The reluctance to the vaccine, mental health, fear of covid-19 and quality of life among Palestinians: an exploratory comparative study in different geographical areas

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Abstract

Purpose – *This study aims to explore the effect of mental health in terms of depression, anxiety, stress, fear of COVID-19 and quality of life (QoL) on the reluctance to be vaccinated in a population of Palestinian adults living in occupied Palestinian territories and Israel.*

Design/methodology/approach – *The authors recruited 1,122 Palestinian adults who consented to participate in the study; 722 were females, and the mean age of the sample was 40.83 (SD 8.8). Depression, anxiety, and stress scale (DASS), World Health Organization QoL-BREF, FCov-19 and reluctance to the vaccine scale were administered; hierarchical regression analysis was applied to test vaccine reluctance as a dependent variable, and mental health, fear of COVID-19 and QoL as independent variables. This study hypothesized influence of such variables on the vaccine choice with differences due to the participants' geographical locations.*

Findings – *Findings showed an effect of mental health, particularly depression, QoL and fear of COVID on vaccine reluctance, with depression and fear of COVID in the West Bank and Gaza, while in Israel, QoL played a role in vaccination choices.*

Research limitations/implications – *The future needs to be comprehended more thoroughly to discover mutations and fluctuations over time in vaccine hesitancy and the increasing role of psychological distress, diminished QoL and fear of Covid-19. Online recruitment might not have allowed the study to include the most disadvantaged strips of the Palestinian population.*

Practical implications – *Human rights perspectives must be considered in public health and public mental health policies to ensure the QoL and well-being for the Palestinian population during and following the pandemic.*

Social implications – *The crumbling of the Palestinian health-care system exacerbated the sense of dread among the population and made them less likely to vaccinate. The pandemic-like spread of Covid-19 prompts a plea for the global community to actively advocate for the urgent re-establishment of equity, autonomy and durability of the medical infrastructure in the occupied territories and equal entitlements for the Palestinians in Israel.*

Originality/value – *The results demonstrated the importance for public mental health to consider the multiple levels implied in the vaccine refusal in Palestine and Israel among the Palestinian population.*

Keywords *Reluctance of the vaccine, Mental health, Quality of life, Fear of COVID-19, Palestinian population*

Paper type *Research paper*

Introduction

The COVID-19 pandemic spurred research and development for new vaccines (Le *et al.*, 2020). Mass vaccination campaigns were launched, but a critical gap in health-care systems emerged between the Global North and South, causing disparities in access to

vaccines (Singh and Chattu, 2021). In 2021, approximately 600 million vaccine doses were distributed, with 80% of the global population receiving only 5% of the vaccines (Tatar *et al.*, 2021; Our World in Data, 2021). Poor and non-white individuals were at greater risk of exclusion from vaccination, while high gross domestic product (GDP) countries in the Global North were fully covered (Basak *et al.*, 2022). Reluctance to the vaccine was relatively low in the Global South (Solís Arce *et al.*, 2021).

Several studies have explored the influence of psychological predictors and environmental factors on individuals' willingness to receive vaccinations (Feleszko *et al.*, 2021; Parimi *et al.*, 2022). Notably, regional disparities have been examined to determine if they contribute to variations in vaccine acceptance (Abedin *et al.*, 2021; Ba *et al.*, 2022; Kricorian *et al.*, 2022; Nguyen *et al.*, 2022). However, recent findings have indicated that free and paid vaccination acceptance does not differ significantly across regions (Campos-Mercade *et al.*, 2021; Jecker, 2022). This suggests that the effects of psychological predictors on vaccine acceptance are independent of the environmental context.

For example, regarding Malaysians, the perceived effectiveness of vaccination in controlling the COVID-19 pandemic appears to be a significant factor. When Malaysians perceive the vaccine as an effective preventive measure against COVID-19, their inclination to seek free vaccination increases. Moreover, it is worth noting that while fear of COVID-19 predicts vaccination endorsement, its predictive power is comparatively weaker compared to the vaccine's perceived effectiveness (Lee, 2022).

These findings highlight the importance of investigating psychological predictors and their impact on vaccine acceptance, as well as understanding the interplay between individual beliefs, regional factors and the effectiveness of vaccines in controlling the pandemic. By shedding light on these factors, interventions and policies can be developed and targeted effectively to promote vaccine uptake and ultimately contribute to achieving global herd immunity.

Hesitancy to get vaccinated has been linked with deteriorated living conditions, low quality of life (QoL), mental health and ethnicity worldwide. In a study carried out in Britain on more than 20.000 individuals belonging to minority groups, Asian and black, females with lower educational and economic status were more at risk of refusing the vaccination (Chaudhuri *et al.*, 2022). In a sample of Indian adults, 36% were hesitant and 6% were against the vaccine (Umakanthan *et al.*, 2021).

A study focussing on the existing literature on COVID-19 hesitancy worldwide used both a principal component analysis and thematic qualitative analysis to identify factors related to COVID-19 vaccine refusal. When comparing the results of the two approaches, it was found that six out of the eight factors matched. The most frequently discussed factor in the literature was the safety and effectiveness of the vaccine, with a total of 88 themes classified under this factor. The second most commonly discussed factor was mistrust, with 72 associated themes. The third factor, which was discussed with relative frequency, pertained to the socioeconomic characteristics of the people, with a total of 52 related themes extracted (Ochieng *et al.*, 2021).

Anxiety, depression and stress dramatically increased during the pandemic, contributing to a global mental health emergency during and after the virus outbreak (Brooks *et al.*, 2020; Shevlin *et al.*, 2020). In a survey carried out in Canada and the USA (Turna *et al.*, 2021), 30.7% of the sample reported anxiety symptoms against 19.6% and 35. 1% reported in previous research in China (Zhang *et al.*, 2020; Huang and Zhao, 2020). Depression was detected in 29.4% of the sample against 9.8% and 48.3% in a Chinese sample (Zhang *et al.*, 2020; Gao *et al.*, 2020). According to a survey conducted by Turna *et al.* (2021) in Canada and the USA, 30.7% of the sample reported experiencing anxiety symptoms. This percentage differs from the rates reported in previous research conducted in China by Zhang *et al.* (2020) and Huang and Zhao (2020), where 19.6% and 35.1% of the participants, respectively, reported anxiety symptoms. Accordingly, similar results were

obtained in American, Indian and Iranian samples (Gallagher *et al.*, 2020; Khademian *et al.*, 2021; Rehman *et al.*, 2021).

In Palestine, according to the results provided by Radwan *et al.* (2021), the majority of students involved in the research experienced moderate to severe levels of anxiety (89.1%) and depression (72.1%), while less than half (35.7%) experienced moderate to severe stress. The scores for stress, anxiety and depression were significantly different based on gender, age group, family size and family economic status. Age and family's economic level were negative predictors correlated with stress, whereas family size positively affected stress. The study also found that concerns about COVID-19's impact on the economy, education and daily life were positively correlated with depression, anxiety and stress; the availability of social support had a negative correlation (Radwan *et al.*, 2021). Mahamid *et al.* (2023) also discovered a positive and significant correlation between COVID-19-related fear and mental health outcomes and a negative correlation with perceived emotional support, support seeking and received support in a Palestinian population.

Mental health played a role in the attitudes of individuals sceptical towards the vaccine (Smith *et al.*, 2021); in particular, people with previous mental health conditions showed less fear of the infection and refusal of the new generation vaccine with adherence to specific conspiracy theories (Gibbon *et al.*, 2021; Paul *et al.*, 2021).

As for our study, the Palestinian case shows some peculiarity due to the ongoing military occupation, low-intensity conflict and chronic discrimination (Peteet, 2016). According to available data, the total Palestinian population is comparable in size to the total Israeli Jewish population (Zureik, 2023).

The COVID-19 outbreak exacerbated the critical living conditions of the population, increasing mental distress and a sense of isolation and exclusion with limited access to vaccines and other medical supplies (e.g. only 3% of the Gaza population was vaccinated in 2021) to curtail the pandemic (Shoib *et al.*, 2021). On the other hand, despite a lack of statistics, research in the region revealed a concerning resistance to vaccination and scepticism on the new generation vaccine mainly due to the Israeli control of the distribution and availability of the doses (Kateeb *et al.*, 2021; Maraqa *et al.*, 2021; Abu-Odah *et al.*, 2022). Accordingly, an association between mental health conditions, such as anxiety, depression and stress, with vaccine refusal was found in Gaza (Hamdouna and Al Massri, 2022). Finally, people with lower QoL were more exposed to mental burdens related to the fear of the virus (Mahamid *et al.*, 2021).

Moving from the premises mentioned earlier and considering the peculiarity of a context under military occupation, our study would investigate whether mental health, QoL and fear of the coronavirus might influence people's hesitancy to the vaccine in a Palestinian population living in the occupied Palestinian territories (oPts) and Israel.

The study

To our knowledge, up to date, no studies on the Palestinian population have been conducted to test the influence of mental distress, QoL and COVID-19 fear on people's will to be vaccinated.

The peculiar conditions of the oPts make this topic worthy to be covered even though it has been extensively studied worldwide. For 77 years, Palestine endured a chronic health and economic crisis due to the ongoing Israeli military occupation. Shortages of financial and material resources, health services and supplies severely affected the civil population's mental well-being and QoL (Giacaman *et al.*, 2011). Gaza has lived under an almost complete military blockade since 2007 that severely compromised the resources to cope with social suffering and disruption of QoL (Elessi *et al.*, 2019). The West Bank and East Jerusalem experience an acute crisis impeding sustainable development due to settler-

colonial violence (the settlers primarily consist of Israeli Jewish settlers), territorial discontinuity and military occupation (Giacaman *et al.*, 2007). Finally, Palestinians in Israel live in disadvantaged conditions in terms of socioeconomic and educational opportunities, perceiving themselves as marginalized and racialized second-class citizens (Abo-Rass *et al.*, 2020). If in the Palestinian territories, the QoL is severely compromised and impacts individuals' mental health, in Israel, social exclusion is quite common among the Palestinian communities (Rosenthal, 2021).

Accordingly, the military occupation severely influenced the vaccination campaign in the occupied territories. In fact, the Palestinians received adequate vaccine doses through donations from developed countries in the late phase of the outbreak. The vaccination program was set to be implemented with the provision of free-of-charge and voluntary vaccinations. A certain amount of doses by donation (Pfizer and AstraZeneca, 43,200 doses for the West Bank, 28,800 doses for the Gaza Strip) were supplied through the COVAX campaign (Unicef, 2021). When the health authorities started an extensive vaccination campaign in Palestine, Israel was leading country for the third dose (Martin and Arawi, 2021). Such a gap created two types of mass psychological reactions. First, people felt once again frustrated and neglected by the international community, considering that at the beginning of the WHO-launched global vaccine campaign, an insufficient batch of Xinovax (Chinese) and Sputnik (Russian) donated stocks were available in oPts. In the late phase of the global vaccination campaign, most of the available doses were provided by the Ministry of Health, with AstraZeneca, prohibited in Europe and minimum availability of Pfizer and Johnson & Johnson stocks (Howard and Schneider, 2022; Watt *et al.*, 2021). Second, a late Israeli campaign of vaccination support of oPt through cooperation with the Palestinian Authority favoured rumours and complot theories among the population of an attempt of mass poisoning and control through the vaccine by the occupier. Accordingly, psychological stress due to the occupation and QoL disruption might have potentiated such negative attitudes against vaccination. Moreover, in Israel, Palestinians sympathized with their ethnic group in the territories and showed mistrust for the governmental authorities (Ali-Saleh *et al.*, 2023).

The Palestinian people's reluctance to receive the COVID-19 vaccine can be attributed to two main factors. Firstly, the spread of false rumours, misinformation and complot theories on social media causing panic and fear among the population. Secondly, there is a sense of mistrust towards the vaccines that the government has purchased. The exaggeration of the vaccine's side effects has also contributed to this reluctance (Abu-Odah and Musa, 2022).

In the present study, we sought to explore the main independent variables predicting the reluctance towards the vaccine: QoL, mental distress (depression, anxiety and stress) and fear of COVID-19. Those predictors were tested both in the whole population, made of Palestinian adults, and in specific territorial entities, West Bank (WB), Gaza Strip and East Jerusalem (EJ) in the oPts and Israel. We hypothesized a prediction effect of mental health, QoL and fear of COVID-19 on vaccine hesitancy (*H1*). Secondly, we hypothesized differences in the contexts. We expected a prevalence of mental distress and fear of COVID in the occupied territories (WB, Gaza Strip and EJ) (*H2*), while an effect of mental distress and QoL in the Israeli sample of Palestinian descendants (*H3*).

Methods

Participants

The study recruited Palestinians living in the oPt and those living in Israel. The participants were selected online using social media networks such as Facebook and Twitter, e-mails and online advertisements. The Google Forms used in the study was distributed online by the study authors and a wide circle of colleagues and friends to reach a broad audience that represents the studied populations. All participants had to be of Palestinian origins,

Arabic native speakers, currently living in the oPt, East Jerusalem and Israel and free of severe mental and neurodevelopmental conditions such as psychosis or personality disorders.

Instruments and procedures

The study was conducted from December 2021 to May 2022, during which the Palestinian Ministry of Health actively carried out the COVID-19 vaccination programme. The convenience sampling method was used to recruit the participants to the study using online Google Forms, which included a description of the study, the scales used and the intended objectives of the study. We considered completing the online questionnaire as giving consent to participate in the study, which was conducted following the guidelines of the Declaration of Helsinki (2013) and the American Psychological Association (2010). The study had been approved by the Institutional Review Board at An-Najah National University (Protocol INTR June 2022/9).

We used four different instruments to test the abovementioned hypotheses. To ensure linguistic accuracy and reliability, *the COVID-19 Vaccine Acceptance Scale (VAC-COVID-19)*, which had not been previously validated in Arabic, underwent a translation process from the original English version to Arabic and then back-translated to Arabic. This process aimed to verify the linguistic accuracy and reliability of the scale in its translated form. The Arabic instruments were pilot-tested by native Arabic-speaking experts in psychology, counselling and social work. They evaluated the instruments for their clarity and relevance in content and language. An expert English-Arabic translator and editor did the translation back to English. Finally, the translated Arabic version was pilot-tested among 70 participants, who helped further refine the instruments' clarity.

Depression, Anxiety and Stress (DAS-21) Scale: a 21-item self-reported instrument that utilizes Likert-type questions graded 0 (did not apply to me at all over the past week) to 3 (applied to me very much or most of the time over the past week) for the presence over the previous week of particular symptoms and manifestations that are common in depression and anxiety disorders. The instrument was initially designed and developed by Lovibond and Lovibond (1995) to assess the severity of the main symptoms of depression, anxiety and distress.

World Health Organization Quality of Life Instrument (WHOQOL-BREF): a shorter version of the longer WHOQOL-100 questionnaire, developed by the World Health Organization (1996), to test one's health and QoL, whether there is active disease or not. It is a self-administered questionnaire comprising 26 questions examining perception of health and well-being over the previous two weeks. The instrument also utilizes Likert-scale questions graded from 1 (not at all) to 5 (an extreme amount). The scale has an upwards scoring system, with higher scores indicating a better QoL.

Fear of COVID-19 Scale (FCV-19S): a self-reported instrument that assesses fear of COVID-19 among individuals. It comprises seven items that explore emotions of fear towards the COVID-19 pandemic. The items are graded from 1 (strongly disagree) to 5 (strongly agree), with a total score ranging from 7 to 35. The higher scores increase a higher degree of fear of COVID-19. Ahorsu *et al.* (2022) developed the instrument early in the pandemic and showed acceptable internal validity with a Cronbach's alpha of 0.82.

The COVID-19 Vaccine Acceptance Scale (VAC-COVID-19): Developed by Mejia *et al.* (2021) to assess attitudes, beliefs and behaviours towards the COVID-19 vaccines. We utilized 11 items of the scale grouped into two categories: items 1–7 explored reasons for not accepting/receiving the vaccine, and items 8–11 explored reasons for accepting/receiving the vaccine. All items were graded from 1 (never) to 5 (always). Higher scores indicate a higher degree of reluctance towards the vaccine.

Data analysis

We used hierarchical linear regression analysis to generate models that predict the impact on the level of reluctance to the vaccine as an outcome variable of various predictors, namely, symptoms of depression and anxiety, QoL and fear of COVID-19. Regression analysis was carried out to understand what predicts vaccine hesitancy among the Palestinian population. The analysis was conducted based on geographical location to generate more relevant and specific models given the different contexts under which they live. Additionally, Pearson correlation was calculated to explore the association between the predictor variables (depression, anxiety, stress, QoL and fear of COVID-19) and the outcome variable (reluctance to the vaccine).

To ensure accuracy, we checked all variables for assumptions related to hierarchical regression, such as homogeneity of the variance and multivariate normality. We found no significant violations of normality. We also identified and excluded three extreme multivariate outliers using Mahalanobis' distance ($p < 0.001$). Additionally, we verified that all scores were normally distributed and found that none of the variables displayed kurtosis or skewness values outside the recommended range of -2 to $+2$ (as recommended by George and Mallery, 2021). The analysis was carried out using SPSS version 26.

Results

Nearly 70% of the participants resided in cities, 19.7% in villages and 11.1% in Palestinian refugee camps. Almost half of the sample came from the Gaza Strip, 35.5% from the West Bank, 9.5% from Israel and 5.1% from East Jerusalem. The sample was relatively educated; 53.7% completed a bachelor's degree, 31.8% held a master's degree and 14.5% were educated up to secondary school.

Table 1 shows the descriptive statistics about the measures and scales used: Depression, Anxiety, Stress, WHOQOL, Fear of COVID-19 and Reluctance to the COVID-19 vaccine. Participants reported relatively high scores on the WHOQOL, indicating good QoL. They also reported moderate scores on the DASS-21 components, with higher scores on symptoms of depression and stress sub-scales than anxiety. Scores of the FCV-19S were mild. The reliability of all the scales used in the study was high, with Cronbach's alpha values exceeding 0.8 for each scale. The Stress scale had the lowest reliability coefficient of 0.82, while the Fear of COVID-19 Scale (FCV-19S) had the highest reliability coefficient of 0.91.

Prediction of reluctance to COVID-19 vaccine

Reluctance to the vaccine was positively correlated with symptoms of stress, anxiety, depression and fear of COVID-19, while it negatively correlated with QoL, as shown in Table 2.

Linear regression analysis using a hierarchical method explored which factors predicted the reluctance to the vaccine in the study sample. The probability of F entering the model was set at ≤ 0.05, and F's probability of removing the variables from the model was ≥ 0.100. The

Table 1 Descriptive statistics for the main study's variables ($N = 1122$)

Variable	*Mean*	*S.D*	*Min*	*Max*	*Range*	*Skewness*	*Kurtosis*	*Reliability*
QoL	3.41	0.019	1.21	4.96	3.75	−0.51	0.32	0.90
Stress	2.15	0.019	1.00	4.00	3.00	0.48	0.05	0.82
Anxiety	1.80	0.020	1.00	4.00	3.00	1.04	0.85	0.85
Depression	2.12	0.019	1.00	4.00	3.00	0.52	0.14	0.86
Fear of COVID	1.66	0.02	0.29	5.00	4.71	1.48	1.54	0.91
Reluctance	2.43	0.01	0.15	4.00	3.85	0.13	0.01	0.86

Source: Table by authors

Table 2 Pearson correlation between reluctance to the vaccine as an outcome and QOL, stress, anxiety, depression and fear of COVID as predictor variables ($N = 1122$)

		1	2	3	4	5	6
1	Reluctance to vaccine	1.000					
2	QOL	−0.08**	1.000				
3	Stress	0.28**	−0.35**	1.000			
4	Anxiety	0.27**	−0.36**	0.81**	1.000		
5	Depression	0.28**	−0.37**	0.89**	0.83**	1.000	
6	Fear of COVID	0.23**	−0.16**	0.37**	0.45**	0.37**	1.000

Note: ** α is significant at ≤ 0.01
Source: Table by authors

regression analysis was used for the study sample as a whole and then categorized based on the geographical locations of the participants.

A hierarchical regression analysis was conducted to determine the predictors of vaccine hesitancy in the study population. Step 1 included gender, residence, age and educational level, whereas Step 2 included symptoms of stress, anxiety, depression, QoL and fear of COVID-19. Analysis found several factors influencing vaccine reluctance. Firstly, gender significantly predicts reluctance to the vaccine, with females ($\beta = 0.10$; $^{**}p < 0.001$) exhibiting a higher tendency towards reluctance. Additionally, residence plays a role, with camp residents ($\beta = 0.08$; $^{**}p < 0.001$) more likely to be reluctant than urban and rural residents. The educational level also contributes, as individuals with a high school degree ($\beta = 0.15$; $^{**}p < 0.001$) exhibit higher levels of reluctance compared to those with a bachelor's (BA) or master's (MA) degree. Finally, age is a factor, with the age category of 41–50 ($\beta = 0.07$; $^{**}p < 0.001$) displaying a greater reluctance to the vaccine compared to the age categories of 20–30 and 31–40. Moreover, our model showed that vaccination reluctance is predicted by symptoms of depression ($\beta = 0.15$; $^{**}p < 0.001$), fear of COVID ($\beta = 0.11$; $^{**}p < 0.001$) and QoL ($\beta = 0.06$; $^{**}p < 0.001$) (Table 3).

When the regression analysis was applied for each geographical region, the models changed with different predictors for each geographical region, as shown in Table 4. Symptoms of depression ($\beta = 0.32$; $^{***}p < 0.05$) was the significant predictor of the reluctance to the vaccine in the West Bank, whereas, in Gaza Strip, fear of COVID-19

Table 3 Hierarchical regression analysis for variables predicting vaccination reluctance ($N = 1122$)

Variable	B	SEB	β	Sig.	R^2
Step1					0.03
Gender	0.13	0.03	0.10	0.000***	
Residence	0.07	0.02	0.08	0.004***	
Age	0.03	0.01	0.07	0.01**	
Educational level	0.14	0.02	0.15	0.000***	
Step2					
Gender	0.11	0.03	0.08	0.003***	0.13
Residence	0.05	0.02	0.05	0.039***	
Age	0.06	0.01	0.12	0.000***	
Educational level	0.11	0.02	0.12	0.000***	
Stress	0.07	0.05	0.08	0.20	
Anxiety	0.03	0.04	0.04	0.45	
Depression	0.14	0.06	0.15	0.02*	
Fear of COVID	0.07	0.02	0.11	0.000***	
QoL	0.05	0.02	0.06	0.04*	

Notes: $^{***}P < 0.001$; $^{*}p < 0.05$
Source: Table by authors

Table 4 Hierarchical regression for variables predicting vaccination reluctance due to geographical region (N = 1122)

Region	*Variable*	*B*	*SEB*	*β*	*Sig.*	R^2
West Bank	*Step1*					0.08
	Stress	−0.11	0.10	−0.117	0.27	
	Anxiety	0.10	0.08	0.11	0.22	
	Depression	0.31	0.10	0.32	0.004***	
	QOL	0.08	0.06	0.08	0.15	
	Step2					
	Stress	−0.09	0.10	−0.10	0.35	0.09
	Anxiety	0.05	0.09	0.05	0.56	
	Depression	0.31	0.10	0.32	0.004***	
	QOL	0.08	0.06	0.02	0.14	
	Fear of COVID	0.08	0.044	0.10	0.06	
Gaza	*Step1*					
	Stress	0.07	0.08	0.08	0.41	0.05
	Anxiety	0.08	0.06	0.09	0.23	
	Depression	0.04	0.08	0.05	0.59	
	QOL	−0.06	0.03	−0.07	0.12	
	Step2					
	Stress	0.04	0.08	0.05	0.60	0.09
	Anxiety	0.04	0.06	0.05	0.50	
	Depression	0.05	0.08	0.06	0.51	
	QOL	−0.05	0.03	−0.07	0.13	
	Fear of COVID	0.08	0.02	0.14	0.002***	
East Jerusalem	*Step1*					
	Stress	0.88	0.30	0.90	0.005***	0.24
	Anxiety	0.05	0.26	0.04	0.84	
	Depression	−0.47	0.30	−0.49	0.12	
	QOL	0.05	0.15	0.05	0.73	
	Step2					
	Stress	0.92	0.31	0.94	0.004***	0.25
	Anxiety	0.06	0.26	0.05	0.80	
	Depression	−0.52	0.31	−0.54	0.10	
	QOL	0.04	0.15	0.04	0.79	
	Fear of COVID	−0.07	0.11	−0.08	0.53	
Israel	*Step1*					
	Stress	0.38	0.17	0.50	0.02*	0.45
	Anxiety	−0.07	0.12	−0.10	0.53	
	Depression	0.04	0.17	0.05	0.79	
	QOL	0.35	0.09	0.32	0.000***	
	Step2					
	Stress	0.35	0.16	0.46	0.03*	0.51
	Anxiety	−0.17	0.12	−0.23	0.16	
	Depression	0.06	0.16	0.08	0.67	
	QOL	0.36	0.09	0.32	0.000***	
	Fear of COVID	0.14	0.04	0.27	0.001***	

Notes: $^{**}p < 0.01$; $^{*}p < 0.05$
Source: Table by authors

($\beta = 0.14$; $^{***}p < 0.05$) predicted the vaccination reluctance significantly. As for East Jerusalem, only symptoms of stress ($\beta = 0.90$; $^{***}p < 0.001$) entered the model and significantly predicted the vaccine's reluctance. Finally, Israeli Palestinians showed that vaccination reluctance predicted by symptoms of stress ($\beta = 0.46$; $^{***}p < 0.05$), QoL ($\beta = 0.32$; $^{***}p < 0.001$) and fear of COVID-19 ($\beta = 0.272$; $^{***}p < 0.001$).

Discussion

Our work sought to explore the effect of QoL, fear of COVID-19 and mental distress on the reluctance to be vaccinated in a sample of Palestinian adults living in different areas of so-called historical Palestine (Pappé, 2021), the West Bank, East Jerusalem and Gaza Strip

in the oPts and Israel. We entered the model with the selected independent variables both in the sample as a whole and for each separated territorial entity.

In Palestine, the profile of individuals who are more hesitant towards COVID-19 vaccination reveals that middle-aged women residing in refugee camps and with lower levels of education tend to exhibit greater scepticism when showing depression symptoms.

Our study, in line with previous international research (Asaoka *et al.*, 2022; Palgi *et al.*, 2021; Pan *et al.*, 2022; Tsutsumi *et al.*, 2022), found that mental health, particularly symptoms of depression, played a crucial role in vaccine choices among the Palestinian population, primarily in the West Bank. Disrupted living conditions in oPts and the marginalization of the Palestinian minority in Israel further worsened the population's psychological well-being during the pandemic (Shoib *et al.*, 2021; Veronese *et al.*, 2021a, 2021b). Depressive symptoms appeared to be reactive to increased isolation and a significant gap between Palestinians and Israelis, contributing to vaccine hesitancy (Dahdal *et al.*, 2021). Fear of COVID-19, influenced by depression symptoms, negatively impacted vaccine receptiveness.

Literature reports how mental health conditions influence fear of COVID-19 and expose individuals to more health-related risky behaviours (Veronese *et al.*, 2021a).

Mental health showed its role as a predictor of vaccine refusal in all the Palestinian population in the region, with differences that might be discussed in the light of political condition. First, in the West Bank, the general trend was confirmed with depression as a crucial predictor. At the same time, Gaza showed COVID-19 anxiety as the pivotal condition that fostered concern about the infection and hesitancy towards vaccines (*H2*). WB is enduring a military occupation; those effects were exacerbated during the pandemic's first phase, augmenting people's sense of impotence and depression (Shadeed and Alawna, 2021). A sense of isolation, disconnection and dependency on Israeli authorities increased the population's mistrust and suspicion of vaccination campaigns. In May 2021, during the second wave of the infection, Gaza experienced a 10-day violent bombardment that destroyed the few vaccinal hubs in the Strip (Zarocostas, 2021). Thus, fear of COVID-19 and growing anxiety emerged as risk factors for vaccine acceptance in a context characterized by high uncertainty and acute violence (Devi, 2021). In East Jerusalem, violent repressions and evictions from homes impacted inhabitants' stress, most probably compromising the trust of the Israeli health authority and fostering scepticism, suspicion and refusal of the vaccine (Hawari, 2020; Samman and Saifi, 2022). Finally, the Palestinian-Arab population in Israel is facing marginalization and reduced access to resources compared to the Jewish citizens residing in Israel. Accordingly, QoL and stress played a crucial role, and the fear of COVID reduced the number of people seeking vaccination (Green *et al.*, 2021; Saban *et al.*, 2021).

Living in a refugee camp, characterized by significant disruptions to the QoL and increased exposure to the burdens of military violence, appears to contribute to higher levels of vaccine reluctance among specific demographics.

In sum, mental health conditions, QoL and fear of COVID played a key role in fostering hesitancy for the vaccine among the population underlining the disparity between the disadvantaged Palestinian and the Israeli population.

We discuss some limitations. First, the cross-sectional study design prevented any causality inference and showed mere associations between the relevant variables included in the study. We need future research to understand better trajectories and changes over time in vaccine hesitancy and the aggravating role of mental distress, reduced QoL and far of COVID-19. Online recruitment might not have allowed the study to include the most disadvantaged strips of the Palestinian population. However, the Israeli discrimination against the indigenous population affects the whole socioeconomic level of Palestinian society, making our results consistent with the reality on the ground in Israel and Palestine (Zureik, 2001). The sample size would have suggested using more complex statistical

elaboration, such as structural equation modelling (SEM), instead of hierarchical regression analysis. However, SEM is a complex technique that requires a solid theoretical model and is better suited for analysing complex systems with multiple latent variables. Currently, we are in the frame of an exploratory analysis: our goal is exploratory in nature; thus, linear regression allows for a more flexible approach. We can assess the relationships between variables without predefining a theoretical model, making it helpful in generating initial insights or hypotheses that we will test in a future conceptual model. Choosing a single outcome variable to pilot our research question, SEM, may be overly complex and unnecessary.

The quantitative exploration of vaccine hesitancy among Palestinians did not allow us to understand cultural, deeper religious and even environmental constraints that could have exacerbated the refusal to vaccinate. Moreover, we must acknowledge that our instruments would not have precisely discerned from previous psychological conditions and those related to the COVID-19 outbreak among the population. Future qualitative and ethnographic studies will allow us to understand and deepen our findings' meaning.

Conclusions

Our findings revealed the crucial role of mental health (symptoms of depression and a minor role of anxiety and stress), fear of COVID-19 and QoL in increasing vaccine scepticism among the Palestinian population. The deteriorated living conditions in the occupied territories (West Bank, Gaza and East Jerusalem) pose urgent concerns regarding Public Health and Public Mental Health (Ayyash, 2022). The collapse of the health system in Palestine did not favour positive attitudes towards vaccination and increased fear, depression and distress among the population (Bizri *et al.*, 2021). Hence, public health and public mental health policies cannot avoid including human rights-related perspectives in promoting QoL and well-being among the Palestinian population during and beyond the pandemic (Diab *et al.*, 2018; Hammoudeh *et al.*, 2020; Muhareb and Giacaman, 2020). Syndemia is the interaction and synergistic effects of two or more co-occurring health conditions – often due to social, economic and political antecedents and determinants – or epidemics, exacerbating their impact on a population (Horton, 2020); the syndemic nature of widespread COVID-19 urges a call for the international community to campaign for the immediate restoration of equity, self-determination and sustainability of the health system in the occupied territories and equal rights for the Palestinian population living in Israel.

Overall, COVID-19 fear and related psychological burdens among Palestinians lead to vaccine hesitancy and refusal in a context of surveillance and control ruled by the Israeli occupier.

As the occupying power, Israel is bound by international law to fulfil its duty of providing health care to the population living under occupation, including ensuring access to vaccinations during a pandemic (Watt *et al.*, 2021). This obligation stems from the Fourth Geneva Convention, a cornerstone of humanitarian law, which outlines the protection of civilians in times of occupation and armed conflict (Imseis, 2003). While Israel did supply a limited number of vaccines to the Palestinian Authority, the process has been criticized for its slow pace and lack of transparency (Howard and Schneider, 2022; Watt *et al.*, 2021).

The historical and ongoing political tensions, coupled with the impact of the Israeli occupation on the Palestinian QoL, contribute to a sense of mistrust among some Palestinians. This scepticism can influence their decision-making regarding vaccinations, as they may question the underlying motivations or fear potential adverse consequences (Dahdal *et al.*, 2021).

The absence of a significant relationship between QoL and vaccination hesitancy among the Palestinian population residing in oPts is a noteworthy finding, contrary to our initial expectations. One plausible explanation is that the QoL of this population is already

extensively compromised. Therefore, any impact on vaccination choices is minimal, as there were no substantial changes in QoL during the pandemic.

Critics argue that Israel's control over the movement of people and goods into and within the occupied territories has hindered the Palestinian vaccination efforts. Additionally, some suspect that the limited supply of vaccines provided by Israel was a strategic move to assert control over the Palestinian population or to gain diplomatic leverage.

Israel contends that it has prioritized vaccinating its population first due to the urgency within its borders. They have also argued that the Oslo Accords, which govern the relationship between Israel and the Palestinian Authority, place responsibility for health care on the Palestinians themselves.

While we acknowledge that our results cannot be generalized, it is crucial to emphasize the significance of prioritizing QoL and mental well-being. This holds true especially for populations experiencing stress, uncertainty, political and military violence, marginalization and racialization. Understanding the costs and benefits of a COVID-19 vaccination campaign becomes essential in these circumstances. We must globally address the interconnectedness of the COVID-19 syndemic (Horton, 2020) and its impact on public mental health, considering that individuals living in challenging conditions with compromised QoL may exhibit increased fears regarding COVID-19 and experience reluctance towards vaccination.

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Further reading

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