83.4 %)	112 (85.5 %)	19 (73.1 %)	
Education	No College	44 (28.8 %)	34 (26.6 %)	10 (40.0 %)	0.175
	Some College or Greater	109 (71.2 %)	94 (73.4 %)	15 (60.0 %)	
Health Rating	Good/Very Good/Excellent	122 (78.7 %)	106 (82.2 %)	16 (61.5 %)	0.019^a
	Fair/Poor	33 (21.3 %)	23 (17.8 %)	10 (38.5 %)	
Flu Shot Frequency	Every Year/Most Years	126 (81.3 %)	117 (90.0 %)	9 (36.0 %)	<0.001^a
	Every few years/Not often/Not at all	29 (18.7 %)	13 (10.0 %)	16 (64.0 %)	

^a Chi-square p -Value $< .05$ Boldface used to highlight significant findings.

Table 2
COVID-19 concerns and clinical impact.

Item	Category or Response	Total n(%)	Unhesitant n (%)	Hesitant n (%)	p-Value
Have you been Diagnosed with COVID-19?	Yes	21 (13.9 %)	18 (14.3 %)	3 (12.0 %)	0.763
	No	130 (86.1 %)	108 (85.7 %)	22 (88.0 %)	
How worried are you about getting COVID-19	Somewhat Worried/Very Worried	65 (41.9 %)	57 (43.8 %)	8 (32.0 %)	0.272
	Not too worried/Not at all worried	90 (58.1 %)	73 (56.2 %)	17 (68.0 %)	
How worried are you that your family may get COVID-19	Somewhat Worried/Very Worried	95 (60.9 %)	84 (64.1 %)	11 (44.0 %)	0.059
	Not too worried/Not at all worried	61 (39.1 %)	47 (35.9 %)	14 (56.0 %)	
Did Your Medical Care Quality Decrease?	Yes	27 (18.8 %)	22(18.3 %)	5 (20.8 %)	0.082
	No	117 (81.3 %)	98(81.7 %)	19 (79.2 %)	
Did Your Urogynecology Care Quality Decrease?	Yes	11 (7.8 %)	9 (7.6 %)	2 (8.7 %)	0.861
	No	130 (92.2 %)	109 (92.4 %)	21 (91.3 %)	
Did You Postpone or Cancel Clinic Visits?	Yes	102 (70.8 %)	84 (69.4 %)	18 (78.3 %)	0.393
	No	42 (29.2 %)	37 (30.6 %)	5 (21.7 %)	
Did You Postpone or Cancel Surgery or Procedures?	Yes	117 (83.6 %)	98 (83.1 %)	19 (86.4 %)	0.700
	No	23 (16.4 %)	20 (16.9 %)	3 (13.6 %)	
Comfort Attending In-Person Visits	Very Comfortable/Somewhat Comfortable	143 (93.5 %)	125 (96.9 %)	18 (75.0 %)	<0.001 ^a
Likelihood of Attending a Telemedicine Visit	Somewhat Uncomfortable/Not at all comfortable	10 (6.5 %)	4 (3.1 %)	6 (25.0 %)	0.318
	Very Likely/Moderately Likely	98 (71.0 %)	85 (72.6 %)	13 (61.9 %)	
	Neither likely nor unlikely/Moderately Unlikely/Very Unlikely	40 (29.0 %)	32 (27.4 %)	8 (38.1 %)	

^a Chi-square p-Value <.05 Boldface used to highlight significant findings.

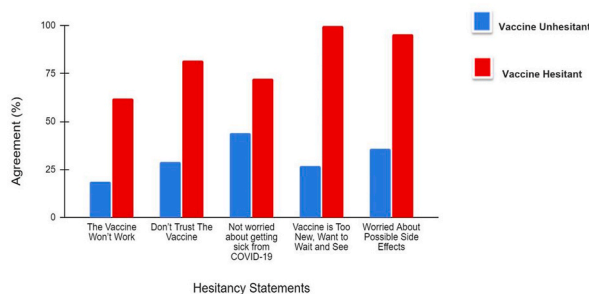


Fig. 1. Possible reasons for vaccine hesitancy.

to other studies of the urogynecology population, skewing older and more White [16,17]. Chi-square testing showed no regional differences in the subject population, with all three sites having a similar proportion of vaccine-hesitant and unhesitant individuals.

The vaccination rate (77 %) and unhesitant rates (83 %) within our survey align closely with older adults' trends across the general population. According to the CDC, by May 2021, 80 % of American adults aged 65 years or older had received at least one dose of the vaccine; these rates have risen by 9 % in the last 12 months [17]. Our findings demonstrate similar trends, with subjects 60 years or older being significantly more likely to be unhesitant towards vaccination. Additionally, consistent with other studies [18], [-19] having the flu shot every or most years was the single strongest predictor of unhesitant vaccine attitude in our study sample, indicating the prognostic value of vaccination history.

We find that patients who identified as being in poor health were more likely to be hesitant towards vaccination. Attendance of outpatient visits may therefore be a critical time for counseling in patients with multiple chronic conditions. A review of existing literature presents conflicting evidence regarding the relationship between a person's self-identification of health and vaccination

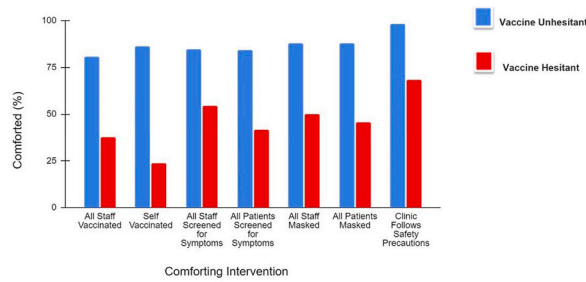


Fig. 2. Responses to possible interventions to increase in-person patient comfort.

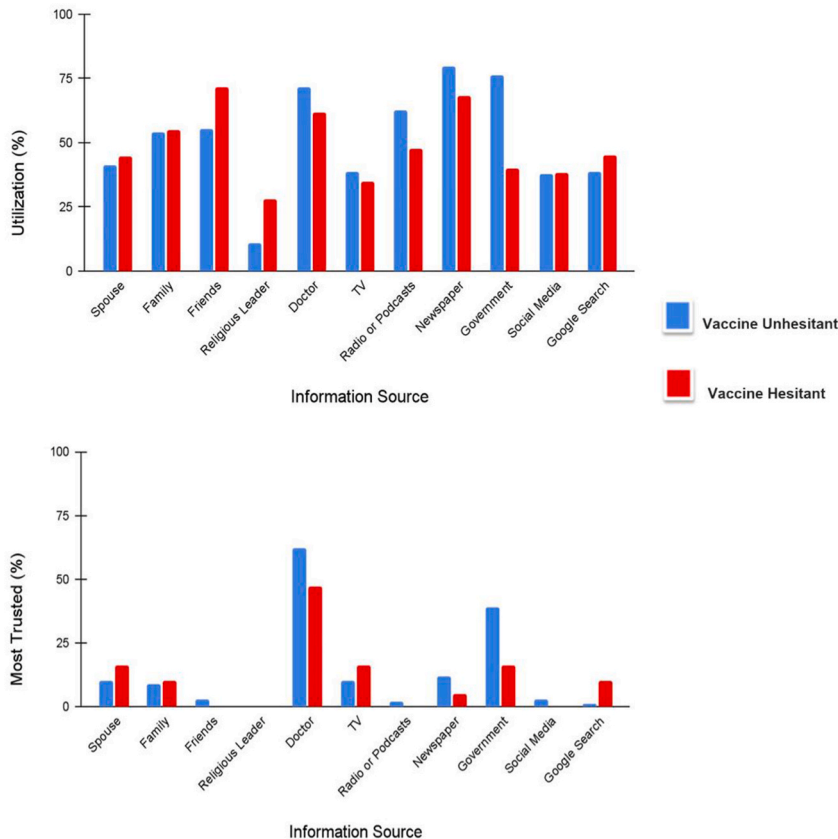


Fig. 3. Utilization and trust of information sources on COVID-19.

propensity [19–21]. These studies suggest an age-related difference, which may inform how different age groups perceive the benefit of vaccination in the case of poor health. Perhaps older subjects in poor health may be more apprehensive about vaccines due to fear of side effects that could worsen their health, similar to the older urogynecology population in our sample. Conversely, younger poor health subjects with more trust in vaccines may view vaccines as a protective opportunity, leading to increased vaccination rates among those in poor health. Unsurprisingly, amongst the hesitant group, justifications for vaccine hesitancy, including concerns about side effects, aligned with other contemporary studies [22,23].

Our secondary research objectives concerned understanding urogynecology patient attitudes toward attending in-person visits during the pandemic and establishing plausible clinic interventions to increase patient comfort while receiving in-clinic care. Though our survey demonstrated a very high percentage of patients were comfortable coming to in-person visits, researchers recognize the increased potential for sampling bias given that many patients filled out papers in the clinic. When examined separately, the patients surveyed by phone were also largely comfortable coming to in-person visits (56/64 participants, 88 %).

Our exploration of willingness to attend in-person visits revealed a meaningful hesitancy-comfort relationship. Specifically, the results showed that more hesitant individuals were uncomfortable coming to in-person visits. These hesitant patients were also significantly less comforted by all suggested clinic interventions than patients in the unhesitant group. We speculate that the apparent

lack of trust in the vaccine's efficacy would make these patients less comfortable putting themselves in situations where COVID-19 exposure is possible, even when interventions are in place to mitigate this risk. As such, it is prudent that urogynecology clinics continue to demonstrate adherence to guidelines to increase the comfort of all patients. This includes following clinic safety protocols, staff masking, and staff screening.

Despite this difference across both groups in COVID-19 information sources, the largest percentage of subjects in both groups reported doctors and medical professionals as their most trusted source. This is in line with other studies that highlight doctors' crucial role in encouraging COVID-19 vaccination [23–25]. As other studies have urged [26], continued efforts from the medical community to communicate vaccine efficacy and importance to patients are essential to encouraging vaccination and combating misinformation.

Our survey has several limitations. Firstly, the sample size was insufficient to investigate or detect several findings reported across other studies. In several larger studies, lower education was shown to predict hesitant attitudes [20,27,28]. Additionally, prior literature suggests lower vaccination rates amongst Black and African American individuals [29,30] as well as Hispanic or Latino individuals.

Our survey methods were also not performed in the same manner across sites. The Delaware and California sites only utilized paper surveys, whereas the New Jersey site had most of the surveys obtained via telephone. Observer bias could likely underestimate the reports of the decline in the quality of urogynecology care. Researchers also recognize that paper surveys would not account for patients who were reluctant to come into the office; however, as mentioned above, the phone survey patients were comfortable coming in person.

5. Conclusions

As the pandemic is expected to ease into an endemic, our findings highlight the importance of addressing the concerns of urogynecology patients who are apprehensive about attending in-person clinic visits. The success of remote healthcare models during the COVID 19 pandemic has already been established in the field of urogynecology [31]; it can help bridge the gap for patients requiring care but who are not as comfortable attending in-person visits. This survey finds that the United States' urogynecology population demonstrates many of the same overarching trends in COVID-19 attitudes and vaccine hesitancy as the greater US population. Therefore, interventions and accommodations for the urogynecology population should mirror those for the older U.S. population and be spearheaded by the medical providers in the position to give advice.

Data availability statement

No data associated with this study has been deposited into a publicly available repository. The authors do not have permission to share data.

Ethics statement

Informed consent was not required for this study because:

The protocol has been reviewed and verified by the Institutional Review Board as Exempt according to 45CFR46.101(b)(2): (2) Surveys, Interviews, Educational Tests, Public Observation.

CRedit authorship contribution statement

Sean Spector: Writing – review & editing, Writing – original draft, Visualization, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Shanaya Shah:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Muhammad Haseeb ul Rasool:** Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **Elizabeth Hilt:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Howard Goldstein:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Investigation, Formal analysis, Data curation, Conceptualization. **Jason Meade:** Project administration, Data curation, Conceptualization. **Electra Korn:** Writing – review & editing, Writing – original draft, Visualization, Formal analysis, Data curation. **Lioudmila Lipetskaia:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: The primary author, Sean Spector, received assistance from Jessica Meehan (a non-affiliated research assistant) in manuscript preparation and writing. This assistance was in exchange for financial compensation from Sean Spector to Jessica Meehan.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e30092>.

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