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ORIGINAL ARTICLE

Sociodemographic and Clinical Characteristics of Vaccine Hesitancy at an Outpatient Addiction Treatment Center

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Main Points

- People with addiction have lower vaccination rates than the general public.
- Type of substance can be identified as a risk factor for vaccine hesitancy.
- Higher education and older age were significant variables favoring higher vaccination rates.

Abstract

After the first cases of coronavirus disease 2019, more than 700 million people were infected with severe acute respiratory syndrome coronavirus 2, and more than 7 million people died. The development of new vaccines helped alleviate the pandemic's effects. People with addiction have lower vaccination rates compared to the general public. Reasons like vaccine hesitancy, difficulty in accessing healthcare services, and stigmatization all contribute to this issue. We aimed to investigate the sociodemographic characteristics that might have an impact on vaccination in people with addiction. Accordingly, 394 participants were included in the study. Structured Clinical Interview for DSM-5 (SCID-5) -5 was employed to make the psychiatric diagnoses of the participants. Case report forms were filled out for the participants' sociodemographic characteristics and psychiatric and family history. Participants were compared regarding their vaccination status. There were significant relationships between vaccination rates and sociodemographic characteristics of the participants. Older and more educated participants were more likely to get vaccinated. There was a significant relationship between substance type and vaccination rates. Vaccination rates were lower for participants compared to the general population. The results indicate that specific sociodemographic and clinical characteristics can be identified as risk factors for vaccine hesitancy in people with addiction. Prioritizing this group will help reduce vaccine hesitancy and increase vaccination rates.

Keywords: Addiction, demographics, education, substance use, vaccination

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Introduction

It has been almost four years since the first cases of coronavirus disease 2019 (COVID-19). During this time, more than 700 million people were infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and nearly 7 million people died (Dadax, 2020). Fortunately, the numbers started to slow down with the development of different vaccines and worldwide vaccination procedures. Unsurprisingly, vaccination and the concept of vaccines became a trendy subject in public. It has been shown that the success of vaccination depends not only on the vaccine itself but also on the public (Jacobson et al., 2015).

Thoughts and beliefs on vaccination differ vastly among different sociocultural groups. In a recent study in the USA, vaccine hesitancy was found to be higher in African-American people and people with lower income status (Yasmin et al., 2021). Data show that people with addiction problems are less

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likely to trust the vaccination compared to the general population (Masson et al., 2021). Also, people with addiction have lower vaccination rates for other recommended vaccinations such as diphtheria, hepatitis A, hepatitis B, influenza, etc. (Frew et al., 2021). The Australian National Drug Surveillance System stated that only 57% of the people who use IV drugs would receive a COVID-19 vaccine if available, while in the general population, this rate was 77% (Dietze et al., 2022). This would lead to lower vaccination rates in people with addiction. A recent study conducted in Barcelona showed that this vaccine hesitancy of people with substance use disorder (SUD) can be reversed with information and education provided by medical professionals (Vallecillo et al., 2022). As a public health measure, providing information and education to people with SUD would increase vaccination rates in this group. This would help people with SUD and the general population because, in a pandemic, all the population must be addressed to gain immunity. Today, the worldwide prevalence of SUDs is estimated to be around 100 million for alcohol use disorders and between 27 and 41 million for people who are opioid dependent (Dadax, 2020). Drug and alcohol use disorders are ranked 16th and 20th, respectively, as the leading causes of the global burden of disease in adults aged 25 – 49 years (Yasmin et al., 2021). These numbers indicate that addiction is an essential problem for the general population and should not be discarded.

People with addiction also have a higher risk for SARS-CoV-2 in terms of medical complications from the infection itself and comorbid medical conditions such as liver disease, cardiovascular disease, respiratory problems, and compromised immune systems (Pavarin et al., 2011). It has been shown that people with addiction are more likely to need mechanical ventilation and intensive care in the case of COVID-19 compared to the general population (Ramakrishnan et al., 2022). As a high-risk group, people with SUD should be prioritized for vaccination. Multiple reports indicate they have trouble gaining access to health services or receiving adequate health care because of social and economic inequalities and discrimination from healthcare providers (Melamed et al., 2020). Unsurprisingly, these challenges for disadvantaged groups become much more apparent in a global crisis like a pandemic.

According to the literature data, sociodemographic characteristics, such as age, marital status, educational status, and employment, also play an essential part in vaccine hesitancy. It may be beneficial to create sociodemographic segments to plan how to reach these groups to increase vaccination rates.

To date, the data about COVID-19 vaccinations in people with addiction problems are very limited. We aimed to investigate the difference in vaccination rates between people with addiction and the general population in Türkiye. Additionally, we analyzed the sociodemographic differences and differences in substance use in the substance user group to identify their possible effects on vaccination status.

While designing the study, we developed a couple of hypotheses we would like to test that align with the literature data, which will be discussed in the manuscript. Firstly, we hypothesized that older people would be more likely to get vaccinated than younger people. Another hypothesis was that people who used drugs would be less likely to get vaccinated compared to alcohol users. Lastly, we assumed that people with addiction would have lower vaccination rates compared to the general population.

Material and Methods

This study was approved by the Ege University Clinical Research Ethics Board and complied with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, revised in 2008 (Approval number: 23-2T/25 Date: 09.02.2023). All participants gave written informed consent before the enrollment. Participants who were referred to the Ege University Psychiatry Clinic were included in the study after an evaluation of the inclusion and exclusion criteria.

Inclusion criteria were: (1) being older than 18, (2) diagnosis of addiction according to DSM-5, and (3) acceptance to participate after being informed about the study. Exclusion criteria were: (1) having a mental illness that would affect the reliability of answers to questionnaires, (2) mental retardation, (3) current or past diagnosis of COVID-19, (4) having a disease that would cause immunodeficiency, (5) having a contraindication for COVID-19 vaccination, and (6) having an oncological disease.

SCID-5 was employed to make the psychiatric diagnoses and identify the comorbidities of the participants. Case report forms were filled out for the participants' sociodemographic characteristics, psychiatric history, and family history. Sociodemographic data comprised age, gender, marital status, educational status, and employment status. Participants were compared regarding their vaccination status (getting the first dose of vaccination, getting the second dose of vaccination, and getting both doses of vaccination). These groups were compared with regard to the sociodemographic data and substance types. The vaccination rate of the whole sample was compared to the vaccination rate of the general population for the city of İzmir and Türkiye. The data for the vaccination rate of İzmir and Türkiye were collected from https://covid19asi.saglik.gov.tr/. The study was initiated after the onset of the administration of the second dose of vaccination for the entire population. Detailed data about the vaccination program in Türkiye for COVID-19 are accessible through this link: https://covid19asi.saglik.gov.tr/TR-77706/covid-19-asisi-ulusal-uygulama-stratejisi.html. The data collection lasted for 13 weeks until the desired sample size was reached, calculated with a-priori power analysis.

Statistical analyses were performed using the SPSS for PC version 25 (IBM SPSS Corp.; Armonk, NY, USA) software. The Shapiro – Wilk test was used to assess normal distribution. Numeric variables were expressed as mean and standard deviations if there was a normal distribution, whereas median with interquartile range (IQR) if there was a skewed distribution. Parametric comparative analyses for demographic and clinical characteristics of the groups were performed with an independent *t*-test. For non-parametric distributions, a Mann – Whitney *U*-test was performed. Where appropriate, categorical data were analyzed using the chi-square or Fisher's exact test. Dummy variables were used where there were more than two categories. The odds ratio was calculated where applicable. Age, gender, marital status, educational status, employment status, and substance types were used as the independent variables. Vaccination status was used as the

dependent variable. Logistic regression analyses were performed to determine the predictive values of significant variables. The level of significance was set at $p \leq .05$.

Results

Our sample consisted of 394 participants. The sex distribution was 90.2% male vs. 8.8% female. The mean age of the sample was 36.54 (minimum: 18; maximum: 74, SD: 12.363).

Of the participants, 283 (71.8%) received the first vaccination dose for COVID-19. Mean age (38.94 ± 12.64 vs. 30.37 ± 9.10; $p < .001$) and education duration (10.49 ± 3.01 years vs. 9.77 ± 2.61 years; $p = .007$) were significantly higher in the vaccinated group compared to the non-vaccinated group. Furthermore, 80.3% ($n = 183$) of the participants who had a marriage history received the first dose of vaccination compared to 60.7% ($n = 100$) of the participants who did not have a marriage history ($p < .001$). About 81.1% ($n = 142$) of the participants who had an occupation were vaccinated, whereas the vaccination percentage was 64.4% ($n = 141$) for the unemployed participants ($p < .001$).

For the second dose of vaccination, 195 (49.5%) participants were vaccinated. The statistical differences regarding age (41.72 ± 13.09 vs. 31.47 ± 9.10; $p < .001$) and education duration (10.86 ± 3.04 years vs. 9.72 ± 2.68 years, $p < .001$) were significant for the second dose of vaccination. Also, 60.5% ($n = 138$) of the participants who had a marriage history received the second dose of vaccination, and this rate was 34.3% ($n = 57$) for the participants who did not have a marriage history ($p < .001$). The vaccination rate for the second dose was 59.4% ($n = 104$) for the participants who had occupations and 41.6% ($n = 91$) for the unemployed participants ($p < .001$).

Some participants got the first dose of vaccination but not the second one. Accordingly, 88 (31.1%) participants did not get the second vaccination after the first dose. Comparing this group with the participants who got both vaccination doses, the age and education duration differences were similarly significant. Participants with a marriage history were more likely to complete the vaccination process. Contrary to previous comparisons, there were no significant differences regarding employment status. Collected data are summarized in Table 1.

Table 2 compares the non-vaccinated participants with the participants who received two doses of vaccination.

We performed two logistic regressions. One determined the odds ratios of the variables for getting two doses of vaccination compared to non-vaccinated participants, and the second determined the odds ratios for the participants who got the first dose of vaccination but not the second one compared to vaccinated participants. The collected data are summarized in Tables 3 and 4.

Finally, we compared the vaccination rates of our sample to the vaccination rates of the general population in the city of İzmir,

Table 1.
Second Dose of Vaccination (within the participants who got the first dose)

	Vaccinated 68.9% (*n* = 195)	**Not-vaccinated 31.1% (*n* = 88)**		***p****	
Age[1]	41.72 [18 – 74]	32,86 [18 – 57]		<.001	
Education (years)[1]	10.86 [5 – 16]	9,66 [5 – 16]		.001	
	n (%)	*n* (%)	*p***	OR	95% CI
Gender					
Female	21 (75)	7 (25)	.463	1.397	[0.571 – 3.418]
Male	174 (68.2)	81 (31.8)			
Marriage history					
Yes	138 (75.4)	45 (24.6)	.001	2.313	[1.376 – 3.890]
No	57 (57)	43 (43)			
Employment					
Yes	104 (73.2)	38 (26.8)	.114	1,504	[0.906 – 2.497]
No	91 (64.5)	50 (35.5)			
Substance type					
Alcohol use disorder					
Yes	106 (78.5)	29 (21.5)	.001	2,423	[1.432 – 4.101]
No	89 (60.1)	59 (39.9)			
Drug use disorder					
No	128 (80)	32 (20)	<.001	3.343	[1.977 – 5.654]
Yes	67 (54.5)	56 (45.5)			

Note: [1]Mean value and minimum-maximum values are given. *Mann – Whitney U-test. The significance level is 0.05. **Pearson chi-square test. The significance level is 0.05. CI, confidence interval; OR, odds rate.

Table 2.
Unvaccinated vs Getting Two Doses of Vaccination

	Vaccinated 63.7% (*n* = 195)	**Unvaccinated 36.3% (*n* = 111)**		***p****	
Age[1]	41.72 [18 – 74]	30.37 [18 – 59]		<.001	
Education (years)[1]	10.86 [5 – 16]	9.77 [5 – 16]		<.001	
	n (%)	*n* (%)	*p***	OR	95% CI
Gender					
Female	21 (75)	7 (25)	.193	1.793	[0.737 – 4.363]
Male	174 (62.6)	104 (37.7)			
Marriage history					
Yes	138 (75.4)	45 (24.6)	<.001	3.551	[2.178 – 5.788]
No	57 (46.3)	66 (53.7)			
Employment					
Working	104 (75.9)	33 (24.1)	<.001	2.701	[1.647 – 4.431]
Unemployed	91 (53.8)	78 (46.2)			
Substance type					
Alcohol use disorder					
Yes	106 (83.5)	21 (16.5)	<.001	5.104	[2.938 – 8.867]
No	89 (49.7)	90 (50.3)			
Drug use disorder					
No	128 (84.8)	23 (15.2)	<.001	7.310	[4.235 – 12.618]
Yes	67 (43.2)	88 (56.8)			

[1]Mean value and minimum-maximum values are given. *Mann – Whitney U-test. The significance level is 0.05. **Pearson chi-square test. The significance level is 0.05. CI, confidence interval; OR, odds rate.

where the study was conducted, and in Türkiye. Vaccination rates were lower in our sample for both doses and weekly compared to the city and country. For the first week of vaccination, first-dose vaccination rates were 60% for the sample, 66.44% for the country and 75.15% for the city. For the 13th week, these percentages were 81%, 89.02%, and 94.05%, respectively, as summarized in Table 5. For the second vaccination dose, 13th-week vaccination percentages were 81% for the sample, 89.02% for the country, and 94.05% for the city. The overall data are summarized in Table 6.

Discussion

Our study provided us with some valuable information regarding vaccination in people with alcohol or SUDs. There were significant differences regarding age, employment, and education between the vaccinated and unvaccinated groups. The mean age of the vaccinated group for the first dose and the second dose was significantly higher, and this finding is consistent with the literature (Jefsen et al., 2021; Sprengholz et al., 2021; Tzur Bitan et al., 2021). Older participants were more likely to get vaccinated,

Table 3.
Unvaccinated vs Getting Two Doses of Vaccination

	B	**SE**	**Wald**	**OR**	***p***	**CI**	
Age	0.066	0.019	11.539	1.068	.001	1.028	1.110
Education	0.152	0.056	7.411	1.165	.006	1.044	1.299
Alcohol use	1.095	0.835	1.723	2.990	.189	0.583	15.342
Drug use	1.637	0.805	4.119	5.138	.042	0.1058	24.959
Marriage history	0.492	0.332	2.200	1.646	.138	0.854	3.134
Employment	1.062	0.298	12.667	2.891	.000	1.611	5.187

Summary statistics: Model χ^2 = 60.508 p = .001, Hosmer – Lemeshow χ^2 = 6.253 p = .619, model accuracy = 73.9%.

Table 4.
The Second Dose of Vaccination within the Participants Who Got the First Dose

	B	SE	Wald	OR	*p*	CI
Age	0.073	0.019	15.017	1.076	.000	1.037 1.116
Education	0.172	0.054	10.041	1.187	.002	1.068 1.320
Alcohol use	0.910	0.705	1.667	2.484	.200	.624 9.989
Drug use	0.889	0.696	1.633	2.434	.199	.622 9.524
Marriage history	0.173	0.331	0.274	1.189	.691	.621 2.277
Employment	0.762	0.293	6.757	2.144	.009	1.206 3.809

Summary statistics: Model χ^2: 104.617 p = .001, Hosmer – Lemeshow χ^2: 8.271 p = .807, model accuracy: 74.7%.

and as they got older, the chances of getting the vaccination increased by 7% for getting the vaccination and 7.5% for completing the vaccination every year. A recent study showed that vaccine hesitancy is higher in younger groups and associated with lower education (Robertson et al., 2021). Increased acculturation, individualism, and constant exposure to misinformation through social media regarding vaccinations in general could have a negative impact on younger generations. Similarly, in our study, lower total education duration was associated with a lower vaccination rate; as the duration of education increased, the vaccination rate and compliance with the treatment also increased. Every year, the odds increased by 16% for getting the vaccination and 19% for completing the vaccination. This finding is consistent with the literature (Eyllon et al., 2022). One study stated that people with SUD tend to think that the importance of COVID-19 is being exaggerated (H. Huang et al., 2021), and this belief could be reverted with education. Participants with regular jobs were more likely to get vaccinated than those without. These findings are in harmony with some studies that indicate that lower income status is associated with a lower rate of vaccinations (Razai et al., 2021). We did not inspect income status directly, but vaccinated participants were more likely to have regular jobs. This can be interpreted as an important indicator of income status, consistent with the literature. Participants with jobs were 2.5 times more likely to get vaccinated and 2 times more likely to complete the vaccination. Regarding marital status, a relationship between vaccination status and marital status was detected. No marriage history was mainly associated with being unvaccinated, which is again consistent with the literature (Sullivan et al., 2021). This data lets us speculate that no marriage history is one important risk factor for vaccine hesitancy. According to Amuzie, being single is twice as risky for vaccine hesitancy compared to those who are divorced or widowed (Amuzie et al., 2021). Marriage can be interpreted as a form of social support or bonding. People who have never married may lack this system in their lives, which may create different tendencies to avoid getting vaccinated. It should be noted that societal habits are changing rapidly, so these assumptions should be made carefully. Contrary evidence also exists in the literature. Moola et al. (2021) stated that people who were divorced, separated, or widowed were found to be twice as likely to be vaccine-hesitant than single or unmarried.

We did not find any relationship between sex and vaccination rates. Although some data show no significance of sex on vaccination (H. Huang et al., 2021), other evidence indicates that women are more hesitant about vaccination (Flanagan et al., 2017; Murphy et al., 2021). In our sample, sex distribution was in favor of males. The study was conducted in an alcohol and substance use disorder outpatient clinic; this can be associated with this unequal gender distribution.

The vaccination rate of our sample was lower, for both the first dose and second doses, compared to the general population of İzmir and the general population of Türkiye İzmir is the third largest city in Türkiye in terms of population and overall development and the fifth most developed city in terms of healthcare and services (TC Sanayi ve Teknoloji Bakanlığı Kalkınma Ajansları Genel Müdürlüğü, 2019). As the study was conducted in such a city, the vaccination rate of İzmir was higher than in Türkiye,

Table 5.
Vaccination Percentages for the First Dose of Vaccination

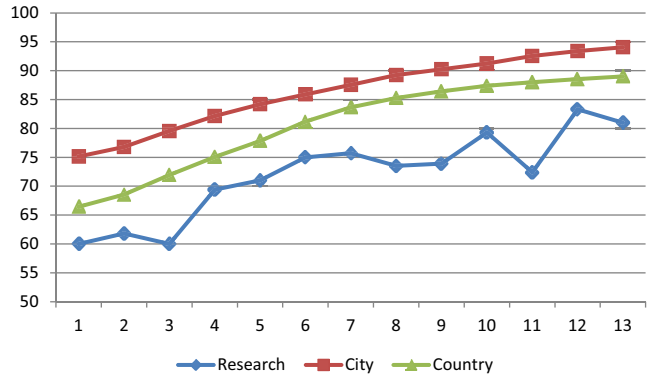
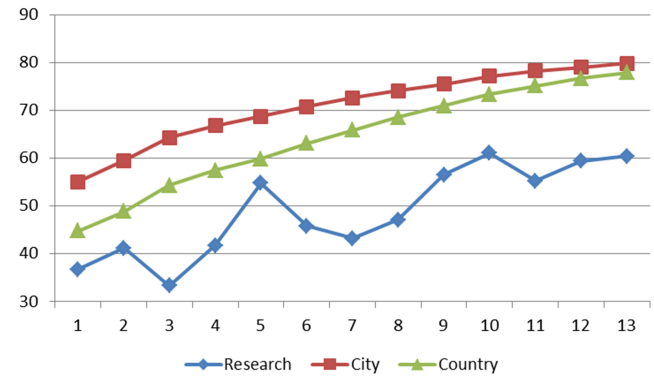


Table 6.
Vaccination Percentages for the Second Dose of Vaccination



so this finding could give us a chance to argue that people with addiction are especially disadvantaged regarding vaccination. It is very concerning that, even in a city that has much better conditions for healthcare compared to the country average, vaccination rates for people with addiction were much lower than the average population in the country. There is substantial evidence in the literature consistent with this finding (Kaufman et al., 2022; Pulcini et al., 2013). In a recent study in Ireland, it is stated that vaccination is more complicated and less present in people with SUD, and because of that, prioritizing this group of people, regarding education about vaccination, avoiding stigmatization, and encouraging them to get vaccinated is especially important (Powell et al., 2023). In another study, over 70% of people with SUD did not get vaccinated for COVID-19 and are living in riskier conditions for infections (C. Huang et al., 2023). It has been shown that people with SUD were more likely to not attribute any importance to social distancing (Stack et al., 2022; Taylor et al., 2021). Lastly, our findings indicate that the type of SUD is also important regarding vaccination. Participants with substance use were five times less likely to be vaccinated. Participants with alcohol use disorder, compared to other SUDs, were more likely to get vaccinated but not as predictive as substance use when it comes to vaccination. In a recent study in California, people with opioid use have lower vaccination rates compared to other drug use disorders, and especially for this group, it is stated that withdrawal symptoms or cravings are considered more negative consequences than complications of COVID-19 (Masson et al., 2021). Moreover, another study indicated that people with opioid use disorder are more likely to have COVID-19 infection. Also, hospitalization rates and deaths from COVID-19 are higher in this group compared to people with alcohol use disorder and the general population. According to a recent study, adults who engaged in daily alcohol or opioid use reported lower CDC guideline adherence for COVID-19 mitigation, and any opioid use was associated with greater odds of COVID-19 testing, while daily stimulant use was associated with greater odds of COVID-19 infection (Wang et al., 2021). These findings are consistent with our study. To our knowledge, this is one of the few studies exploring vaccination status in people with SUD. Most studies mainly focused on vaccine hesitancy, and we also aimed to gather information about people who drop out of the vaccination process. Lastly, we compared vaccination rates weekly for 13 weeks and compared our sample both with the city and the country. We believe our findings can provide some valuable information regarding this issue.

Our study is not without limitations. Our sample consisted of people with addiction; having a healthy control group with similar sociodemographic characteristics could strengthen our findings. Moreover, all the participants were patients who voluntarily came to a psychiatric clinic to get treatment for SUD. This may have created a selection bias and made it difficult to generalize our findings to the general population. Also, this is a cross-sectional study, so the results should be interpreted cautiously.

Conclusion and Recommendations

Addiction is a significant public health problem with many aspects. Problems like stigmatization are becoming more visible in situations of crisis. Prioritizing this group of people for health services like vaccinations, screenings, educational organizations, and social programs will help to reduce vaccine hesitancy and increase overall vaccination rates. Preventive approaches could be beneficial for both people with addiction and the public. Further research is needed to discover specific interventions to help people with addiction.

Ethics Committee Approval: This study was approved by the Ethics Committee of Ege University (Approval No: 23-2T*25, Date: 09.02.2023).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

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