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Factors influencing Australian nursing and midwifery students COVID-19 vaccination intentions

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ABSTRACT

Background: Vaccination for COVID-19 has become a cornerstone management plan for many countries. Australian state governments made vaccinations mandatory for all healthcare workers. Despite evidence on the important role vaccines hold in preventing or decreasing serious disease, there have been many nurses and midwives who have demonstrated vaccine hesitancy. This hesitancy has also been present in undergraduate nursing and midwifery students. The aim of this study was to explore factors influencing Australian nursing and midwifery students' intentions towards receiving the COVID-19 vaccine; identify the barriers and facilitators to obtaining the COVID-19 vaccine; and understand students' perceptions of mandating the COVID-19 vaccine and identify any impact on their studies..

Methods: Cross-sectional mixed method study utilising an online survey platform. Data were analysed using binomial and multinomial logistic regression through Statistical Package for the Social Sciences. A content analysis was completed for the qualitative data.

Results: There were 715 participants and 556 who completed the survey in full. Nurses made up the majority of participants (n = 409), 133 participants were midwives and 30 were in dual nursing/midwifery programs. Education and communication were identified as two major factors that facilitate vaccine acceptance.

Conclusions: Vaccines are integral in the prevention of contracting COVID-19 or reducing the severity of the symptoms. However, many nursing and midwifery students have shown reluctance towards getting vaccinated. The mandate to be vaccinated to attend clinical placement has led to the inability of some students to complete their course. The findings from this study are valuable in informing the future COVID-19 vaccination strategies and improving vaccine acceptance. COVID-19 remains a global health risk and therefore further research is needed of vaccine acceptance amongst the future health workforces. It is crucial knowledge for policy makers and healthcare services as they plan for any future pandemics and implement Australia's national vaccine strategy.

Introduction

SARS-CoV-2 (COVID-19) infection was first declared a global pandemic by the World Health Organization (WHO) on March 12, 2020, and has had devastating health, economic and social consequences [47]. As the crisis developed; many countries experienced difficulties related to the increased demand for skilled Healthcare Workers (HCWs) [1,10].

Australia has not escaped the challenges caused by COVID-19, and

Abbreviations: 5C Scale-Confidence, Complacency, Constraints, Calculation, Collective responsibility; ACT, Australian Capital Territory; COVID-19, Coronavirus disease; HCWs, Healthcare Workers; IBM, International Business Machines Corporation; NSW, New South Wales; NT, Northern Territory; PPE, Personal Protective Equipment; QLD, Queensland; SAGE, Strategic Advisory Group of Experts; SA, South Australia; SM, Midwifery students; SN, Nursing students = SN; SNSM, Dual degree nursing and midwifery students; SPSS, Statistical Package for the Social Sciences; TAS, Tasmania; VIC, Victoria; WA, Western Australia; WHO, World Health Organization.

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similarly has experienced an increased demand for HCWs [11], and many leaders agree that healthcare graduates will help to alleviate this increasing industry demand. Nursing and midwifery courses consist of both academic and clinical components [2,7]. The clinical placement component of these courses exposes students to all the same vulnerabilities associated with HCWs caring for patients with COVID-19 [40], and therefore the complexities of managing the healthcare workforce extends to undergraduate students and the universities they study with.

Vaccination is an effective low-cost COVID-19 mitigation strategy [44]. All COVID-19 vaccines that have been licenced by the WHO for use have undergone randomised clinical studies to ensure they are of high quality, safe, and effective [48]. At time of writing, 69.8% of the world population had received at least one dose of a COVID-19 vaccine, and 13.34 billion doses had been administered globally [15,30]. However, studies have shown that vaccination acceptance differs among communities and nations and is influenced by a number of factors [18,28,45]. The WHO Strategic Advisory Group of Experts (SAGE) [51] has developed a matrix of vaccine acceptance factors. These factors range from contextual influences (influential leaders, religious views, anti-vaccination lobbies, environment, and media), individual impacts (information and the trust in the healthcare system), and vaccination-specific issues (evidence of risk/benefit, availability and mode of administration) [18,21,22].

Studies conducted globally have reported varying willingness rates of COVID-19 vaccination among different populations. In the United States, China, and Japan, the willingness to receive the vaccine was reported as 69%, 83.3%, and 65.7%, respectively [21,49]. Vaccine acceptance rates among HCW's ranged from 23.4 % in Taiwan to 95 % in Asia-Pacific [22,34,35,39,41]. The main concerns of HCW's were the post-vaccination adverse effects along with safety and effectiveness [32,35,39,41,50]. Prevention of illness, safeguarding family members and type of workplace were found to be facilitators of vaccine acceptance [22,35,39]. In 19 countries, that were highly impacted by COVID-19 in 2021, 71.5 % of participants said they would accept a COVID-19 vaccination [24].

In 2021 HCWs, including nursing and midwifery students, were mandated to be fully vaccinated for COVID-19 in all states and territories of Australia [4]. Students who did not meet these requirements were not able to attend clinical placement. The decision to deny healthcare students who were not yet vaccinated from completing clinical placements had an enormous educational and financial impact on students [37]. Many students had their placements paused or cancelled over the past three years due to staff shortages, lack of availability of Personal Protective Equipment (PPE) and lockdowns resulting in travel restrictions [12]. Students who were unable to complete the clinical component of the course due to vaccine hesitancy were ineligible to meet the requirements of becoming a qualified nurse or midwife, impacting on the future health workforce [25]. As future HCWs entering an evidence-based industry, nursing and midwifery students play a vital role in supporting vaccination acceptance among the public [32]. Therefore, it is crucial to prioritise addressing nursing and midwifery students' concerns, barriers, and facilitators in vaccination acceptance. A successful post-pandemic strategy would be to prepare a well-educated future workforce for evolving healthcare needs by acknowledging and addressing their concerns [32,33].

It is critical to understand nursing and midwifery students' perspectives on vaccination intentions, availability, and information, together with how it will affect their studies or career plans. While other studies have included Australian general populations [29], aged care workers [6], or midwifery and consumer populations [9], at the time of writing this paper, there have been no previous studies conducted to assess the perceptions of Australian nursing or midwifery students related to vaccination intention for COVID-19. We investigated the three distinct aspects of obtaining vaccination, 1) the students' intention to have the vaccine, 2) barriers and facilitators to obtain the vaccine, and 3) how the mandatory vaccination impacted their studies. Accordingly, the survey with both multiple choice and open-ended questions allowed us to explore the data around the barriers and facilitators in vaccination acceptance/hesitancy among nursing and midwifery students enrolled in Australian universities. The aim of this study was to explore factors influencing Australian nursing and midwifery students' intentions towards receiving the COVID-19 vaccine; identify the barriers and facilitators to obtaining the COVID-19 vaccine; and understand students' perceptions of mandating the COVID-19 vaccine and identify any impact on their studies.

Methods

Study design

This cross-sectional study invited undergraduate nursing and midwifery students to complete an anonymous mixed-method survey generated in the online platform, Qualtrics. After reviewing the literature and examining current nursing and population health research, the research team identified two relevant and validated survey tools – The 5C scale, which was developed by Betsch et al. [5], and a survey previously used by Lin et al. [27] to understand COVID-19 vaccine demand and hesitancy in China. These self-reported survey tools have demonstrated validity and reliability when used in other countries [23,27]. The surveys were adapted and combined for this study. The 5C scale provides a tool to measure the psychological antecedents of vaccination; which are confidence, complacency, constraints, calculation, and collective responsibility [5]. In comparison, the survey developed by Lin et al. [27] uses the Health belief model in addition to assessing demographic information, general health, acceptability, and preference of the vaccine. The anonymous adapted survey consisted of both open and closed-ended questions. It was presented in six sections. These are as follows: screening and consent; general information; acceptability of COVID-19 vaccine; preference of COVID-19 vaccine; Health belief model; and impact of mandating the vaccine.

Population, sample and recruitment

A purposive sample of undergraduate nursing and midwifery students was recruited through nursing and midwifery student social media platforms between January 2022 and May 2022. Participants were eligible if they were aged 18 years or older and were currently enrolled in a Bachelor of Nursing or midwifery programme. Students enrolled in any academic year or mode (distance, on-campus, full-time, or part-time) were invited to participate.

Participants were recruited through advertising on social media platforms and were asked to forward the invitation to their peers, and then recruitment continued through snowballing technique. Students interested in participating in the study accessed the survey via a link provided within the advertisement. The link opened the online survey, where following the standardised introduction, participants confirmed that they met the qualifying criteria to participate in the survey. If qualifying criteria were not met, participants were thanked for their time and proceeded no further. Participants were eligible to enter a draw to win a $25 gift card by submitting a second separate survey after completing the anonymous survey. Once completed, participants were able to share the link on social media. This combination of purposive and snowball sampling has been adopted to maximise the eventual sample size and reduce the selection bias to intrinsic non-random sampling [26]. A post-hoc power analysis of the data was completed using G*Power v3.1.9.7 for Logistic regression. With a final sample size of 556, estimated power for the study is 0.36.

Data analysis

Analysis of the quantitative data was facilitated through two software packages: Microsoft Excel and SPSS (Statistical Package for the

Social Sciences). The data was checked and cleaned in Microsoft Excel before being uploaded to SPSS v26 [17], for statistical analysis using the data cleaning protocol suggested by van den Broeck et al. [43]. Descriptive statistics were used to assess demographic information. Categorical data was summarised as counts and percentages. Quantitative data used binomial logistic regression and multinomial logistic regression to determine if independent variables could predict outcomes from dependent variables [36]. Logistic regression is an analytical tool that determines the likelihood of predicted outcomes through odds ratios [36]. Odds ratios are notated as 'Exp(B)', the greater the Exp(B), the greater the odds that the predicted event will occur compared to the reference variable [36]. Qualitative data were analysed using thematic content analysis to determine the presence of themes [42].

Results

Sample Characteristics

Most participants knew someone who had been diagnosed with COVID-19n = 453 (83.1%) but had not been diagnosed themselves n = 482 (88.3%) or had not cared for any clients on placement who had been diagnosed n = 400 (73.7%). Full characteristics of the participant sample are outlined in Table 1.

COVID-19 and vaccination characteristics

Availability and acceptability of COVID-19 vaccine

The availability of the vaccine had an impact on n = 51(29.4%) participants who reported issues to source the vaccine in time to attend their clinical placement. Nevertheless, at the time of the survey, most participants were compliant with mandated vaccine requirements (See Table 2). A quarter of the participants did not agree that receiving the vaccine would make them less worried about contracting COVID-19n = 132(24.8%). Concern for the COVID-19 vaccine being "fake" was low n = 27(5.1%), however more participants were concerned about the privacy of their personal information n = 98(18.8%).

Vaccine mandate

Vaccine compliance influenced students' ability to continue their studies. Participant responses related to mandating the COVID-19 vaccination are displayed in Table 3.

Vaccine uptake predictions

Fears surrounding the virus were often predictors of whether participants had a COVID-19 vaccination (Strongly Agree Exp(B) = 10.16, p =.029; Agree Exp(B) = 26.67, p =.002). Furthermore, positive outlooks on the vaccine itself also suggested increased odds ratios that participants had at least one vaccination (Agree Exp(B) = 32.92, p = <0.001). Results indicate that when it comes to whether participants have at least one vaccination or not, predictors surrounding vaccine and virus perceptions play a significant role in determining an individual's intention to vaccinate. Participants who indicated they had no issues with the mandate in areas such as their studies and withdrawal, were more likely to have at least one vaccination (No Exp(B) = 37.600, p =.001). This was in line with participants who believed the mandate would not be reversed (Exp(B) = 39.159, p <.001).

Mandate behaviour predictions

Logistic regression analyses were used to predict outcomes related to the mandate for each discipline. When compared to nursing students, midwifery students were less likely to agree the mandate was appropriate for healthcare workers (Exp(B) = 0.498, p =.002). The regression also showed that midwifery students were generally more likely to

Table 1
Demographic Characteristics of Participants.

Participant Characteristics								
Gender	Female		Male		Non-Binary		Prefer not to say	
n (%)	548 (94)		30 (5.1)		2 (0.3)		3 (0.5)	
Age range	18—–24	25–34	35–44	45–54	55–64			
n (%)	198(34)	193(33.1)	131(22.5)	46(7.9)	15(2.6)			
State	WA	TAS	QLD	SA	NSW	VIC	ACT	NT
n (%)	23(4)	11(1.9)	360(62.5)	75(13)	47(8.2)	50(8.7)	7(1.2)	3(0.5)
Discipline – nurses-midwives or dual program n (%)								
Nursing (currently enrolled)							273(47.7)	
Nursing (not currently enrolled, but have studied in previous 18 months)							26(4.5)	
Nursing (recently graduated)							110(19.2)	
Midwifery (currently enrolled)							103(18)	
Midwifery (not currently enrolled, but have studied in previous 18 months)							10(1.7)	
Midwifery (recently graduated)							20(3.5)	
Dual program Nursing & Midwifery (currently enrolled)							22(3.8)	
Dual program Nursing & Midwifery (not currently enrolled, but have studied in previous 18 months)							2(0.3)	
Dual program Nursing & Midwifery (recently graduated)							6(1)	
Program Progress								
Just started							109(15.2)	
Halfway through							279(39)	
Just finished							146(20.4)	
Unsure							13(1.8)	
Have you been allocated a clinical placement where you could be exposed to COVID-19 positive clients/patients? n (%)					Yes		No	Unsure
					262(48.3)		219(40.4)	61(11.3)
Pregnancy status					Yes		No 521(96.3)	N/A
n (%)					9(1.7)			11(2)
Trying For Pregnancy Status					Yes		No	N/A
					24(4.5)		489(91.9)	19(3.6)
Breastfeeding Status					Yes		No	N/A
					38(7)		480(88.9)	22(4.1)
Do you have an existing chronic disease? n (%)					Yes		No	
					57(10.5)		484 (89.5)	
Perceived Rated Overall Health Very good					Good		Fair	Poor
n (%) 128(23.7)					336(62.1)		72(13.3)	5(0.9)

Table 2
COVID-19 and Vaccination responses.

Acceptability of COVID-19 vaccine		
Have you had one or more doses of the vaccine?	Yes	No
n (%)	512 (95)	27 (5)
Reason for vaccine	n (%)	
Protect Myself	363(71)	
Protect My Family	372(72.8)	
Protect the Community	342(66.9)	
To Enable Employment	281(55)	
Mandated for Studies or Work	420(82.2)	
To Travel Overseas/Interstate	158(30.9)	
To Socialise Outside my House	205(40.1)	
Other	13(2.5)	
Health Belief Model	n (%)	
My Chance of getting COVID-19 in the next few months is high		
Strongly agree	206(38.5)	
Agree	234(43.7)	
Disagree	83(15.5)	
Strongly Disagree	12(2.2)	
I am Worried about the likelihood of getting COVID-19		
Strongly agree	101(18.9)	
Agree	209(39.1)	
Disagree	171(32)	
Strongly Disagree	53(9.9)	
I am afraid of getting COVID-19		
Strongly agree	66(12.4)	
Agree	186(35)	
Disagree	201(37.8)	
Strongly Disagree	79(14.8)	
I am worried that the possible side-effects of COVID-19 vaccination would interfere with my usual activities -		
Strongly agree	78(14.8)	
Agree	129(24.4)	
Disagree	201(38.1)	
Strongly disagree	120(22.7)	
I am concerned about the efficacy of the COVID-19 vaccination		
Strongly agree	75(14.2)	
Agree	132(25)	
Disagree	236(44.8)	
Strongly disagree	84(15.9)	
I am concerned about the efficacy of the current COVID-19 vaccines for current and future strains		
Strongly agree	100(19.1)	
Agree	218(41.6)	
Disagree	158(30.2)	
Strongly disagree	48(9.2)	
I am concerned about the safety of the COVID-19 vaccination -		
Strongly agree	70(13.4)	
Agree	87(16.6)	
Disagree	244(46.7)	
Strongly disagree	122(23.3)	
I have received adequate information about the COVID-19 vaccine		
Strongly agree	179(34.5)	
Agree	252(48.6)	
Disagree	61(11.8)	
Strongly disagree	27(5.2)	
Mode of Information Gathering -	**Cumulative Numbers*	
Social Media	172(33.2)	
Mass Media (TV networks)	154(29.7)	
Healthcare Work	399(77)	
Family/Friend/Neighbour/Etc.	158(30.5)	
University Email	176(34)	
Government Website	447(86.3)	
Peer Reviewed Journal	308(59.5)	
Other	30(5.8)	

withdraw (Exp(B) = 1.91, p =.287) or contemplate withdrawal (Exp(B) = 1.34, p =.465) because of the mandate; however, these findings were not statistically significant.

Multinomial regression was also used to determine odds ratios of impact on nursing and midwifery students. Corresponding with the above analysis, no statistically significant findings were found to suggest that the mandate had an impact on studying for nursing students (Yes: Exp(B) = 0.302, p =.268; No: Exp(B) 0.567, p =.588) or midwifery students (Yes: Exp(B) = 0.410, p =.418; No: Exp(B) 0.244, p =.188). Likelihood of students voluntarily vaccinating themselves if the mandate was not in place showed similar findings. There were no statistically significant results suggesting the likelihood of nursing (Yes: Exp(B) = 0.440, p =.277; No: Exp(B) 0.560, p =.514) or midwifery (Yes: Exp(B) = 0.232, p =.059; No: Exp(B) 0.407, p =.325) students volunteering to vaccinate.

Table 3
Mandate responses.

Vaccine Mandate			
Mandating Vaccine	Yes	Maybe	No
Has mandating the COVID-19 vaccine in healthcare students impacted your studies? n (%)	128 (25.1)	42(8.2)	340 (66.7)
Have you recently withdrawn from your program of study as a result of the mandate? n (%)	18 (10.8)		149 (89.2)
Are you contemplating withdrawing from your program of study as a result of the mandate? n (%)	38 (22.8)		129 (77.2)
Do you believe the mandate for COVID-19 vaccination in students will be reversed? n (%)	24(4.7)	85 (16.8)	398 (78.5)
Would you have voluntarily received the COVID-19 vaccine if it had not been mandated? n (%)	341 (67.3)	79 (15.6)	87 (17.2)
Do you agree with mandating the COVID-19 vaccine for all healthcare students? n (%)	368 (72.6)		139 (27.4)

Content analysis

The following content analysis reports the open-ended responses around perceived facilitators and barriers towards acquiring the vaccine, participant perceptions of the mandate, and its influence on nursing and midwifery students' studies. Five themes emerged from the data analysis: 1) Impacts of Mandate including 'disruption to studies', 'inconsistencies' and 'loss of job or degree'; 2) Autonomy including 'freedom of choice' and 'forced'; 'lack of tolerance of divergent views'*;* 3) Vaccine including 'side effects and 'not fit for purpose', 4) 'Lack of community education'. The following results are supported by direct quotes from students (nursing students = SN, midwifery students = SM, dual degree nursing and midwifery students = SNSM).

Impact of Mandate:

This theme consisted of three sub-themes, *disruption to studies, loss of job and degree* and *inconsistencies.* Each of these themes were described as impacting on students and their ability to complete their study, continue with study or chosen field and current or future roles in health. Additionally, the aspect of rapid changes and inconsistency in how mandates were applied across health workforces were seen to be unfair by students.

Disruption to studies: Impact of the vaccination mandates on student studies were focused on disrupting progress in the degree due to inability to attend or complete clinical placement in healthcare facilities. One participant explained that in their university there was, *'Cancellation of placements for all student[s] while [mandates] were introduced'* (SNSM 417), whilst others reported choosing to defer *'I have had to defer for a year and possibly will not finish my degree'* (SN 621), *'I deferred till mandates are dropped',* (SNSM 82).

Loss of Job and Degree: Students perceived the impact of the mandates as threatening their employment and many stated they would be unable to complete their degree. Students who were not willing or able to be vaccinated for COVID-19 voiced similar concerns when asked why they had withdrawn.

Initially due to caring for father-in-law. However, I'm not sure I'll return as I'm not vaccinated for covid, and I don't agree with the mandates. I've had all other vaccinations required. I am currently out of work too as I'm not vaccinated. I'm 52 and scared for my future but refuse the (sic) be vaccinated against covid… I can't continue, and I only have two subjects left. I'm not prepared to risk my life and lively hood

(sic). I'm devastated and I'm also now unemployed (SN 342).

Whilst some voiced frustration and chose to withdraw from their degree *'I withdrew due to the Covid-19 vaccine mandates'* (SN 672); others felt that were no choice for them to move forward in completing their degree, and they laid the responsibility with the University even though Mandates were initiated by the government: *'Cannot participate in placements or finish the degree without being vaccinated so there is no point in continuing. Feeling extremely disappointed in the University'* (SN 609).

Inconsistencies: Responses in this sub-theme elucidate students' views of inconsistencies to how the mandate was applied in the healthcare setting. Students felt they were not dealt with fairly and had more restrictions placed on them compared to current healthcare workers. Two students highlighted inconsistencies around timing of mandates for universities compared to current healthcare workers: *'Had to be vaccinated to go on final* [placement in] *2020 but many of the employed nurses at* [health service] *at that time weren't vaccinated'* (SN 408); *'The timing of the mandate was a reaction instead of a plan. Students were mandated before healthcare workers which made no sense'* (SM 113). Another student felt that even though they followed the mandate, they were still impacted unfairly: *'students were made to get the vaccination but were then removed from placement anyway'* (SN 98).

Autonomy

This theme consists of three sub-themes, *freedom of choice, forced* and *lack of tolerance of divergent views.* Students felt their autonomy as individuals and future healthcare professionals was disregarded. The mandates forced students to make choices about their current and future health values, they also felt their freedom of choice and self-determination was contravened. Many described feeling forced to make a choice and that there was no tolerance for any student or healthcare workers to voice different views of the mandate to vaccinate.

Freedom of choice: This sub-theme consists of responses from students who felt that their right to choose had been removed from them. Some midwifery students felt that even though they are taught to ensure consumers have a choice in their care, they were not afforded the same opportunity, with students' freedom of choice being taken away.

'*Made me realise* [though] *we are taught to advocate, choice and informed consent we are not given that right*' (SM 237)

'*We spend 3.5yrs learning about patient autonomy and informed consent and supporting patient/women's choice…so hypocritical*' (SNSM 195).

Many others felt as though they were given a difficult choice which would affect them significantly:

'I had to choose between *my dream future career and a vaccine that I didn't want to receive* (SN 694)

Am pro vaccination but also pro-choice. Students were given a choice of vaccination or no degree (SN 229)

The vaccine should be a freedom of choice and not a tool to blackmail through loss of job, career, segregation etc (SN 6).

Forced: Students felt they were forced into receiving a vaccine, one student felt they had been deprived of their rights:

'*I am 100% a pro vaxxer and I would have gotten it as I believe in it, I just feel the mandate has stripped people of rights and that is not very Australian. Even the* UK *sitting in a much worse position hasn't forced it upon the population*' (SN 346).

Other students felt that they were forced into the vaccine if they wished to continue with their degree, even if they believed they had a valid reason not to receive it: '*We were forced to have it if we wish to proceed with our degree*' (SM 231); '*… forcing those who have valid reasons to not have the vaccinations, be forced to walk away from the career they worked bloody hard for with immense passion*' (SM 102).

Another student could see both sides of the argument, stating that people should not be forced into the vaccine, but then protecting themselves and others is also important: '*Nobody should be made to have a vaccine if they don't feel comfortable. Although it is a hard situation to be in as we do need to protect ourselves and others*' (SN 138).

Lack of tolerance of divergent views: Some students appeared frustrated with those who lacked understanding around the importance of vaccination in a healthcare field. *'Healthcare students who do not understand the importance vaccines are in pandemics and for public health in general should not be in the healthcare industry'* (SN 396).

'Vaccine have always been mandated for nurses and students. *I 100% support this and while I recognise that there is an element of educational and cultural privilege in holding a natural trust in my government and 'big pharma', there should be very little tolerance for nurses and student nurses buying into conspiracy theories when we have access to a HUGE body of peer reviewed evidence'* (SN 547).

A lack of tolerance of different views and being forced into undertaking vaccination had another student questioning if a career in healthcare was really for them *'It's made me question studying healthcare due to the mandates and job threats if not complying/taking away your choice if [you're] not comfortable'* (SN 425).

Vaccine

This theme consists of two sub-themes *side effects* and *not fit for purpose.* The vaccine itself was a focus of much concern in the student group, mostly related to the side effects experienced by students or the side effects being broadcast in media. Another concern was the efficacy and purpose of the vaccines available not being fit for the purpose advertised.

***Side effects*:** Students were concerned with the side effects of the vaccine, one student stated they were concerned for their health:

After suffering severe *side effects after my Pfizer vaccine and ongoing health problems as a result, the thought of having a booster vaccine to undertake placement in 8 weeks has left me preparing to drop out entirely. I am afraid for my health* (SN 671).

Another was thankful they didn't receive the vaccine due to the number of reported adverse reactions:

I will not be bullied into taking a drug that has not been properly studied. which now seeing *the thousands of adverse reactions I'm thankful for my decision*, [the university] *has blood on their hands* (SN 370).

***Not fit for purpose*:** Students believed the vaccine was not fit for purpose and had concerns regarding the efficacy of the vaccine along with the impact it has on the human body:

The vaccine is for the first variant of the virus. Several other variants … like delta and omicron are currently spreading, and other new variants are more likely to continue. So these vaccines are useless for the other variants. So mandating it hasn't been proven effective as the virus can still be received and passed on by vaccinated people and cause complications and death for those at risk (SN 694).

We need to practise evidence based medicine. The covid injection is not proving it is efficacious, needs more research. Also, fertility concerns, observation of excess abortions after covid injection has been administered. Also observe sickness in babies who feed from lactating mothers who had covid injection. Also, old women menstruating after each covid injection!! (SM 631).

Lack of community education

The final theme, lack of community education was focused on students views of problems related to the vaccination for COVID-19. Students felt that not enough education was provided to the community about the vaccine, and that the type of education was not relevant to the general public. Students felt that authentic and respectful communication about the vaccination would have enhanced the education messaging.

I believe that in Western Australia we have been very lucky so far, making people complacent. Vaccination is a proven method of reducing the incidence of serious illness and death. Greater community education is required on both the safety and efficacy of all vaccines for public health (SN 488)

I wish there was better communicated information for the general public. Simplified explanations of scientific data, without patronising or infantile bullshit. Respectful information (SN 380).

These themes were related to current actions that were occurring during January to May 2022. Vaccination mandates, university and health setting responses changed quickly and often during March 2020-March 2022 across Australia.

Strengths and limitations

Our study included responses from every state and territory of Australia. Some states were more impacted by COVID-19, promoting varied perspectives to be heard. However, a global perspective was not obtained. Adopting and combining previously validated data collection tools was a strength, which promoted the validity and reliability of the study.

The response rate of online surveys can be a limitation, which we acknowledge even though we received a high response, it is difficult to know what the response rate was, as we are unable to quantify the number of people who could have been eligible to participate in the social media sites we accessed. Therefore, it is not possible to calculate a response rate. In addition, this form of survey may have attracted respondents with strong opinions on vaccines, leading to potential biases in the results. Data collection occurred during 2021 in Australia, when the rules around mandates varied between different states and were continuously changing. Changes have continued (albeit at a slower rate), which may affect the generalisability of some of the results.

Discussion

As part of the overall prevention and mitigation plan of a global pandemic, policymakers must take decisive action to address vaccine acceptance and the factors affecting the vaccine uptake rate. As future health professionals, nursing and midwifery students are key players in promoting public acceptance of vaccinations. This study identifies barriers and facilitators for undergraduate nursing and midwifery students to obtain the COVID-19 vaccine in Australia.

Nursing and midwifery students' acceptance rates of the COVID-19 vaccine varied in this study. Many believed as a healthcare worker, receiving a vaccine was not optional, but a mandatory requirement to ensure their own health and the health of their patients. Other than mandating requirements, reasons like protecting themselves, their family and the community led to the vaccine acceptance, which was consistent with other studies [6]. However, based on the mandates for the COVID-19 vaccine set by the Australian Government, and its impact on the career and course progression, among nursing and midwifery students, some negative trends are evident. Autonomy was a consistent theme identified throughout the survey responses and was often used in the context of coercion, as many participants were forced to comply with the mandate or sacrifice their degree and career. Autonomy is defined as the quality or state of being self-governing [31]. In healthcare, autonomy enables individuals to make their own decisions about their health [46]. In studies conducted worldwide, varying degrees of autonomy intrusion were cited as a significant adverse consequence of the vaccine mandate [13,20]. While many people felt the vaccine mandates intruded on their levels of autonomy, many others were proponents of the vaccination mandate, and many views clashed in the social fora [19].

People who held a negative viewpoint towards the mandate were firm in their opposition to it. Certain individuals believed that the conditions surrounding the mandate were unjust, which appeared to impact their opinions about healthcare employment. Despite their advocacy for the vaccine, the restrictions on Autonomy called into question the fairness of the mandate. Participants expressed anti-mandate perspectives despite being pro-vaccination, and this was supported by their concerns for vulnerable populations, e.g. those who were pregnant [9]. The mandate applied on short notice, interrupted the studies and possible chance of degree progression for many students [8]. Mandate-related cancellations of clinical placement had a compounding financial effect for students. In order to attend placement, most students take leave from paid work, they were unable to change this due to late placement cancellation, but also had added costs of cancelled accommodation and flights [16]. Mandates created an additional level of stress for students on top of the mental health impact of contracting the disease, border closures and lockdowns [38]. Mandates created conflicts in workplaces between people with different views, with some being prepared to undertake vaccination to keep their jobs even though they disagreed with the mandate, and others being prepared to lose their job rather than comply with vaccination mandates [20].

Data from this study gives unique understanding of the barriers and facilitators for undergraduate nursing and midwifery students to obtain the COVID-19 vaccine. As future HCWs entering an evidence-based industry, nursing and midwifery students play a vital role in supporting vaccination acceptance among the public [32]. This valuable evidence from our findings supports targeted public health campaigns open communication, and education to reduce potential barriers to vaccine acceptance by health professionals and, in turn, the wider community.

One recommendation from participants in our study related to improved community education to increase community knowledge and potentially vaccine acceptability and uptake. This view of increasing health literacy and communication is supported in the literature where community education is promoted as a crucial step in addressing misconceptions, information giving about the vaccine and therefore promoting acceptance of vaccines [14].

Conclusion

Despite the importance of vaccines in preventing or minimizing severity of COVID-19, many nurses and midwives have shown reluctance towards vaccination. This study aimed to identify factors related to COVID-19 vaccine acceptance and uptake and impact of vaccination mandates for COVID-19 among nursing and midwifery students. Results showed that mandating vaccination and removing choice, impacted on many nursing and midwifery students being able to complete their qualification, leading to an increased shortfall in future healthcare worker numbers. Education and communication were identified as two major factors that could facilitate vaccine acceptance. The findings from this study are valuable in creating informed future community-wide vaccination strategies to improve vaccine acceptance. Predictions of future pandemics creating global health risks indicate it is crucial for policy makers and healthcare services to enact evidence-based and community-tailored vaccine strategies and pandemic responses.

Ethics approval

Ethical Clearance has been obtained for this study through the University Human Research Ethics Committee. Ethical clearance number: 23353.

Data availability statement

The university where the funding for this project was obtained uses a data management system for research studies. A data management plan was created for this study and all data has been stored within that system.

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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.

Data availability

Data will be made available on request.

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