RESEARCH ARTICLE

COVID-19 vaccination hesitancy amongst COVID-19-positive patients in a Maltese suburban population

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ABSTRACT

Background

The COVID-19 pandemic brought about unprecedented demands in primary care service provision and delivery. Vaccination helped to alleviate disease burden, control outbreaks, improve patient outcomes and reduce avoidable deaths. However, there is limited data on COVID-19 vaccination hesitancy on selectively suburban populations in island communities. It is imperative to identify the rationale behind vaccine hesitancy amongst patient subgroups.

Objectives

The aim of the study was to assess COVID-19 vaccination hesitancy amongst COVID-19-positive patients in a Maltese suburban population. The objectives of the analysis include assessing the patients' attitudes towards COVID-19 vaccination, providing information to facilitate the planning of vaccination campaigns and to inform the vaccine strategy.

Methods

A quantitative, retrospective, descriptive, cross-sectional study was performed. A telephone consultation was conducted on a purposive sample of 700 patients who had a positive PCR test for SARS-CoV-2 between July and September 2021. The novel, validated 5C (Constraints/Confidence/Collective responsibility/Complacency/Calculation) scale was used amongst the unvaccinated/partially vaccinated patient population to analyse psychological antecedents of vaccination, facilitate diagnosis, address vaccine hesitancy and potentially, increase vaccine uptake. Statistical analysis was performed using the Statistical Package for the Social Sciences v27.

Results

Almost one-fifth of participants were unvaccinated or partially vaccinated. The most common psychological underpinnings of vaccine hesitancy were confidence and constraints. Collective responsibility was the least frequent psychological antecedent of vaccination.

Conclusion

This study provides information for healthcare professionals, researchers, educators and policymakers to guide resource allocation,

develop area-targeted public health programmes and mitigate the effects of vaccine hesitancy in suburban populations.

Key Words
Community health care; COVID-19; primary health care; vaccination; vaccine hesitancy.

INTRODUCTION

The COVID-19 pandemic has modified the multidimensional concept of primary care on 3 levels of care including the structure, process and outcomes (Rawaf *et al.*, 2020; Kringos *et al.*, 2010). Several methodological and conceptual challenges arise when developing country-specific and context-specific primary health care policies in island communities (Agius, 1990; Lamnisos, Lambrianidou and Middleton, 2019). It is thought that the small size of discrete geographically-defined communities, the limited variation in the degree of remoteness and the associated social homogeneity reduce the tendency for health and social discrepancies in island communities (Turrell, Kavanagh and Subramanian, 2006; Agius, 1990). The Maltese public primary health care system swiftly adapted to such circumstances by establishing the first Telemedicine Centre to support and manage patients with COVID-19 infection while under quarantine in the community (Primary Health Care, 2021).

A team of local general practitioners, called the 'Primary HealthCare Community COVID-19 Initial Assessment team' (PHC-CCIAT), performed the initial medical assessment and clinical decisions for all newly diagnosed community patients (Primary Health Care, 2021). Timely care was provided locally throughout the COVID-19 pandemic (Cassar *et al.*, 2021). Psychological antecedents of vaccination were used to facilitate risk assessment, diagnosis and evaluation of primary care patients with COVID-19 infection in the community (Betsch *et al.*, 2018).

There is limited literature concerning COVID-19 vaccination hesitancy on selectively suburban populations in island communities. The aim of the study was to assess COVID-19 vaccination hesitancy amongst COVID-19-positive patients in a Maltese suburban population. The objectives of the analysis include assessing the attitude of patients towards COVID-19 vaccination together with the actual uptake of the vaccine, providing information to facilitate the planning of vaccination campaigns and to inform the vaccine strategy.

METHOD

A quantitative, retrospective, descriptive, cross-sectional study was conducted by using a telephone survey. Data was obtained from the Access Database developed by the Primary HealthCare Department and used by the PHC-CCIAT. The form was developed for clinical purposes to assess COVID-19 positive patients in the community. An intermediary was used to fully anonymise the data. The current study included a purposive sample of 700 COVID-positive patients between July and September 2021. The inclusion criteria included those patients above 16 years of age, those who had tested positive for COVID-19 infection and only those who were being managed in suburban communities in the Maltese islands. The exclusion criteria included those subjects who were too sick to participate, those with no contact telephone numbers or those who did not reply, tourists and those residing in hotels/boats or elderly homes.

Patients' places of residence were documented. The definition of suburban areas relied on the categorization made by local experts as per the European Urban Health Indicator System project. The northern regions of Malta are characterized by suburban landscaping and agricultural activities (Agius, 1990). The suburban regions in Malta included those localities that are not situated near the harbour area (Patterson *et al.*, 2017).

The innovative 5C scale (Constraints/Confidence/Collective responsibility/Complacency/Calculation) was validated for field settings and regular international evaluation of important antecedents of vaccination. Varied factors were found to explain vaccination behaviour including constraints (structural and psychological barriers), confidence (attitudes towards vaccination), characteristics affecting collective responsibility (willingness to protect others), complacency (not perceiving illness as high risk) and calculation (engagement in extensive information searching). The 5C scale was applied to the unvaccinated and the partially vaccinated patient populations. In the current study, this 5C novel tool helped to facilitate diagnosis, address vaccine hesitancy and potentially, increase vaccine uptake. (Betsch *et al.*, 2018).

Data was analysed to extract the socio-demographics and vaccination attitudes of all these patients. Statistical analysis was performed using the Statistical Package for the Social Sciences v27 (IBM International; http://www.spss.com).

Ethics approval

Permission was sought from the Data Protection Officer of the Primary HealthCare Department. The study received ethics approval from the University of Malta on 7th March 2022 (reference number: MED-2021-00052).

RESULTS

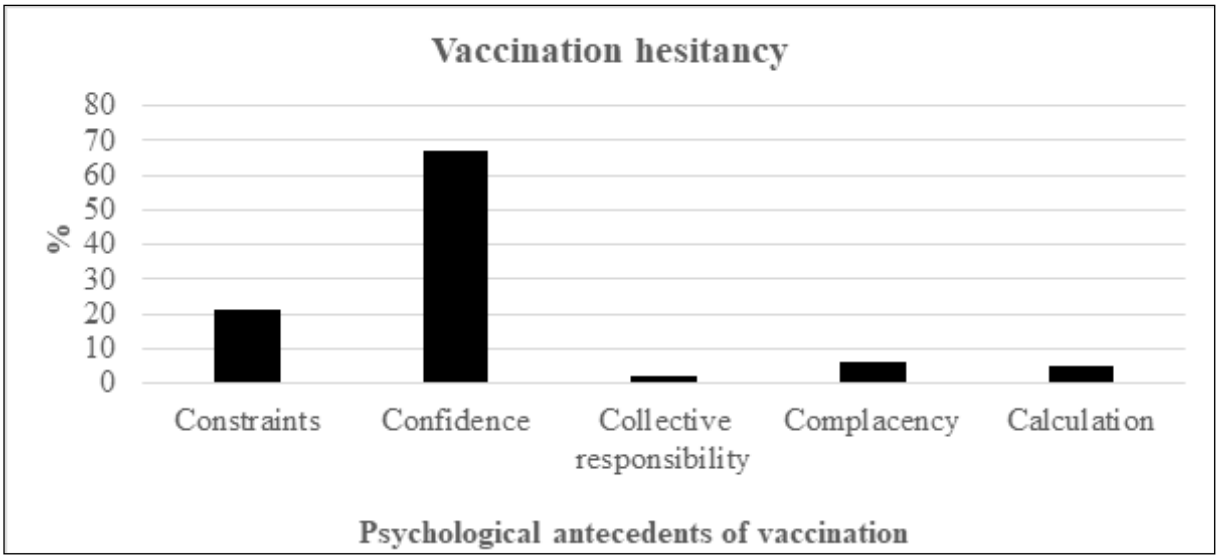
There were slightly more male respondents than female ones. Most respondents had higher levels of education and good social support. Almost one-fifth of participants were unvaccinated or partially vaccinated (Table 1). The sample population had an age distribution of 16–90 years with a mean of 45±18 years.

Table 1: Sociodemographic characteristics of participants (n=755)

Characteristic	*n* (%)
Gender	
Male	393 (52)
Female	360 (48)
Educational Level	
Primary	32 (8)
Secondary	191 (47)
Tertiary	187 (46)
Self-reported Perceived Social Support	
Good	616 (89)
Lives alone	63 (9)
Lacking	10 (1)
Patient reliable to call back (as assessed by the trained primary care doctor)	
Yes	690 (90)
No	73 (10)
Place of recovery	
Community	682 (98)
Hospital	15 (2)
Vaccination status	
Full	562 (81)
None	124 (18)
Partial	11 (2)
Intention to get vaccine	
Refuse	25 (22)
Hesitant	53 (46)
Willing	36 (32)

The most common psychological underpinnings of vaccine hesitancy were confidence (n = 67) and constraints (n = 21). This was followed by complacency (n = 6) and calculation (n = 5). Collective responsibility (n = 2) was the least frequent psychological antecedent of vaccination (Table 2).

Table 2: Psychological antecedents of vaccination hesitancy



DISCUSSION

Women and men exhibit diverse health-seeking behaviours (Wong *et al.*, 2010; Pullicino *et al.*, 2015; Pullicino *et al.*, 2018). In the current study, there were slightly more male respondents than female ones. Males might have responded to medical care because they tend to have higher severity rates from COVID infection (Gebhard *et al.*, 2022; Mukherjee and Pahan, 2021; Arslani *et al.*, 2022). This might imply a difference between seeking health care services and actually requiring them (Oberoi *et al.*, 2016). The fact that there were slightly more males than females seeking care in the current study might imply that SARS-CoV-2 affects males more adversely than females.

A Chile-based cross-sectional study using an online questionnaire showed that almost one-half of patients were willing to take the vaccine (Cerda and Garcia, 2021). Similarly, a cross-sectional study conducted in outpatient clinics in Turkey demonstrated that 60.5% were considering getting vaccinated (Sayaca *et al.*, 2022). Conversely, in this local study, participants were less willing to be inoculated (32%). Diverse participants' selection criteria, contexts and methodologies might explain this difference.

This study showed that suburban patients have different beliefs regarding vaccine hesitancy. Similar to the current study, cross-sectional studies conducted in Turkey and Chile showed that most vaccine-hesitant patients experienced confidence issues (Sayaca *et al.*, 2022; Cerda and Garcia, 2021). Online and offline presence of anti-vaxxers might have affected confidence or the person's trust in the vaccine's safety profile and efficacy (Romer and Jamieson, 2020). Specific, finely tuned, differentiated information that can be fit for purpose can be collected and disseminated to diverse target audiences particularly for the anti-vaccine and undecided cohorts (Rawaf *et al.*, 2020; Cerda and Garcia, 2021; Government of Malta, 2022, Sayaca *et al.*, 2022).

Homebound patients might have experienced constraints issues or challenges to access the vaccine in a timely manner during a period of permacrisis. Local telemedicine doctors referred homebound service users for vaccination to be administered at their home (Primary Health Care, 2022). Healthcare professionals need to continuously hone their skills to tackle the challenges experienced by vulnerable populations in suburban regions. Furthermore, the healthcare system might strengthen its information infrastructure to inform marginalized or underserved patients when and how to contact primary care (Rawaf *et al.*, 2020; Chang *et al.*, 2021).

Creative, innovative ways of communication with various stakeholders might help to address confidence and constraints barriers (Rawaf *et*

al., 2020; Cerda and Garcia, 2021). In several countries, the initiatives and vision of local healthcare professionals led to the strengthening of telemedicine services including the introduction or expansion of the use of telephone, e-mail and virtual consultations. Furthermore, triaging was introduced to separate 'suspected' COVID-19 from non-COVID-19 care including routine/ emergency vaccination appointments (Rawaf et al., 2020; Primary Health Care, 2022).

Only a minority of patients expressed the willingness to protect others from infection through their own vaccination. Vaccine-hesitant individuals might not value or feel the need for collective responsibility, despite several and repeated appeals in the local media to protect the most vulnerable (Government of Malta, 2022).

Limitations

Due to time and resource constraints, this study did not capture vaccine hesitancy amongst those residing in elderly homes, hotels or on boats. The views of patients who were too unwell or not in Malta/Gozo were excluded as well. The validated 5C scale only assessed concurrent validity and not predictive validity (Betsch *et al.*, 2018). Respondents' recall bias, 'halo effect' and 'Hawthorne effect' could have occurred (Pullicino *et al.*, 2015). Further research can address these limitations and can also assess vaccine hesitancy amongst a larger sample population size.

Recommendations

The pandemic presented essential lessons to strengthen and support health care systems through better links between public health, primary health care, and secondary care to lead to better preparedness in future pandemic waves (Rawaf *et al.*, 2020; Chang *et al.*, 2021). At primary care level, different recommendations were identified to target vaccine hesitancy. These include:

- Incorporating the patient's beliefs in the management to manage patients effectively;
- Discussing vaccine strengths with the patient in a proper, timely manner to enhance confidence in the vaccine;
- Allowing time during the consultation to tackle psychological barriers;
- Outlining the benefits of the vaccine to boost vaccine uptake and relieve the burden on the secondary care hospital;
- Using the likelihood of the underlying reasons for vaccine hesitancy to plan advice during the consulation process;
- Coordinating with public health specialists whilst discussing the rationale behind vaccine hesitancy to plan vaccine campaigns;
- Using the highly prevalent reasons for vaccination hesitancy, that is confidence and constraints, to inform vaccine strategy;
- Liaising with policy makers and educators to increase vaccine uptake;
- Providing data to researchers to improve patient outcomes.

It is crucial that hard-won relevant lessons are retained to improve patient outcomes and equity in suburban patient populations (Rawaf *et al.*, 2020, Chang *et al.*, 2021). Evaluating the rationale behind vaccine hesitancy allows the identification of essential trend developments over time and the designing and evaluation of strategies to tackle vaccine hesitancy and enhance vaccine uptake (Betsch *et al.*, 2018).

CONCLUSIONS

In summary, the findings of this study highlighted the underlying barriers for vaccine uptake in suburban communities, particularly confidence coupled with structural and psychological barriers or constraints. This study provides essential information for healthcare professionals, researchers, educators and policymakers to guide resource allocation and to develop area-targeted public health interventions to tackle vaccination hesitancy amongst suburban residents to curtail its consequences.

REFERENCES

Agius, F., 1990. Health and social inequities in Malta. ***Soc Sci Med,*** 31(3), pp. 313-318.

Arslani, K., Eken, C., Tschudin-Sutter, S., Gebhard, C.E., Zellweger, N., Bassetti, S., Bingisser, R., Lampart, M., Osswald, S., Kuster, G.M. and Twerenbold, R. for the COVIVA investigators, 2022. Sex disparities in patients with suspected COVID-19 presenting at an emergency department in Switzerland. ***Swiss Med Wkly,*** 152(19-20).

Betsch, C., Schmid, P., Heinemeier, D., Korn, L., Holtmann, C. and Bohm, R., 2018. Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. ***PLoS One,*** 13(12), p. e0208601.

Cassar, M.R., Borg, D., Camilleri, L., Schembri, A., Anastasi, E.A., Buhagiar, K., Callus, C. and Grech, M., 2021. A novel use of telemedicine during the COVID-19 pandemic. ***Int J Infect Dis,*** 103, pp. 182-187.

Cerda, A.A. and Garcia, L.Y., 2021. Hesitation and Refusal Factors in Individuals' Decision-Making Processes Regarding a Coronavirus Disease 2019 Vaccination. ***Front Public Health,*** 9, p. 626852.

Chang, J.E., Lai, A.Y., Gupta, A., Nguyen, A.M., Berry, C.A. and Shelley, D.R., 2021. Rapid Transition to Telehealth and the Digital Divide: Implications for Primary Care Access and Equity in a Post-COVID Era. ***Milbank Q,*** 99(2), pp. 340-368.

Gebhard, C.E., Hamouda, N., Gebert, P., Regitz-Zagrosek, V. and Gebhard, C. on behalf of the COGEN Investigators, 2022. Sex versus gender-related characteristics: which predicts clinical outcomes of acute COVID-19? ***Intensive Care Med,*** 48(11), pp. 1652-1655.

Government of Malta, 2022. COVID-19 Menu [Online]. Malta. Available: https://deputyprimeminister.gov.mt/en/health-promotion/covid-19/Pages/landing-page.aspx [Accessed 2022].

Kringos, D.S., Boerma, W.G., Bourgueil, Y., Cartier, T., Hasvold, T., Hutchinson, A., Lember, M., Oleszczyk, M., Pavlic, D.R., Svab, I., Tedeschi, P., Wilson, A., Windak, A., Dedeu, T. and Wilm, S., 2010. The European primary care monitor: structure, process and outcome indicators. ***BMC Fam Pract,*** 11, p. 81.

Lamnisos, D., Lambrianidou, G. and Middleton, N., 2019. Small-area socioeconomic deprivation indices in Cyprus: development and association with premature mortality. ***BMC Public Health,*** 19(1), p. 627.

Mukherjee, S. and Pahan, K., 2021. Is COVID-19 Gender-sensitive?. ***J Neuroimmune Pharmacol,*** 16(1), pp. 38-47.

Oberoi, S., Chaudhary, N., Patnaik, S. and Singh, A., 2016. Understanding health seeking behavior. ***J Family Med Prim Care,*** 5(2), pp. 463-464.

Patterson, L., Heller, R., Robinson, J., Birt, C.A., van Ameijden, E., Bocsan, I., White, C., Skalkidis, Y., Bothra, V., Onyia, I., Hellmeier, W., Lyshol, H., Gemmell, I., Spencer, A., Klumbiene, J., Krampac, I., Rajnicova, I., Macherianakis, A., Bourke, M., Harrison, A. and Verma, A., 2017. Developing a European urban health indicator system: results of EURO-URHIS 1. ***Eur J Public Health,*** 27(suppl_2), pp. 4-8.

Primary Health Care, 2021. Telemedicine [Online]. Malta: Primary HealthCare. Available: https://deputyprimeminister.gov.mt/en/phc/Pages/Services/Telemedicine/Telemedicine.aspx [Accessed 26 October 2022].

Primary Health Care, 2022. Telemedicine Services [Online]. Available: https://deputyprimeminister.gov.mt/en/phc/Pages/Services/Telemedicine/Telemedicine.aspx [Accessed 26 October 2022].

Pullicino, G., Sciortino, P., Calleja, N., Schafer, W., Boerma, W. and Groenewegen, P., 2015. Comparison of patients' experiences in public and private primary care clinics in Malta. ***Eur J Public Health,*** 25(3), pp. 399-401.

Pullicino, G., Sciortino, P., Francalanza, S., Sciortino, P. and Pullicino, R., 2018. Urban-suburban differences in GP requests for lumbosacral spine radiographs in a primary healthcare centre in Malta. ***Rural Remote Health,*** 18(2), p. 4154.

Rawaf, S., Allen, L.N., Stigler, F.L., Kringos, D., Quezada Yamamoto, H., van Weel, C. and on behalf of the Global Forum on Universal Health Coverage and Primary Health Care, 2020. Lessons on the COVID-19 pandemic, for and by primary care professionals worldwide. ***Eur J Gen Pract,*** 26(1), pp. 129-133.

Romer, D. and Jamieson, K.H., 2020. Conspiracy theories as barriers to controlling the spread of COVID-19 in the U.S. ***Soc Sci Med,*** 263, p. 113356.

Sayaca, N., Cansiz, K.A., Yildirim, E., Ozturk, B. and Kirmaz, C., 2022. The Percentage of Hesitation and Factors Associated with Acceptance or Refusal for COVID-19 Vaccination: Does Education About Vaccines by Allergist Affect Personal Decision? ***Rev Fr Allergol (2009)***, 63(1), 103256.

Turrell, G., Kavanagh, A. and Subramanian, S.V., 2006. Area variation in mortality in Tasmania (Australia): the contributions of socioeconomic disadvantage, social capital and geographic remoteness. ***Health Place,*** 12(3), pp. 291-305.

Wong, S.Y., Kung, K., Griffiths, S.M., Carthy, T., Wong, M.C., Lo, S.V., Chung, V.C., Goggins, W.B. and Starfield, B., 2010. Comparison of primary care experiences among adults in general outpatient clinics and private general practice clinics in Hong Kong. ***BMC Public Health,*** 10, p. 397.

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