ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

ALLIED HEALTH PROFESSIONALS' INVOLVEMENT IN THE COVID-19 VACCINATION RESPONSE: A CROSS-SECTIONAL ONLINE SURVEY

Katrina Dunn[*1,2], *Abby Foster*[3,4,5]

1. School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane, Queensland, 4067, Australia.
2. Speech Pathology Department, West Moreton Health, Queensland Health, Ipswich, Queensland, 4305, Australia.
3. Allied Health Workforce, Innovation, Strategy, Education & Research (WISER) Unit, Monash Health, Melbourne, Victoria, 3192, Australia.
4. School of Allied Health, Human Sciences & Sport, La Trobe University, Melbourne, Victoria, 3086, Australia.
5. School of Allied Health, Monash University, Melbourne, Victoria, 3168, Australia.

Correspondence: katrina.dunn@uq.edu.au

ABSTRACT

BACKGROUND:

Allied health professionals offered an additional workforce strategy to support the COVID-19 vaccination response. The aim of this study was to understand the experiences of Australian AHPs who worked in the COVID-19 vaccination response.

METHODS:

An explanatory-sequential mixed-methods design was conducted, with the first phase involving a cross-sectional online survey. The survey consisted of 36 questions related to participant demographics, role/s undertaken in the COVID-19 vaccination response, and perceptions regarding benefits, concerns, and future roles for allied health professionals in vaccination responses.

RESULTS:

29 participants were eligible for study inclusion defined by completion of all survey questions representing three Australian states and five allied health professions (physiotherapy, speech pathology, occupational therapy, dietetics, and podiatry). The most reported benefit was 'enhanced knowledge base related to vaccines' (n=25, 86.25%), while concerns were expressed related to keeping current with guidelines and accidentally causing harm (each n=11, 37.9%). Theoretical domains enabling allied health professional participation were 'knowledge', 'reinforcement', 'beliefs about consequences', and 'environmental context and resources'. Three key categories were identified in open-ended responses: "An appropriate role" for allied health? The impact of allied health participation; and Processes shape the experience.

CONCLUSIONS:

Findings enhance our understanding of allied health professionals' experiences in the COVID-19 vaccination response, and the benefits and barriers to their involvement. There is an opportunity to better utilise the AHP workforce. Organisations are implored to review their use of AHPs both in the COVID-19 pandemic and broadly in health service delivery to support enhanced use of this workforce in future extended scope of practice or disaster management responses.

KEYWORDS
allied health, COVID-19 pandemic, vaccination, experiences, extended scope, health services, community, survey.

INTRODUCTION

The COVID-19 global pandemic was declared in March 2020. Public health measures were rapidly adopted, with vaccinations becoming available from the end of 2020. The international response to the pandemic included the implementation of strategies to enable wide-scale vaccination uptake. Specific strategies included vaccine mandates, public education campaigns, partnerships between government and community groups, peak medical, healthcare, insurance and business sectors, along with methods to enable public access such as mass vaccination centres and mobile clinics [1].

In response to workforce demands during the vaccination rollout, various jurisdictions within Australia and internationally issued temporary authorisation for allied health professionals (AHPs) to participate in the COVID-19 vaccination response. Roles sanctioned to be performed by AHPs included the receiving, handling, preparation, and/or administration of COVID-19 vaccinations. In Australia, emergency public health orders were issued to authorise allied health involvement in its three most populous states; Victoria [2], New South Wales [3], and Queensland [4]. Workforce profiles differed in each state; however, all Australian AHPs involved in COVID-19 vaccination workforces were required to complete an online series of training modules. Additional bridging training and competency assessment requirements were determined at a local level.

Due to the emergent and urgent nature of the COVID-19 vaccination response, the use of AHPs as vaccinators offered a workforce strategy to support in the vaccination response. While there has been some examination of the general experiences of Australian health workers during the pandemic [5], little is known about the nature and perspectives of AHPs who undertook novel vaccination workforce roles within the COVID-19 vaccination response. The current research study therefore aimed to:

1) Understand the nature of AHP involvement in Australian COVID-19 vaccination workforces.
2) Explore AHPs' perspectives on the benefits and concerns related to involvement in the COVID-19 vaccination response.
3) Examine the factors (barriers and facilitators) influencing the involvement of the AHP workforce in the COVID-19 vaccination response.
4) Determine participants' perspectives on future involvement of AHPs in vaccination responses.

METHODS

STUDY DESIGN

This study involved a cross-sectional, online survey. This methodology was chosen to allow participants to describe the nature of their role in the COVID-19 vaccination workforce and share their experiences, with the option to build and extend on their responses.

The online survey utilised survey design principles [6] and consisted of 36 questions covering: (1) demographic information, (2) nature of employment in the COVID-19 vaccination response, and (3) participant perceptions on their involvement within the COVID-19 vaccination response. A combination of response options was included. Questions for the first and second sections of the survey were modelled off studies within community pharmacy literature [7,8].

The Determinants of Implementation Behaviour Questionnaire [9] (DIBQ) was used to inform the development of questions related to barriers and facilitators. The DIBQ was developed to enable researchers to independently assess all 14 domains

of the Theoretical Domains Framework [10] (TDF). The TDF provides an appropriate framework for examining the barriers and facilitators to the implementation of an AHP workforce in the COVID-19 vaccination response, with the view to understanding methods or strategies which may support future involvement of this workforce. A total of 21 survey statements relating to the 14 TDF domains were included. Response options used a five-point Likert scale [6] (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The order of the barrier and facilitator questions was randomised for each participant to minimise order bias.

Four healthcare clinicians piloted the survey with resultant minor changes to the wording of questions and response requirements. The full survey can be accessed in Appendix 1.

PARTICIPANTS AND SETTING

Eligible participants were required to meet the following criteria: (1) qualified AHP whose discipline was authorised to administer COVID-19 vaccinations under an emergency public health order, (2) current or previous experience working in a COVID-19 vaccination workforce role, and (3) employed in Victoria, Queensland, or New South Wales. Pharmacists were excluded from participation due to their previously well-established role in preparing, handling, and administering vaccinations.

PROCEDURE

Ethics exemption was granted by the relevant Human Research Ethics Committees. Confidentiality and anonymity of participant responses was maintained throughout the data collection and analysis process. All information was de-identified and stored electronically on a secure, password-protected university research data management system. The Consensus-Based Checklist for Reporting of Survey Studies [11] (CROSS) was used to guide reporting of this study.

The online survey was hosted on Qualtrics XM (2001). Security functions incorporated included prevention of multiple submissions, bot detection using an embedded data field, prevention of indexing to block search engines including the survey in results, and anonymized responses that did not record IP address, location data or contact information. Survey recruitment was for a two-month period (September to November 2022). Convenience and snowball sampling methods were employed to maximise survey reach. Convenience sampling occurred predominantly through targeted emails to state-based allied health professional leads and the authors' social media accounts. The survey was also distributed through a professional association national e-newsletter. Due to the use of convenience and snowball sampling, as well as limited publicly available workforce data to determine the size of the population, to the distribution and the response rate could not be determined.

DATA ANALYSIS

Quantitative data from the Qualtrics survey was exported on to a Microsoft Excel spreadsheet. Demographic data was analysed and reported using descriptive statistics (frequencies, percentages, means, standard deviations, and ranges). Participants were able to select more than one option in relevant questions, and thus, reporting of frequencies and percentages adds up to more than the total number of participants. Open-ended responses from the survey were analysed using inductive content analysis [12]. Themes were determined based on participants' perspectives about the phenomenon, rather than derived from previous or existing survey instruments. The first author (K.D.) coded the qualitative content, while the second author (A.F.) conducted peer checking to enhance credibility. To enable consistency of scoring for TDF statements, negative phrases had reverse scoring applied, consistent with the process outlined by Wallace et al. [13]. Calculation of an overall domain score was performed by averaging the mean scores of each statement within each of the 14 TDF domains. "Agreement" and "less than agreement" categories were created by combining Likert ratings of 1, 2, and 3 (strongly disagree, disagree, and neutral; less than agreement) and ratings of 4 and 5 (agree and strongly agree; agreement) respectively, as per the approach by Chang et al. [14].

RESULTS

The survey was accessed by 103 participants. The survey was deemed insufficiently complete by 74 participants, due to (a) the Qualtrics platform indicating participant responses were 'spam' (n=5), (b) participants not consenting to participate (n=8), (c) participants consenting to participate but not progressing to the demographic questions (n=36) or (d) completing limited demographic information only (n=25). The remaining 29 participants completed all survey questions and were included in final analysis. The survey completion rate was 28%.

PARTICIPANT DEMOGRAPHICS

Participants were predominantly from metropolitan areas (n=27, 93.1%) representing all three Australian states eligible for inclusion, with the majority based in Victoria (n=20, 69%). AHP disciplines most represented included physiotherapists (n=10, 34.5%), speech pathologists (n=7, 24.1%) and occupational therapists (n=6, 20.7%). Participants had a wide range of professional experience, with most practising clinicians (n=23, 79.3%). Nearly half (n=23, 44.8%) were re-deployed from routine duties, while nearly two-thirds (n=18, 62.0%) voluntarily chose to participate in the COVID-19 vaccination response. Most participants worked within community vaccination hubs (n=26, 89.7%) and nearly two-thirds (n=19, 65.5%) were involved in vaccination administration. Participants performed nearly 26 shifts on average (range=1-200, SD=40), and administered approximately 190 vaccinations each (n=8, range=50-360, SD=116.1).

BENEFITS OF COVID-19 VACCINATION RESPONSE INVOLVEMENT

Participants identified many professional and personal benefits to being involved in the COVID-19 vaccination response. The most common reported benefit was 'enhanced knowledge base related to vaccines' (n=25, 86.3%). Many participants reported that their 'own personal satisfaction contributing to the COVID-19 vaccination response' (n=23, 79.3%) and 'expanded scope of practice' (n=19, 65.5%) were benefits to involvement. Other benefits reported by participants included 'enabling increased vaccination delivery by expanding workforce to allied health professionals' (n=15, 51.7%), 'working as part of a multi-disciplinary team' (n=11, 37.9%), and 'raising the profile of allied health professionals as care providers in the community' (n=9, 31.0%).

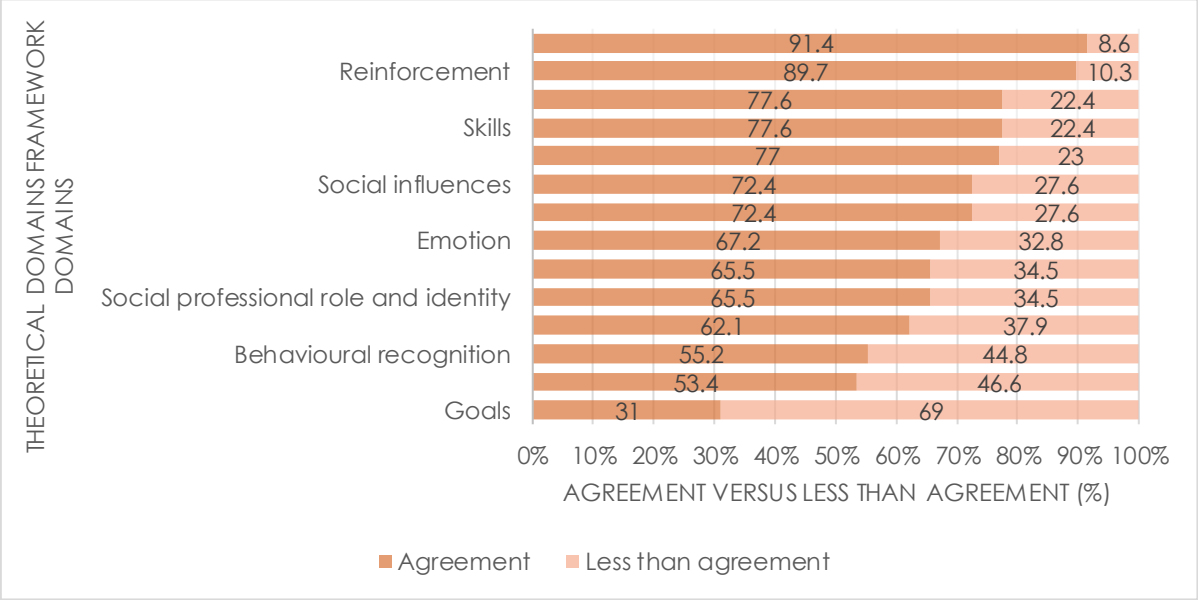
CONCERNS RELATED TO COVID-19 VACCINATION RESPONSE INVOLVEMENT

Participants were asked to identify concerns they had prior to their involvement in the COVID-19 vaccination response and indicate whether these concerns remained at the end of their involvement in the COVID-19 vaccination response. The most common concern prior to commencing in the vaccination response reported by participants were 'difficulty keeping current with immunisation guidelines and/or training' and 'accidentally causing harm to a citizen' (each n=11, 37.9%). While most participants concerned about accidentally causing harm to a citizen had this concern resolved at the end of their involvement, the concern regarding keeping up with immunisation guidelines and/or training remained present for most of these participants at the end of their involvement (each n=9/11, 81.8%). Participants also commonly reported concerns related to 'professional liability and responsibility' (n=8, 27.6%), 'accidentally causing harm to myself' (n=7, 24.1%), and 'insufficient knowledge about vaccination information, including side effects' (n=6, 20.7%) prior to their involvement. Of these pre-involvement concerns, 'accidentally causing harm to myself' remained the most reported concern at the end of their involvement (n=5/7, 71.4%).

FACTORS INFLUENCING ALLIED HEALTH PROFESSIONALS' INVOLVEMENT

Participants responded to all 22 statements linked to the TDF exploring barriers and facilitators related to their involvement in the COVID-19 vaccination response. Figure 1 outlines participants' overall scores for each domain represented by "agreement" and "less than agreement" categories. A summary of participants' ratings against each of the domains is reported in the following section.

FIGURE 1. PERCENTAGE OF AGREEMENT AND LESS THAN AGREEMENT FOR THEORETICAL DOMAINS FRAMEWORK DOMAINS.



Note. Scores ranked in order from most 'agreement' to least 'agreement'.

The TDF domain of "knowledge" had the highest level of agreement (91.4% agreement) in facilitating participants' involvement in the COVID-19 vaccination response. Participants indicated high levels of understanding of the scope and extent of the role, as well as their understanding of the objectives for using AHPs in the COVID-19 vaccination response. Participants ranked four additional TDF domains with high levels of agreement, "reinforcement" (89.7% agreement), "beliefs about consequences" (77.6% agreement), "skills" (77.6% agreement), and "environmental context and resources" (77% agreement), indicating these domains as potential facilitators to their experiences in the COVID-19 vaccination response. In the "reinforcement" domain, participants indicated that they were encouraged to be involved as AHPs in the COVID-19 vaccination response. In support of the "beliefs about consequences" domain, participants perceived the use of AHPs in the COVID-19 vaccination workforce was a strength in their organisation's response and that this involvement reflected well on them professionally. Participants felt that they had the appropriate skills to participate in the COVID-19 vaccination response and that the training they had supported their involvement (related to "skills" domain). Related to the "environmental context and resources" domain, participants indicated that working in the COVID-19 vaccination response was a good fit for their skillset, that the organisation provided sufficient resources for AHP involvement, and that citizens perceived AHP involvement in the COVID-19 vaccination response positively.

Eight of the TDF domains had levels of agreement between 50% to 75%, and were therefore also considered additional potential facilitators to AHPs' involvement in the COVID-19 vaccination response: "social influences" (72.4% agreement), "optimism" (72.4% agreement), "emotion" (67.2% agreement), "intentions" (65.5% agreement), "social professional role and identity" (65.5% agreement), "memory, attention, and decision processes" (62.1% agreement), "behavioural recognition" (55.2% agreement), and "beliefs about capabilities" (53.4% agreement). Participants indicated that their AHP colleagues supported their involvement in the COVID-19 vaccination response (in reference to "social influences" domain). Participants were optimistic that any issues related to the use of AHPs in the COVID-19 vaccination workforce could be resolved (referring to "optimism" domain). Participants stated that working within the COVID-19 vaccination response was rewarding and without high levels of stress for them (referring to "emotion" domain). In relation to the domains of "intentions" and "social professional role and identity" respectively, participants indicated their intention to support future vaccination responses should the need arise and that they believed it was their responsibility as an AHP to support their vaccination response. Participants indicated that they knew how to perform their role effectively following completion of training in the vaccination response (referring to "memory, attention, and decision processes" domain) and that there were appropriate policies/procedures and processes in place to ensure AHPs were used successfully (referring to "behavioural recognition" domain). Participants were confident in their ability to participate in the COVID-19

vaccination response and the control they had on the roles they performed (referring to "beliefs about capabilities" domain).

The remaining TDF domain of "goals" had the lowest level of agreement (31% agreement) and was therefore considered a potential barrier to AHPs involvement in the COVID-19 vaccination response. Specifically, participants did not strongly indicate a future goal to improve their skills within vaccination responses.

Appendix 2 outlines participants ratings for each survey statement along with associated data analysis represented by levels of agreement, means, median, and average domain scores.

FUTURE ROLES FOR AHPS AND FURTHER COMMENTS REGARDING EXPERIENCES

At the conclusion of the survey, participants were asked to (a) state their perspectives on whether AHPs could have similar and/or additional roles in future immunisation responses, and (b) provide any further comments on their experiences. Most (n= 27, 93.1%) participants perceived future opportunities for AHPs to be involved in similar and/or additional roles. Of the 29 survey participants, 22 (75.9%) provided an open-ended response when asked for any further comments regarding their experiences as an AHP in the COVID-19 vaccination response. Two participants responded with "no" regarding further comments and were therefore removed from content analysis, while the remaining 20 participants provided responses. Open-ended responses to both questions were coded into categories and themes. These are further outlined in the section below.

Three overarching themes were identified in the data. They were: (1) "An appropriate role" for allied health?; (2) The impact of allied health participation; and (3) Processes shape the experience.

"An appropriate role" for allied health?

Participants' responses explored the appropriateness of AHPs undertaking roles in the vaccination response. The allied health professional skillset was easily applied in vaccination response roles, and participants felt that AHPs were receptive to learning new skills. Allied health professionals were described as having "scientific, evidence-based training" [P22] and "good knowledge of anatomy/physiology" [P6], combined with "good generalised skills" [P12], including "experience with providing information, informed consent and working in a healthcare setting" [P25]. Participants identified that these skills made allied health professionals "suitable to perform the roles designated" [P12]. In addition to having a strong existing skillset, participants identified that allied health clinicians were "easy to train in other areas of health" [P9]. They perceived that AHPs to be "already trained and trainable" [P14] and were "able to be skilled up in this area with sufficient training" [P22].

Some participants felt that there were opportunities for extensions of the AHP role in the vaccination response. Additional roles included educational roles and creating supportive environments for people with a disability. One participant felt that role extension was limited by nursing staff being "protective over their territory" [P3]. This participant felt that "there could have been many things allied health could have done to ease the load on nursing staff" [P3]. Beyond skillset appropriateness, some participants identified the appropriateness of AHPs working in vaccination response roles as there were limitations in their capacity to perform their usual role due to COVID-19 restrictions. Participant 12 stated that "most of us were limited in what we could do in our regular clinical roles so it made sense to send us where we could be of greater use". This perspective was not shared by all, with some participants reporting they "should have been left to continue the work they do best" [P11]. Some felt redeployment to roles that were "more fitting to [their] profession" [P13] would have been preferable, while others felt that students or less experienced clinicians should have been used in the vaccination response rather than senior clinicians.

The impact of allied health participation

Participants discussed the impact of allied health participation on the broader health workforce, allied health patients, and on AHPs themselves. Respondents saw their participation to be "help[ing] the greater workforce" [P24]. By taking on

these roles, AHPs were able to "assist with workforce shortages" [P28] and "take off the pressure on nursing staff who are better placed on the ward and front line of taking care of patients in need" [P29].

Conversely, participants felt the impact on allied health patients and clients were impacted "in ways we are still trying to recover from" [P17]. One participant described that the closure of services that "take years to build up and we are all very passionate about" [P19] had significant impacts on their clientele that was not adequately acknowledged. Furthermore, participants related the impacts of service closures to an "exacerbation of [clients'] symptoms and co-morbidities" [P11].

The impact on AHPs was multifaceted. Some respondents felt participating in the vaccination response held altruistic value, in that they were "getting something important done" [P6] and "contributing to something greater" [P27]. Others derived benefit from being in an environment characterised by less stress, connection with new colleagues, and insights into nursing culture [P6]. Others experienced AHP involvement negatively, emphasising "the toll it took on staff...[and] how much [they]...were hurting from the closure of their services" [P19]. Negative experiences were exacerbated when "there was no choice to participate" [P13].

Processes shape the experience

Respondents highlighted that organisational and administrative processes shaped the experience of AHPs engaged in the COVID-19 vaccination response. Training and onboarding were "very extensive and took a couple of months to get trained and set up as a hospital employee" [P18], without guarantees of shifts upon completion. Once in the system, AHPs reported "very little clarity when first starting on how shifts would be organised and impact on pay" [P7]. In some circumstances, shift management issues resulted in redeployed AHPs "sitting around with nothing to do for a significant portion of time" [P11]. One participant described the inability to "overcome the red tape" in health service processes, resulting in a perception of disorganisation that "increased the level of stress" [P12].

Participants' perceptions of control, recognition and support also shaped the experience. Many participants did not hold the locus of control related to participation in the vaccination response. One participant reported that "there was no choice to participate" [P13], with another describing the decision to redeploy AHPs from their service as "a knee jerk reaction, not well planned and not based on evidence" [P11]. While some participants felt "welcomed and valued" [P15] in their role, others felt their role "wasn't well acknowledged" [P19]. One participant felt AHPs should have been supported to undertake "more optional study to perhaps gain an extra qualification" [P3] in recognition of their value in the vaccination response. The experience of a supportive environment was variable, with some describing "a great vibe" [P27], and others experienced a lack of managerial support.

DISCUSSION

This study provides insights into AHPs' involvement in Australian COVID-19 vaccination workforces. The rapid, large-scale implementation of the COVID-19 vaccination response provided AHPs opportunity to expand their scope of practice as part of vaccination workforces. Participants identified many benefits to their involvement in COVID-19 vaccination workforces, including enhancing their knowledge related to vaccines, personal reward in contributing to the pandemic response, expanding scope of practice, and increasing vaccination delivery to the community. However, AHPs also reported concerns regarding their participation, including keeping up with training and guidelines, accidentally causing harm to a citizen or themselves, and their professional liability and responsibility.

Most participants in our study worked in a community hub and administered vaccinations. However, AHPs took on a diverse range of workforce roles including managing clinic operations and in Public Health Units. Participants reported sufficient knowledge and skills required to enact these roles. Community pharmacist vaccinators reported enhanced professional satisfaction associated with the increased knowledge and additional services able to be offered to patients when administering influenza vaccinations in Canada [15]. While in response to COVID-19, Canadian pharmacists

reported low levels of discomfort in temporarily extending their scope of practice [16]. AHPs have skills in obtaining and applying knowledge, working cooperatively within a multidisciplinary team, communication, devising and implementing innovative practice, and self-reflecting [17]. This study supports acceptability and suitability of extended scope of practice roles in vaccination workforces for AHP disciplines.

Importantly, AHP participants identified further training needs related to their roles, including knowledge of vaccines (e.g., side effects), response to an adverse event, and immunisation guidelines. These concerns were similarly reported by community pharmacists involved in delivering COVID-19 vaccinations who cited access to and ongoing provision of training as barriers to their involvement[8]. The nature of the COVID-19 vaccination response saw rapid changes to community vaccine eligibility, type and availability, making these findings unsurprising. Alternative delivery modes (i.e., face-to-face) may have been preferred.

Participants described the importance of feeling valued and recognised for their contribution as AHPs in a supportive environment as a strength of their organisations' response to managing vaccination roll-out. Enhancing the scope of roles traditionally not associated with vaccination helped positively influence the professional identity of AHPs. This finding is consistent with Piil et al. [18] who noted positive shaping of nursing professional identity following their involvement in an expanded scope of practice role [18]. Despite this, participants felt that their organisation could have provided more support through sufficient resources, workforce planning and organisation, and supportive management. These experiences are congruent with the experiences of health workers throughout the COVID-19 pandemic. A lack of established protocols impacted frontline health workers' views about support during COVID-19 and other pandemic responses [19]. Paykel et al. [20] described how Australian AHP staffing surges during COVID-19 in the Intensive Care Unit setting were often planned locally and ad-hoc, while medical and nursing workplace planning was often more coordinated. Solutions included greater workforce consultation, streamlined processes with centralised information, and increased staffing [21].

Understanding healthcare professionals' experiences in undertaking new extended scope roles assists healthcare organisations to understand the benefits and challenges of their involvement. Participants reported minimal resistance from colleagues regarding AHP roles in the COVID-19 vaccination workforce. However, it is likely that the temporary nature of this shift in AHP scope of practice during the pandemic enabled an enhanced 'acceptance' amongst non-AHPs to cross traditionally held professional scope boundaries. Expanding the health professional disciplines authorised to administer vaccinations has been previously successfully demonstrated within the pharmacy workforce. In the case of influenza immunisations, improved public vaccination rates have been demonstrated following implementation of community pharmacy vaccination [22]. Importantly, this model of care is also positively perceived by patients and provides professional satisfaction [23]. Challenges reported by community pharmacists included potential challenge to relationships with physicians, increased workload demands, and difficulties vaccinating paediatric patients [15].

AHPs described their limited, defined scope in COVID-19 vaccination workforces and indicated potential to undertake additional roles. There remain legislative and regulatory challenges across many AHP-led initiatives to transform traditional role boundaries. In the case of non-medical prescribing by podiatrists, Fitzpatrick and Borthwick [24] outlined legislative rigidity as a threat to supporting comprehensive clinical care delivery. Removing legislative barriers whereby health workers are readily enabled to perform such tasks once the required training has been completed, has immeasurable health system benefits. The benefits of an agile and responsive workforce with extended scope of practice skillsets has numerous benefits for healthcare organisations, patients, and the AHP workforce. Organisations and professional associations are encouraged to consider opportunities to regulate tasks/skillsets rather than professions enabled to perform certain tasks to identify a greater range of potential skill sharing and scope extension opportunities [24]. In turn, the workforce is more readily enabled to respond flexibly to population needs to ensure the efficient delivery of services to patients [25].

LIMITATIONS

There are several limitations associated with this study, primarily related to the recruitment of participants, survey distribution methods and timing. The size of the AHP COVID-19 vaccination workforce could not be ascertained. Participants from Victoria may have been over-represented in this study; however, this is likely representative of the Australian AHP workforce involved in COVID-19 vaccinations. The research team are both speech pathologists and it is possible that speech pathologists were more highly represented as a result of dissemination methods within professional networks. The timing of the study was approximately 12 months post participants' involvement in vaccination workforces and therefore responses may be subject to recall bias.

CONCLUSION

AHPs provided important contributions to Australia's COVID-19 vaccination response. This is the first study that has explored the roles and involvement of non-pharmacist AHPs in the COVID-19 vaccination response. This study supports the alignment between AHP skillsets and extended roles in public health responses. Importantly, barriers to AHP participation such as education and training, legislative barriers, and limitations to the roles enabled to be performed by AHPs should be considered to enable flexible and agile use of this workforce in future. Further investigation of AHP involvement via semi-structured interviews would enable more in-depth understanding of their experiences working in COVID-19 vaccination workforces.

ETHICS APPROVAL

Ethics exemption was granted by the relevant Human Research Ethics Committees (HREC/88958/MonH-2022-328757 and 2022/HE001672). All participants provided informed consent for their involvement in this study.

References

1. Desborough J, Wright M, Parkinson A, Hall Dykgraaf S, Ball L, Dut GM, et al. What strategies have been effective in optimising COVID-19 vaccine uptake in Australia and internationally? Australian Journal of General Practice. 2022;51(9):725-30. doi:10.31128/AJGP-05-22-6427
2. State Government of Victoria. Authorisation for preparation and administration - COVID-19 VACCINE (surge workforce). Accessed 6 September 2021, from https://web.archive.org/web/20210910023104/https://www.coronavirus.vic.gov.au/victorian-covid-19-vaccination-guidelines
3. New South Wales Health. Authority to Supply Poisons and Restricted Substances – Authorised health practitioners and health practitioner students. Accessed 15 November 2021, from https://web.archive.org/web/20211118054936/https://www.health.nsw.gov.au/immunisation/Documents/authority-COVID-19-vaccines.pdf
4. Queensland Health. Medicines and Poisons Acts 2019: Emergency Order – Public Health Emergency – Pandemic Response to Coronavirus Disease (COVID-19). Accessed 13 August 2021, from https://web.archive.org/web/20211213055710/https://www.health.qld.gov.au/__data/assets/pdf_file/0023/1111748/emergency-order-covid-19-vaccinations.pdf
5. Bismark M, Willis K, Lewis S, Smallwood N. Experiences of health workers in the COVID-19 pandemic: In their own words. New York, NY: Routledge; 2022.
6. Aday LA, Cornelius LJ. Designing and Conducting Health Surveys. 3rd ed. Jossey-Bass; 2006.
7. Balkhi B, Aljadhey H, Mahmoud MA, Alrasheed M, Pont LG, Mekonnen AB, et al. Readiness and willingness to provide immunization services: a survey of community pharmacists in Riyadh, Saudi Arabia. Safety in Health. 2018;4(1). doi:10.1186/s40886-018-0068-y
8. Jarab AS, Al-Qerem W, Mukattash TL. Community pharmacists' willingness and barriers to provide vaccination during COVID-19 pandemic in Jordan. Human Vaccines & Immunotherapeutics. 2022;18(1):2016009. Available from: doi:10.1080/21645515.2021.2016009

9. Huijg JM, Gebhardt WA, Crone MR, Dusseldorp E, Presseau J. Discriminant content validity of a theoretical domains framework questionnaire for use in implementation research. Implementation Science. 2014;9(1):11.doi:10.1186/1748-5908-9-11
10. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. Implementation Science. 2012;7(37). doi:10.1186/1748-5908-7-37
11. Sharma A, Minh Duc NT, Luu Lam Thang T, Nam NH, Ng SJ, Abbas KS, et al. Consensus-Based Checklist for Reporting of Survey Studies (CROSS). Journal of General Internal Medicine. 2021;36(10):3179-87. doi:10.1007/s11606-021-06737-1
12. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. Nurse Education Today. 2004;24(2):105–12. doi:10.1016/j.nedt.2003.10.001
13. Wallace SJ, Sullivan B, Rose TA, Worrall L, Le Dorze G, Shrubsole K. Core Outcome Set Use in Poststroke Aphasia Treatment Research: Examining Barriers and Facilitators to Implementation Using the Theoretical Domains Framework. Journal of Speech, Language, and Hearing Research. 2021;64(10):3969–82. doi:10.1044/2021_JSLHR-20-00683
14. Chang HF, Power E, O'Halloran R, Foster A. Stroke communication partner training: a national survey of 122 clinicians on current practice patterns and perceived implementation barriers and facilitators. International Journal of Language & Communication Disorders. 2018;53(6):1094–109. doi:10.1111/1460-6984.12421
15. Gerges S, Peter E, Bowles SK, Diamond S, Bucci LM, Resnick A, et al. Pharmacists as vaccinators: An analysis of their experiences and perceptions of their new role. Human Vaccines & Immunotherapeutics. 2018;14(2):471–7. doi:10.1080/21645515.2017.1403695
16. Lee DH, Watson KE, Al Hamarneh YN. Impact of COVID-19 on frontline pharmacists' roles and services in Canada: The INSPIRE Survey. Canadian Pharmacists Journal (Ott). 2021;154(6):368-73. doi:10.1177/17151635211028253
17. Paans W, Wijkamp I, Wiltens E, Wolfensberger MV. What constitutes an excellent allied health care professional? A multidisciplinary focus group study. Journal of Multidisciplinary Healthcare. 2013;6:347–56. doi:10.2147/JMDH.S46784
18. Piil K, Kolbæk R, Ottmann G, Rasmussen B. The Impact of the Expanded Nursing Practice on Professional Identify in Denmark. Clinical Nurse Specialist. 2012;26(6):329–335. doi:10.1097/NUR.0b013e31826e3f43
19. Billings J, Ching BCF, Gkofa V, Greene T, Bloomfield M. Experiences of frontline healthcare workers and their views about support during COVID-19 and previous pandemics: a systematic review and qualitative meta-synthesis. BMC Health Services Research. 2021;21(1):923. Available from: doi: 10.1186/s12913-021-06917-z
20. Paykel M, Ridley E, Freeman-Sanderson A, Ramanan M, Booth S, Cook K, et al. Allied health surge capacity in Australian intensive care units during the COVID-19 pandemic: A cross-sectional survey. Australian Critical Care. 2023;36(1):108–13. doi:10.1016/j.aucc.2022.09.001
21. McGuinness SL, Josphin J, Eades O, Clifford S, Fisher J, Kirkman M, et al. Organizational responses to the COVID-19 pandemic in Victoria, Australia: A qualitative study across four healthcare settings. Frontiers of Public Health. 2022;10:965664. doi:10.3389/fpubh.2022.965664
22. Burson RC, Buttenheim AM, Armstrong A, Feemster KA. Community pharmacies as sites of adult vaccination: A systematic review. Human Vaccines & Immunotherapeutics. 2016;12(12):3146–59. doi:10.1080/21645515.2016.1215393
23. Isenor J, Edward N, Alia T, Slayter K, MacDougall D, McNeil S, et al. Impact of pharmacists as immunizers on vaccination rates: A systematic review and meta-analysis. Vaccine. 2016;34(47):5708–23. doi:10.1016/j.vaccine.2016.08.085
24. Fitzpatrick MT, Borthwick AM. A decade of independent prescribing in the UK: A review of progress. Journal of Foot and Ankle Research. 2022;15(1):35. doi:10.1186/s13047-022-00541-8
25. Nancarrow SA. Six principles to enhance health workforce flexibility. Human Resources for Health. 2015;13(1):9. doi:10.1186/1478-4491-13-9

APPENDIX 1: SUPPLEMENTAL MATERIAL. SURVEY QUESTIONS

Demographic Information

1a) What allied health professional qualification do you have?

☐ Dietitian

☐ Exercise physiologist

☐ Medical radiation practitioner

☐ Occupational therapist

☐ Optometrist

☐ Physiotherapist

☐ Podiatrist

☐ Radiographer

☐ Sonographer

☐ Speech pathologist

☐ Other: _____

1b) Nature of allied health employment prior to role in vaccination clinic

☐ Practising clinician

☐ Qualified, non-practising

☐ Researcher

☐ Management

☐ Allied health student

☐ Retired

☐ Unemployed

What state in Australia are you primarily employed in?

☐ New South Wales

☐ Queensland

☐ Victoria

Specify the geographical area of the service where you were employed in the COVID-19 vaccination response.

☐ Metropolitan

☐ Regional

☐ Rural / remote

Years of experience as an allied health professional

☐ 0-5

☐ 6-10

☐ 11-15

☐ 16-20

☐ 21 +

What was the nature of your employment in the COVID-19 vaccination response?

☐ Re-deployed from routine duties

☐ Casual employee – full-time

☐ Casual employee – part-time

☐ Agency staff

☐ Other: _____

Was it your choice / decision to become part of the COVID-19 vaccination response?

☐ Yes

☐ No

How long were you employed in the COVID-19 vaccination response?

Number of shifts: _____

What were your roles and responsibilities as part of the COVID-19 vaccination program? *You may select more than one option.*

☐ Administer vaccines (i.e., administration of a COVID-19 vaccine to an individual). If selected this option, provide estimated total number of COVID-19 vaccinations administered: _____

☐ Prepare vaccines (i.e., preparation of a COVID-19 vaccine in line with local protocols for use within a vaccination service)

☐ Receive and handle vaccines (i.e., transport vaccines from one location to another; confirm vaccines have been transported in compliance with manufacturer's conditions)

☐ Managing operations of COVID-19 vaccination clinic

☐ Other: _____

Where did you provide services in the COVID-19 vaccination response? *You may select more than one option.*

☐Community hub

☐ Mobile clinic

☐ Hospital

What were the benefits to being involved as an allied health professional in the COVID-19 vaccination response? *You may select more than one option*.

☐ Enhanced knowledge base related to vaccines

☐ Expanded scope of practice

☐ Own personal satisfaction contributing to the COVID-19 pandemic response

☐ Working as part of a multi-disciplinary team

☐ Enabling increased vaccinations to be delivered by expanding workforce to include allied health professionals

☐ Raising the profile of allied health professionals as care providers in the community

☐ There were no benefits to being involved

☐ Other: _____

Prior to commencing your role, what were your concerns about being involved as an allied health professional in the COVID-19 vaccination response? *You may select more than one option*.

☐ Insufficient knowledge about vaccination information, including side effects

☐ Difficulty keeping current with immunisation guidelines and/or training requirements

☐ Professional liability and responsibility

☐ Accidentally causing harm to a citizen

☐ Accidentally causing harm to myself (e.g., needle stick injury)

☐ Responding to an adverse event following vaccination administration

☐ Incorrectly preparing the COVID-19 vaccine

☐ Inadequate access to professional supervision or training related to your role in the vaccination response

☐ Remaining current with profession-specific knowledge and skills (e.g., speech pathology)

☐ I didn't have any concerns

☐ If you had other concerns, please specify:

Which of these concerns did you still have at the end of your involvement in the COVID-19 vaccination response? *[Used 'carry forward choices' option so that responses from question 11 copied across. Participants were able to de-select those responses which no longer applied]*.

The next section of this survey will ask you to indicate to what extent you agree with the statements provided

(Presentation of the TDF questions were randomised for each participant and did not have associated TDF headings)

Knowledge:

I was familiar with the objectives of using allied health professionals in the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

I understood the scope and extent of my role in the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Skills:

I feel I had the necessary skills to participate in the COVID-19 vaccination response workforce.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

I feel I would have benefited from more training to support the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Social professional role and identity

As an allied health professional, I believe it was my responsibility to participate in the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Health professionals (non-AHP) perceived allied health professional involvement in COVID-19 vaccination response positively.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Beliefs about capabilities

I was confident in my ability to participate in the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

I had little control over the roles I could perform as an allied health professional in the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Optimism

I was optimistic that any issues related to the use of allied health professionals in the COVID-19 vaccination workforce could be addressed.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Beliefs about consequences

The use of allied health professionals in the COVID-19 vaccination workforce strengthens my organisation's COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Having been an allied health professional in the COVID-19 vaccination workforce reflects well on me professionally.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Reinforcement

There was no encouragement given to me as an allied health professional to support the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Intentions

I intend to support future vaccination responses should the need/opportunity arise.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Goals

I have a goal to improve my skills within vaccination responses.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Memory, attention, and decision processes

Since completing my initial COVID-19 vaccination training, I always remembered how to perform my role in the COVID-19 vaccination response effectively.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Environmental context and resources

Working in the COVID-19 vaccination response has a good fit with my skills as an allied health professional.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

My organisation did not provide allied health professionals with sufficient resources to be involved in the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Citizens perceived allied health professional involvement in COVID-19 vaccination response positively.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Social influences

My allied health professional colleagues were willing to support my involvement in the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Emotion

Working in the COVID-19 vaccination response was rewarding for me.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Working in the COVID-19 vaccination response was stressful for me.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

Behavioural regulation

In my workplace, there were policies/procedures and processes that enabled the successful use of allied health professionals in the COVID-19 vaccination response.

Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree ☐

ADDITIONAL COMMENTS:

Do you believe allied health professionals could have similar and/or additional roles in future immunisation responses? Please explain the reason for your response.

☐ Yes

☐ No

Do you have any further comments on your experiences as an allied health professional involved in the COVID-19 vaccination response?

Invitation: The second arm of this study will involve online semi-structured interviews or focus groups with allied health professionals involved in the COVID-19 vaccination response. Please indicate if you would like to participate in an online semi-structured interview or focus group to discuss your experiences further, by leaving your contact details below. If you select 'yes', a member of the research team will be in touch with you to schedule.

☐ No

☐Yes

Name:

Email:

Contact number:

If you would like a summary of the outcomes of this project, please click 'yes' in the field below and you will be re-directed to a new page. Your details will remain confidential and separate from your responses.

Name:

Email:

APPENDIX 2: PARTICIPANTS' RATINGS AGAINST SURVEY STATEMENTS RELATED TO THE THEORETICAL DOMAINS FRAMEWORK AND ASSOCIATED DATA ANALYSIS

Domain	Survey statements	Likert scale responses, n (%)								
		5	4	3	2	1	A	<A	M	Mdn
Knowledge	I was familiar with the objectives of using allied health professionals in the COVID-19 vaccination response.	12 (41.4)	14 (48.3)	1 (3.4)	1 (3.4)	1 (3.4)	26 (89.7)	3 (10.3)	4.2	4.5
	I understood the scope and extent of my role in the COVID-19 vaccination response.	14 (48.3)	13 (44.9)	2 (6.9)	0 (0.0)	0 (0.0)	27 (93.1)	2 (6.9)	4.4	5
	Average domain score, %						**91.4**	**8.6**	**4.3**	**-**
Skills	I feel I had the necessary skills to participate in the COVID-19 vaccination response workforce.	11 (38.0)	15 (51.7)	2 (6.9)	0 (0.0)	1 (3.4)	26 (89.7)	3 (10.3)	4.2	5
	I feel I would have benefited from more training to support the COVID-19 vaccination response. (R)	4 (13.8)	6 (20.7)	8 (27.6)	8 (27.6)	3 (10.3)	10 (34.5) *19 (65.5)^*	19 (65.5) *10 (34.5)^*	3^	4.5^
	Average domain score, % (R statement scores reversed for overall agreement)						**77.6**	**22.4**	**3.6**	**-**
Social professional role and identity	As an allied health professional, I believe it was my responsibility to participate in the COVID-19 vaccination response.	7 (24.1)	11 (38.0)	8 (27.6)	1 (3.4)	2 (6.9)	18 (62.1)	11 (38.0)	3.7	4.5
	Health professionals (non-AHP) perceived allied health professional involvement in COVID-19 vaccination response positively.	7 (24.1)	13 (44.9)	7 (24.1)	1 (3.4)	1 (3.4)	20 (69.0)	9 (31.0)	3.8	5
	Average domain score, %						**65.5**	**34.5**	**3.8**	**-**
Beliefs about capabilities	I was confident in my ability to participate in the COVID-19 vaccination response.	9 (31.0)	13 (44.9)	5 (17.2)	1 (3.4)	1 (3.4)	22 (75.9)	7 (24.1)	4	5
	I had little control over the roles I could perform as an allied health professional in the COVID-19 vaccination response. (R)	6 (20.7)	14 (48.3)	5 (17.2)	3 (10.3)	1 (3.4)	20 (69.0) *9 (31.0)^*	9 (31.0) *20 (69.0)^*	3.7^	4^
	Average domain score (R statement scores reversed for overall agreement)						**53.4**	**46.6**	**3.9**	**-**

Optimism	I was optimistic that any issues related to the use of allied health professionals in the COVID-19 vaccination workforce could be addressed.	7 (24.1)	14 (48.3)	7 (24.1)	0 (0.0)	1 (3.4)	21 (72.4)	8 (27.6)	3.9	4.5
	Average domain score						**72.4**	**27.6**	**3.9**	**-**
Beliefs about consequences	The use of allied health professionals in the COVID-19 vaccination workforce strengthens my organisation's COVID-19 vaccination response.	10 (34.5)	12 (41.4)	5 (17.2)	1 (3.4)	1 (3.4)	22 (75.9)	7 (24.1)	4	5
	Having been an allied health professional in the COVID-19 vaccination workforce reflects well on me professionally.	10 (34.5)	13 (44.9)	5 (17.2)	0 (0.0)	1 (3.4)	23 (79.3)	6 (20.7)	4.1	4.5
	Average domain score						**77.6**	**22.4**	**4.1**	**-**
Reinforcement	There was no encouragement given to me as an allied health professional to support the COVID-19 vaccination response. (R)	2 (6.9)	1 (3.4)	5 (17.2)	17 (58.6)	4 (13.8)	3 (10.3) *26 (89.7)^*	26 (89.7) *3 (10.3)^*	2.3^	3.5^
	Average domain score (R statement scores reversed for overall agreement)						**89.7**	**10.3**	**2.3**	**-**
Intentions	I intend to support future vaccination responses should the need/opportunity arise.	8 (27.6)	11 (38.0)	7 (24.1)	2 (6.9)	1 (3.4)	19 (65.5)	10 (34.5)	3.8	4.5
	Average domain score						**65.5**	**34.5**	**3.8**	**-**
Goals	I have a goal to improve my skills within vaccination responses.	1 (3.4)	8 (27.6)	12 (41.4)	7 (24.1)	1 (3.4)	9 (31.0)	20 (69.0)	3	4.5
	Average domain score						**31.0**	**69.0**	**3**	**-**
Memory, attention, and decision processes	Since completing my initial COVID-19 vaccination training, I always remembered how to perform my role in the COVID-19 vaccination response effectively.	5 (17.2)	13 (44.9)	5 (17.2)	4 (13.8)	2 (6.9)	18 (62.1)	11 (37.9)	3.5	4.5
	Average domain score						**62.1**	**37.9**	**3.5**	**-**
	Working in the COVID-19 vaccination response has a good fit with my skills as an allied health professional.	7 (24.1)	14 (48.3)	4 (13.8)	2 (6.9)	2 (6.9)	21 (72.4)	8 (27.6)	3.8	4.5

Environmental context and resources	My organisation did not provide allied health professionals with sufficient resources to be involved in the COVID-19 vaccination response. (R)	1 (3.4)	3 (10.3)	5 (17.2)	13 (44.9)	7 (24.1)	4 (13.8) *25 (86.2)^*	25 (86.2) *4 (13.8)^*	2.2^	2.5^
	Citizens perceived allied health professional involvement in COVID-19 vaccination response positively.	2 (6.9)	19 (65.5)	5 (17.2)	2 (6.9)	1 (3.4)	21 (72.4)	8 (27.6)	3.7	4.5
	Average domain score (R statement scores reversed for overall agreement)						**77.0**	**23.0**	**3.2**	**-**
Social influences	My allied health professional colleagues were willing to support my involvement in the COVID-19 vaccination response.	5 (17.2)	16 (55.2)	7 (24.1)	1 (3.4)	0 (0.0)	21 (72.4)	8 (27.6)	3.9	4.5
	Average domain score						**72.4**	**27.6**	**3.9**	**-**
Emotion	Working in the COVID-19 vaccination response was rewarding for me.	13 (44.9)	11 (38.0)	1 (3.4)	3 (10.3)	1 (3.4)	24 (82.8)	5 (17.2)	4.1	5
	Working in the COVID-19 vaccination response was stressful for me. (R)	5 (17.2)	9 (31.0)	3 (10.3)	8 (27.6)	4 (13.8)	14 (48.3) *15 (51.7)^*	15 (51.7) *14 (48.3)^*	3.1^	4^
	Average domain score (R statement scores reversed for overall agreement)						**67.2**	**32.8**	**3.6**	**-**
Behavioural recognition	In my workplace, there were policies/procedures and processes that enabled the successful use of allied health professionals in the COVID-19 vaccination response.	5 (17.2)	11 (38.0)	7 (24.1)	4 (13.8)	2 (6.9)	16 (55.2)	13 (44.8)	3.4	5
	Average domain score						**55.2**	**44.8**	**3.4**	**-**