Vaccine 84 (2026) 128661

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Short communication

Prevalence and correlates of COVID-19 vaccine uptake among sexual and gender minority adolescents in the southern United States

Danielle Lambert [a,*], Nicole Luisi [a,b]

[a] Department of Epidemiology & Biostatistics, University of Georgia College of Public Health, Athens, GA, USA
[b] Department of Epidemiology, Emory University Rollins School of Public Health, Atlanta, GA, USA

ARTICLE INFO

Keywords:
COVID-19
Vaccination
Youth
Sexual and gender minorities

ABSTRACT

Although the COVID-19 pandemic disproportionately affected vulnerable and minoritized communities, vaccine uptake among these populations remains understudied. This study examined the prevalence and predictors of COVID-19 vaccination among LGBTQIA+ adolescents aged 13–17 in the southern U.S. From July 2021 to April 2022, LGBTQIA+ youth were recruited from eight southern states via social media ads. Overall, 76.6% of enrolled adolescents had received the COVID-19 vaccination. Among those who were not vaccinated, 74.4% reported at least some likeliness to be vaccinated in the next three months. Vaccination was more likely among youth who were employed or living with a physical disability or brain injury, and less likely among those reporting housing instability, homelessness, or household receipt of public assistance. Differences in vaccine uptake may reflect policies requiring proof of vaccination in workplaces and healthcare settings, and highlight potential barriers related to factors that disproportionately affect historically minoritized communities and adolescents.

1. Introduction

The COVID-19 pandemic had a disproportionate impact on vulnerable and minoritized communities [1], including among lesbian, gay, bisexual, transgender, queer, questioning, intersex, and asexual (LGBTQIA+; i.e., sexual and gender minorities) individuals [2], who already experience greater social and structural barriers to accessing needed and quality healthcare [3]. The U.S. Food and Drug Administration's (FDA) emergency use authorization (EUA) of the first COVID-19 vaccine in December 2020 was a major preventative milestone in mitigating the spread of COVID-19 [4], though relatively few studies since have focused on vaccine uptake among sexual and gender minorities [5,6]. Following the May 2021 EUA expanding the use of the Pfizer-BioNTech COVID-19 vaccine among adolescents 12–15 years of age [7], limited attention has been given to assessing correlates of vaccine uptake among adolescents, and few studies have specifically focused on uptake and correlates among sexual and gender minority adolescents [8]. The aim of this analysis was to examine the prevalence and predictors of COVID-19 vaccine uptake following the May 2021 FDA EUA specifically among LGBTQIA+ adolescents aged 13–17 residing in eight southern states.

2. Methods

The primary aim of this CDC-funded study was to assess experiences of digital violence and other co-occurring forms of violence exposure among LGBTQIA+ adolescents residing in the southern United States (U.S.); however, with the global COVID-19 pandemic continuing, and increasing in severity, alongside study development, we added measures to our data collection instruments to be able to assess vaccination uptake and the impacts of the pandemic on adolescent well-being. Study respondents were recruited online using tailored social media ads from July 2021 – April 2022, with recruitment starting approximately eight weeks after the FDA's EUA of the Pfizer-BioNTech COVID-19 vaccine for individuals 12–15 years of age [7], which followed the previous December 2020 authorization for individuals 16 years of age or older [4]. To be eligible for study participation, adolescents had to be: (1) 13–17 years of age; (2) identify as LGBTQIA+; (3) reside in one of eight southern states (Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, or Tennessee); (3) have at least one

Abbreviations: aOR, Adjusted odds ratio; FDA, Food and Drug Administration; EUA, Emergency Use Authorization; LGBTQIA+, Lesbian, gay, bisexual, transgender, queer, questioning, intersex, asexual; SES, Socioeconomic status; U.S., United States.

* Corresponding author at: B.S. Miller Hall 101 Buck Road, Athens, GA 30602, USA.
E-mail address: dnl@uga.edu (D. Lambert).

https://doi.org/10.1016/j.vaccine.2026.128661
Received 11 March 2026; Received in revised form 26 April 2026; Accepted 27 April 2026
Available online 8 May 2026

prior romantic (non-sexual) or sexual partner, which included "talking," "seeing," or dating someone and was not dependent on reporting prior sexual activity; and (5) report proficiency in English. Adolescents were screened online and eligible youth were verified by study staff as unique respondents using dual authentication before enrollment [9]. Enrolled adolescents were emailed an individualized, single-use survey link to complete the online study assessment and provided a $20 e-gift card for their participation.

During the study's recruitment period, the Pfizer-BioNTech COVID-19 vaccine was the only COVID-19 vaccine approved for use among adolescents 13–17 years and was administered as a 2-dose series [7,10]. We defined vaccinated adolescents as those who self-reported receipt of two doses, as well as those who reported initiating the series (one dose) as the date of first dose was not collected and eligibility for the second dose could not be determined. Adolescents were considered unvaccinated if they had not started the 2-dose series. Among unvaccinated respondents, we assessed their willingness to get the COVID-19 vaccine in the next three months using a 5-point Likert scale from "not at all likely" to "extremely likely," which we subsequently collapsed for analysis into three categories: not at all likely to vaccinate, slightly or somewhat likely, and very or extremely likely. We used bivariate and multivariable analyses controlling for age and state of residence to investigate differences in COVID-19 vaccine uptake and willingness among adolescents.

3. Results

A total of 384 sexual and gender minority adolescents participated in the study. Respondents ranged in age from 13 to 17 years, with a mean age of 16.1 years (SD = 1.0), and the majority of adolescents identified as non-Hispanic white (52.6%), cisgender female (45.6%), and bisexual (38.0%). Most adolescents had health insurance coverage (90.6%) and a third were currently employed (33.3%). As proxies for socioeconomic status (SES), more than a third (37.2%) of youth lived in a household receiving one or more forms of public assistance and 12.5% reported prior or current experiences with housing instability or homelessness. With respect to key comorbidities for COVID-19 and factors affecting severity, 22.9% of adolescents had a BMI classified as obese, 28.6% had

Table 1
Comparison of sociodemographic characteristics by COVID-19 vaccination uptake among sexual and gender minority adolescents aged 13–17 in the southern United States, July 2021 – April 2022, $N = 384$.

Sociodemographic Characteristics	Overall ($n = 384$)	Vaccinated ($n = 294$)	Unvaccinated (n = 90)	*p-value*
	n (%)	*n* (%)	*n* (%)	
Age, years				0.114
13–14	26 (6.8%)	15 (57.7%)	11 (42.3%)	
15	73 (19.0%)	55 (75.3%)	18 (24.7%)	
16	126 (32.8%)	100 (79.4%)	26 (20.6%)	
17	159 (41.4%)	124 (78.0%)	35 (22.0%)	
Race/Ethnicity				0.271
Hispanic	59 (15.4%)	42 (71.2%)	17 (28.8%)	
Non-Hispanic Black	61 (15.9%)	46 (75.4%)	15 (24.6%)	
Non-Hispanic White	202 (52.6%)	153 (75.7%)	49 (24.3%)	
Non-Hispanic Other	27 (7.0%)	25 (92.6%)	2 (7.4%)	
Non-Hispanic Multiracial	35 (9.1%)	28 (80.0%)	7 (20.0%)	
Gender Identity				0.841
Cisgender Male	31 (8.1%)	23 (74.2%)	8 (25.8%)	
Cisgender Female	175 (45.6%)	137 (78.3%)	38 (21.7%)	
Transgender	50 (13.0%)	39 (78.0%)	11 (22.0%)	
Non-Binary, Queer, or Another Identity	128 (33.3%)	95 (74.2%)	33 (25.8%)	
Sexual Identity				**0.018**
Gay or Lesbian	72 (18.8%)	59 (81.9%)	13 (18.1%)	
Bisexual	146 (38.0%)	110 (75.3%)	36 (24.7%)	
Queer	48 (12.5%)	42 (87.5%)	6 (12.5%)	
Pansexual	60 (15.6%)	41 (68.3%)	19 (31.7%)	
Asexual	22 (5.7%)	12 (54.5%)	10 (45.5%)	
Questioning	36 (9.4%)	30 (83.3%)	6 (16.7%)	
State of Residence				0.707
Alabama	24 (6.3%)	15 (62.5%)	9 (37.5%)	
Florida	96 (25.0%)	72 (75.0%)	24 (25.0%)	
Georgia	68 (17.7%)	54 (79.4%)	14 (20.6%)	
Louisiana	22 (5.7%)	17 (77.3%)	5 (22.7%)	
Mississippi	11 (2.9%)	8 (72.7%)	3 (27.3%)	
North Carolina	72 (18.8%)	58 (80.6%)	14 (19.4%)	
South Carolina	38 (9.9%)	31 (81.6%)	7 (18.4%)	
Tennessee	53 (13.8%)	39 (73.6%)	14 (26.4%)	
Currently Has Health Insurance	348 (90.6%)	272 (78.2%)	76 (21.8%)	0.057
Currently Employed	123 (33.3%)	112 (87.5%)	16 (12.5%)	**<0.001**
Household Receives Public Assistance [a]	143 (37.2%)	95 (66.4%)	48 (33.6%)	**0.001**
Prior/Current Housing Instability or Homelessness	48 (12.5%)	28 (58.3%)	20 (41.7%)	**0.003**
BMI Classification				0.413
Underweight	43 (11.2%)	36 (83.7%)	7 (16.3%)	
Healthy Weight	179 (46.6%)	134 (74.9%)	45 (25.1%)	
Overweight	72 (18.8%)	58 (80.6%)	14 (19.4%)	
Obese	88 (22.9%)	64 (72.7%)	24 (27.3%)	
Chronic Health Condition	110 (28.6%)	82 (74.5%)	28 (25.5%)	0.595
Mental Health Condition	197 (51.3%)	153 (77.7%)	44 (22.3%)	0.631
Physical Disability or Brain Injury	29 (7.6%)	27 (93.1%)	2 (6.9%)	**0.037**
Developmental Disability	73 (19.0%)	60 (82.2%)	13 (17.8%)	0.224

[a] Forms of public assistance included disability, food stamps, section 8 housing, welfare or TANF (Temporary Assistance to Needy Families), WIC (Women, Infants, and Children), or unemployment.

a diagnosed chronic health condition, 19.0% had a diagnosed developmental disability, and 7.6% had a diagnosed physical disability or brain injury.

Approximately three-fourths (76.6%) of adolescents were vaccinated against COVID-19, with 90 (23.4%) adolescents who were unvaccinated, as reported in Table 1. In bivariate analyses, vaccination differed by sexual identity ($p = .02$), current employment ($p < .001$), household receipt of public assistance ($p = .001$), prior or current housing instability or homelessness ($p = .003$), and diagnosis of a physical disability or brain injury ($p = .04$).

In multivariable analyses adjusted for age and state of residence, sexual and gender minority adolescents were more likely to be vaccinated against COVID-19 if they were currently employed (aOR = 2.91, 95% CI: [1.51, 5.63], $p = .002$) or were living with a physical disability or brain injury (aOR = 5.91, 95% CI: [1.28, 27.24], $p = .02$). Adolescents were less likely to be vaccinated if their household received one or more forms of public assistance (aOR = 0.41, 95% CI: [0.24, 0.70], $p = .001$) or if they previously or currently experienced housing instability or homelessness (aOR = 0.42, 95% CI: [0.20, 0.89], $p = .02$). Sexual identity was not statistically significant in the multivariable analyses.

Of the 90 unvaccinated adolescents, 36 (40.0%) were extremely or very likely to get vaccinated against COVID-19 in the next three months, 31 (34.4%) were somewhat or slightly likely to get vaccinated, and 23 (25.6%) were not at all likely to get vaccinated. About three-fourths (74.4%) of youth reported at least some likeliness to get vaccinated in the coming months. Likelihood frequencies are displayed stratified by age, race/ethnicity, gender identity, and sexual identity in Fig. 1, though no statistically significant differences in vaccination likelihood were found by sociodemographic characteristics. A greater proportion of younger adolescents, cisgender males, and racial and ethnic minorities reported being not at all likely to vaccinate in the next three months compared with other demographics.

4. Discussion

In the year following the FDA's EUA approval of the Pfizer-BioNTech COVID-19 vaccine for use among adolescents 12–15 years of age, this study of 384 sexual and gender minority adolescents aged 13–17 years in the southern U.S. found that the majority (76.6%) of respondents had started or completed the 2-dose series, and nearly three-quarters (74.4%) of unvaccinated youth were at least slightly likely to get vaccinated in the next three months. The prevalence of COVID-19 vaccination in this sample was very similar to other assessments of vaccine uptake or willingness among youth and young adults in the U.S [8,11].

Sexual and gender minority adolescents in this study were 2.9 times more likely to be vaccinated against COVID-19 if they were currently employed and 5.9 times more likely to be vaccinated if they had a diagnosed physical disability or brain injury. This statistically significant difference in vaccine uptake may be due to policies mandating or promoting proof of vaccination in workplaces and healthcare settings, which may have encouraged employed adolescents and those obtaining regular clinical care to get vaccinated. While nationally representative studies in the U.S. have found that less than half of respondents have an employer-based COVID-19 vaccination requirement, these employer-based requirements are often associated with higher vaccine uptake [12–14]. Similarly, a nationally representative study in September 2021 found that mandates requiring vaccination to participate in certain activities or to enter venues encouraged about 35% of respondents to get vaccinated, which may be particularly motivating to adolescents' social well-being [13]. This increase in vaccination in this study was seen despite many southern states limiting mandates for public and private entities, and allowing for exemptions [15]. Policies around COVID-19 vaccination and other control measures may have also varied within states, as was seen in Georgia with differing guidelines issued by the

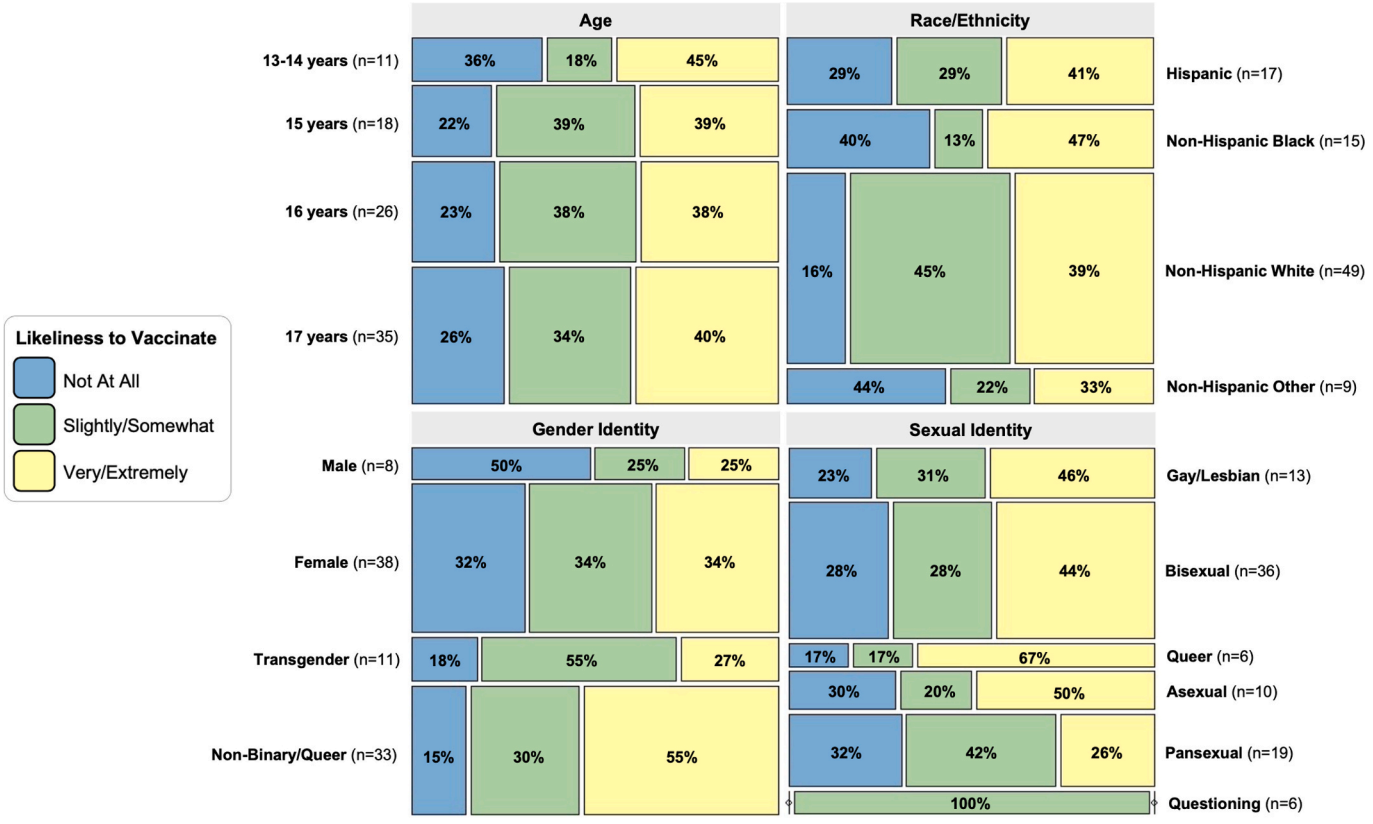

Fig. 1. Likelihood of COVID-19 vaccination within the next three months among unvaccinated sexual and gender minority adolescents aged 13–17 years in the southern U.S., by demographic characteristics, July 2021–April 2022 ($n = 90$).

Mayor of Atlanta for the metropolitan area compared to guidelines enacted by the state's Governor [16].

One limitation of this study is that parental consent, which was needed for minors in most states, was not assessed as a potential barrier to adolescents' likelihood of COVID-19 vaccination. In the eight states included in this study, parental consent was required in Georgia, Florida, Louisiana, and Mississippi and in North Carolina and Tennessee a provider's waiver of parental consent would have been needed in the absence of the parent's permission [17]. In November 2021, which was about the midpoint of this study's recruitment period, a nationally representative study conducted by KFF among parents with a child under the age of 18 in the home found that 30% of parents were definitely opposed to getting their teenager vaccinated against COVID-19, which was an increase from 22% who definitely opposed in April 2021 [18]. In this same study, among parents with unvaccinated children, Hispanic, Black, and lower SES parents were more likely to report potential barriers to vaccinating their child, including concerns related to taking time off work, identifying a trusted place to get the vaccine, and traveling to a testing location [18]. Mirroring these findings among parents, Hispanic, Black, and non-Hispanic other adolescents in this study most frequently reported being not at all likely to get vaccinated in the next three months.

Sexual and gender minority adolescents were significantly less likely to be vaccinated if they lived in a household that received one or more forms of public assistance or if they had experiences with housing instability or homelessness. These findings are consistent with other studies, especially among LGBTQ and lower SES populations [5,19,20], and point to barriers to uptake based on social and structural factors that historically disproportionately impact minoritized communities and adolescents.

CRediT authorship contribution statement

Danielle Lambert: Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization. **Nicole Luisi:** Writing – review & editing, Visualization, Formal analysis, Data curation.

Authorship

All authors attest they meet the ICMJE criteria for authorship.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

This study was supported by the Centers for Disease Control and Prevention's National Center for Injury Prevention and Control (K01CE003226, Principal Investigator: Lambert). The study sponsors had no role in the creation of this manuscript. Sincerest gratitude to the mentoring team for this K01 award: Drs. Andrea Swartzendruber, Pamela Orpinas, Ye Shen, Patrick Sullivan, and Carolyn Lauckner.

Data availability

Data will be made available on request.

References

[1] Webb Hooper M, Napoles AM, Perez-Stable EJ. COVID-19 and racial/ethnic disparities. JAMA 2020;323(24):2466–7. PMID: 32391864, https://doi.org/10.1001/jama.2020.8598.
[2] Fish JN, Salerno J, Williams ND, Rinderknecht RG, Drotning KJ, Sayer L, et al. Sexual minority disparities in health and well-being as a consequence of the COVID-19 pandemic differ by sexual identity. LGBT Health 2021;8(4):263–72. PMID: 33887160, https://doi.org/10.1089/lgbt.2020.0489.
[3] Dahlhamer JM, Galinsky AM, Joestl SS, Ward BW. Barriers to health care among adults identifying as sexual minorities: a US National Study. Am J Public Health 2016;106(6):1116–22. PMID: 26985623, https://doi.org/10.2105/AJPH.2016.303049.
[4] Pfizer. Pfizer and BioNTech Celebrate Historic First Authorization in the U.S. of Vaccine to Prevent COVID-19 [updated December 11, 2020; cited 2026 March 10]; Available from, https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-celebrate-historic-first-authorization; 2020.
[5] Newman PA, Dinh DA, Nyoni T, Allan K, Fantus S, Williams CC, et al. COVID-19 vaccine hesitancy and under-vaccination among marginalized populations in the United States and Canada: a scoping review. J Racial Ethn Health Disparities 2025;12(1):413–34. PMID: 38117443, https://doi.org/10.1007/s40615-023-01882-1.
[6] Garg I, Hanif H, Javed N, Abbas R, Mirza S, Javaid MA, et al. COVID-19 vaccine hesitancy in the LGBTQ+ population: a systematic review. Infect Dis Rep 2021;13(4):872–87. PMID: 34698208, https://doi.org/10.3390/idr13040079.
[7] U.S. Food and Drug Administration (FDA). Pfizer-BioNTech COVID-19 Vaccine EUA Letter of Authorization, Reissued 05-10-2021 [updated May 10, 2021; cited 2026 March 10]; Available from, https://www.fda.gov/media/144412/download; 2021.
[8] Xu J, Narla SS, Davoudpour S, Ruprecht MM, Curtis MG, Phillips G. COVID-19 testing and vaccination uptake among youth and young adults: disparities by age, race/ethnicity, sexual orientation, and gender identity. Am J Infect Control 2024;52(3):312–9. PMID: 37741292, https://doi.org/10.1016/j.ajic.2023.09.010.
[9] Lambert DN, Luisi N. The feasibility and cost-effectiveness of tailored social media advertising to recruit sexual and gender minority adolescents in the South: online survey study. Preprint. 2026. https://doi.org/10.2196/preprints.95006.
[10] Institute for Vaccine Safety. What We Know: COVID-19 Vaccines. Johns Hopkins Bloomberg School of Public Health; 2023 [updated October 31, 2023; cited 2026 March 10]; Available from: https://www.vaccinesafety.edu/what-we-know-so-far-covid-19-vaccines/#:~:text=The%20vaccine%20developed%20and%20manufactured,adults%2018%20years%20and%20older.
[11] Brandt EJ, Rosenberg J, Waselewski ME, Amaro X, Wasag J, Chang T. National Study of youth opinions on vaccination for COVID-19 in the U.S. J Adolesc Health 2021;68(5):869–72. PMID: 33824070, https://doi.org/10.1016/j.jadohealth.2021.02.013.
[12] Sparks G, Lopes L, Montero A, Brodie M. KFF COVID-19 Vaccine Monitor: April 2022. Kaiser Family Foundation (KFF); 2022. Available from, https://www.kff.org/covid-19/kff-covid-19-vaccine-monitor-april-2022/.
[13] Hamel L, Lopes L, Sparks G, Kirzinger A, Kearney A, Stokes M, et al. KFF COVID-19 Vaccine Monitor: September 2021. Kaiser Family Foundation (KFF); 2021 [cited 2026 April 24]; Available from, https://www.kff.org/covid-19/kff-covid-19-vaccine-monitor-september-2021/.
[14] Lee JT, Sean Hu S, Zhou T, Bonner KE, Kriss JL, Wilhelm E, et al. Employer requirements and COVID-19 vaccination and attitudes among healthcare personnel in the U.S.: findings from National Immunization Survey Adult COVID module, August - September 2021. Vaccine 2022;40(51):7476–82. PMID: 35941037, https://doi.org/10.1016/j.vaccine.2022.06.069.
[15] National Academy for State Health Policy. State Efforts to Limit or Enforce COVID-19 Vaccine Mandates [cited 2026 March 10]; Available from, https://nashp.org/state-tracker/state-efforts-to-ban-or-enforce-covid-19-vaccine-mandates-and-passports/; 2021.
[16] Samuel M. The differences between Atlanta's coronavirus guidance and the state's. WABE 2020;30:2020.
[17] Kaiser Family Foundation (KFF). COVID-19 Vaccination and Parental Consent [updated May 26, 2021; cited 2026 March 10]; Available from, https://www.kff.org/covid-19/covid-19-vaccination-and-parental-consent/; 2021.
[18] Hamel L, Lopes L, Kearney A, Stokes M, Kirzinger A, Sparks G, et al. In: Kaiser Family Foundation (KFF), editor. KFF COVID-19 Vaccine Monitor: Winter 2021 Update On Parents' Views Of Vaccines For Kids; 2021 [cited 2026 April 24]; Available from, https://www.kff.org/mental-health/kff-covid-19-vaccine-monitor-winter-2021-update-on-parents-views-of-vaccines/#2a811d00-c34f-47ca-8727-ecca383abfc4.
[19] Abramovich A, Pang N, Kunasekaran S, Moss A, Kiran T, Pinto AD. Examining COVID-19 vaccine uptake and attitudes among 2SLGBTQ+ youth experiencing homelessness. BMC Public Health 2022;22(1):122. PMID: 35042491, https://doi.org/10.1186/s12889-022-12537-x.
[20] Tucker JS, D'Amico EJ, Pedersen ER, Garvey R, Rodriguez A, Klein DJ. COVID-19 vaccination rates and attitudes among young adults with recent experiences of homelessness. J Adolesc Health 2022;70(3):504–6. PMID: 34949569, https://doi.org/10.1016/j.jadohealth.2021.11.017.