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Australian and New Zealand medical students' confidence and preparedness to prescribe

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Abstract

Background Writing a medication prescription is an expected competency junior doctors internationally feel underprepared to complete. Providing clarity in medical prescribing education standards and assessment criteria may address the lack of preparedness.

The primary aims of this study were to understand Australian and New Zealand (NZ) final-year medical students' confidence and preparedness to write a discharge or outpatient prescription. Secondarily, identify by whom, when, and using what modalities education on prescription writing should be provided.

Methods This quantitative analytical cross-sectional survey was developed by SM and approved by all authors. Ethical approval allowed email survey distribution via REDCap® to participants from June to December 2022. Data was analysed using Microsoft Excel® and MedCalc odds ratio v23.1.6. Likert-scale responses were tabled comparing participant confidence and preparedness to handwrite and electronically write discharge or outpatient prescriptions. Descriptive analyses determined the preferred education modalities, educator, and time during medical degree to receive prescription writing education.

Results Final-year medical students from Australia ($n=123$) and NZ ($n=51$) completed the survey. Participants felt their university degree didn't increase their preparedness to electronically or hand-write prescriptions. Learning on placement was most desirable in comparison to other options. Majority of participants selected pharmacists as the educator and their final year as an ideal time during their medical degree to receive education on prescription writing.

Discussion The absence of mandated education and assessment on the skill to prescribe was evident. The results showed a self-acknowledgement of under-preparedness and confidence to write medication prescriptions. This suggests a need for further education and specific assessment standards on the skill of prescription writing.

Conclusion Pharmacist-led mixed-methods education model during the final year of medical education is suggested to address gaps in education and assessment on prescription writing. Providing further education on the skill of prescription writing before graduation may reduce prescribing errors made as junior doctors.

Keywords Prescription, Medical education, Undergraduate medical education, Medical student, Pharmacist

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Background

Internationally, junior doctors feel underprepared to prescribe on their first day of practice [1–4]. Nevertheless, prescribing is a competency expected of all junior doctors. More than half of all medication harm occurs at the

point of prescribing [5] and almost 20% of all orders are written by junior doctors in an Australian hospital setting [6]. Globally, medication errors are one of the leading causes of preventable harm in the healthcare setting, estimated to account for US$42 billion annually [5]. Electronic prescribing was introduced to minimise medication harm. Use of electronic systems needs to be complemented with user caution and awareness of the act and skill of writing a prescription. In addition, knowledge of the appropriate state medicines regulation to adhere to creates awareness into safe prescribing practices. Therefore, medical students must be taught the skills required to write a legal, safe, and technically compliant prescription to reduce the risk of medication errors once they become junior doctors.

A medication prescription is a legal document written by an approved prescriber to authorise the supply of treatment for the patient. Writing a prescription is a skill all medical students must learn. The definition of 'prescribe' varies depending on local legislative, professional or governance processes, [7, 8] resulting in no clear international definition. Due to established relationships between medical education providers, this study was conducted across Australia and New Zealand (NZ). Consequently, the Australian Health Workforce definition of prescribe was used: 'the process involving information gathering, clinical decision making, communication and evaluation, resulting in the initiation, continuation or cessation of a medicine' [8]. This definition aligns with the medication management pathway [9] which is recommended by the Australian Commission on Safety and Quality in Health Care to ensure safe and quality use of medications.

Prescribing medications is a broad activity encompassing multidimensions of inpatient ordering, and outpatient and discharge prescription writing (see Fig. 1). Each prescription type has distinguishing differences in practice which the prescriber must know and acknowledge. In Australia, many inpatient orders cannot be used by a pharmacist to dispense a medication covered by the Pharmaceutical Benefits Scheme and would incur a cost to the patient if supplied privately. Simply put, as an inpatient it is a medication order for a nurse to administer the medication to the patient. As an outpatient or on discharge, the medication is prescribed, meeting further legal and safety requirements, for pharmacists to dispense a specified quantity. Focused education on a single prescription type does not prepare medical students transitioning to junior doctors for the requirements of others.

Fig. 1 How prescribing medication for the consumer is multilayered and multidimensional, highlighting the duality of the clinical and technical elements of prescribing

The ability to apply learnings of the multilayers to writing a prescription (see Fig. 1) can be challenging if the prescriber's knowledge is incomplete or inaccurate. Such challenges may be exacerbated by inconsistent teaching and assessment for prescription writing. These inconsistencies may result in the Dunning-Kruger effect, whereby individuals may overestimate their ability to write a safe and legal prescription [10]. A further challenge is combining the cognitive aspect of clinical decision-making and the technical skill of writing a prescription and defining the whole "prescribing". We propose the clinical knowledge for decision-making should be separated from the technical skill of prescribing so that education can be designed to teach both components independently.

Medical education providers and programs within Australia and NZ are assessed and accredited collaboratively by The Australian Medical Council (AMC) and the Medical Council of NZ [11]. The primary assessment criteria is whether the education provider and program provide graduates with the required knowledge, skills and professional attributes to practice medicine [11]. The AMC standards for clinical practice describes prescribing as the graduates' ability to safely, appropriately, effectively and sustainably prescribe in line with quality and safety frameworks and clinical guidelines [11]. This descriptor of a learning outcome is broad, vague and omits the requirement for adherence to local legal regulations when prescribing.

It is incumbent for educators to ensure medical students are prepared to write prescriptions once they graduate. Advised general therapeutics education is clear, with the AMC stating that graduates must be able to "describe the aetiology, pathology, clinical features, natural history and prognosis of common and important conditions at all stages of life" [11]. Suggested frameworks exist, like the Prescribing Competencies Framework, that contribute to a shared understanding of the general prescribing processes and may be used to assist in the development of education and training programs [7]. However, medical education providers need further clarity on specific education impacting the skill of outpatient and discharge prescribing, targeted towards the specific legislation and regulatory frameworks, separating it from inpatient ordering. Medical students have listed prescribing "low" as a core clinical skill in relation to their preparedness as an intern [12]. Variations in education (e.g. post-graduate versus undergraduate courses, differences in degree durations, prior education) and assessment may contribute to inconsistencies in medical graduates' prescription writing abilities.

Additional education on prescription writing has been shown to improve medical student prescribing [13, 14] . Yet, many students report a lack of preparedness and confidence [12] suggesting something may be missing from their education. Medical students' opinion of what, when, how and by whom targeted education on prescription writing should be provided is unknown [13]. A previous review identified most educational interventions were aimed to improve inpatient medication ordering [13]. Therefore a gap in outpatient and discharge medication prescription writing education exists.

Results from the 2019 joint AMC/Medication Board of Australia survey show medical students and junior doctors lack preparedness to prescribe [12]. A prescription that meets all clinical requirements may still not be dispensable due to failure in meeting all the legal and safety requirements. We propose, teaching the technical skill separately to clinical decision-making may improve preparedness for prescribing. This study investigated students' opinion of how, when and by whom the separate education should occur. Specifically, our primary aim was to understand Australian and NZ final-year medical students' confidence and preparedness to write a discharge or outpatient prescription (electronically and handwritten). Second, we sought to identify education modalities, the educator(s) professional background, and the ideal time during the medical degree curriculum to provide education on prescription writing.

Methods

This is a quantitative analytical cross-sectional study using a survey to collect data. The survey was modified from a previous pilot study [14]. The preliminary questions from Mokrzecki et al. [14] assisted in constructing this survey, along with pre-testing to ensure content and face validity. Completion of face validity was limited by REDCap® restrictions, and James Cook University (JCU) requirements, due to enrolment of the principal investigator (SM) in their degree.

Study setting

Information pertaining to this study was distributed through Medical Deans Australia and New Zealand (MDANZ). All 23 medical schools across Australia and NZ were invited to participate. A nominated contact person from each participating university coordinated the approval and email distribution of the online survey to adhere to confidentiality and anonymity standards.

Consent and participants

To participate, students were required to be in their final year of medical school and provide informed consent at survey commencement (mandatory field). Whilst assenting medical schools permitted a third party from their university to contact their students, the survey was entirely voluntary for students. Student participants were

advised they could withdraw at any point during the survey, which would exclude their responses from the study.

Final-year medical students were specifically targeted as firstly, they have the best overall learnings from the entire medical degree they have just undertaken, and secondly, they would likely be using their prescribing skills in the immediate future as an intern. Thus, their perception of confidence and preparedness would assist in the development of future studies. Further, we considered the final year of medical school would have the best concordance given proximity to graduation to overcome variations in course length and other inter-course differences across the variety of included medical schools.

Development and distribution of survey

Survey questions were developed by SM and approved by all authors (see appendix 1). REDCap® was used for distribution of the online survey and data collection. The survey was roughly 20-min in duration and was open from June to December of 2022. Participants were provided a link, which directly opened the survey.

Data analysis

Data was collected through REDCap®. Confidence and preparedness to write a prescription (hand-written and electronic) were assessed using a 5-point Likert-scale. Due to low response rates, these responses were grouped (strongly disagree with disagree and neutral, and strongly agree with agree) and re-termed in two groups – the affirmative as 'agree' and the remainder as 'not agree'. The dataset was made dichotomous because the purpose of this study was to identify participants who were not confident or prepared (including those who selected neutral), as they would potentially be the target population of receiving education in future studies.

Likert-scale responses of participants confidence and preparedness to handwrite and electronically write discharge or outpatient prescriptions were analysed descriptively in Microsoft Excel®. The Likert-scale responses were split between those who had previously completed a prior health-related degree (PHRD) and those who had not. This data was analysed using an odds ratio calculator (MedCalc version 23.1.6) to examine the association between participants self-perceived confidence and preparedness to handwriting or electronically write a medication prescription, comparing those who have a PHRD to those that don't.

Descriptive analyses were completed to determine the preferred education modalities, educator, and time during medical degree to receive education on prescription writing. The responses were gathered from a multi-select survey question and were not ranked by participants. Therefore, the intent of analysis was to determine desirability of each response independently.

Results

Of the 23 medical schools, seven actively accepted the invitation to participate, six declined to participate, and ten neither formally accepted nor declined to send the survey to their students. From the 17 possible universities that could have had participants involved in this study, 14 universities had participants respond (see Fig. 2).

University of Auckland represented all the responses obtained from NZ data. Due to the small number of participants, where appropriate, data from Australia and NZ has been grouped. See Table 1 for representation of all participant demographics.

Information presented online of enrolled final-year medical students across participating universities is unclear, but data shows there were over 2000 possible participants [15, 16]. Whilst this survey yielded a low response rate ($n=174$), the demographics are akin to larger surveys that have been distributed and collected by the MDANZ Medical Schools Outcomes Database. As with each national data report, typically females represented a larger proportion of the responding population (in the 2022 national data report, females represented 56% of Australia's responders [15] and 59% of NZ cohort [16]), and our survey was similar (see Table 1). As different age brackets were used between each report and this survey, data was not comparable.

Confidence and preparedness

Whilst there were no significant results ($p>0.05$), a larger proportion of participants – irrespective of having a PHRD – generally felt their university degree did not increase their preparedness to handwrite or electronically prescribe an outpatient or discharge medication prescription. Those who had a PHRD did not show strong results either way for being confident to prescribe or not. However, majority of those without a PHRD felt they were not confident to prescribe (see Table 3).

Legal regulation

Of the 174 participants, 114 stated that they were aware of a specific legal regulation to follow when writing a prescription. For the purposes of planned future studies, the Queensland (QLD) data was further analysed. Of the 31 QLD respondents, three were ineligible for inclusion as two answered the question incorrectly and one failed to respond. Eighteen (64.29%) of the 28 QLD respondents indicated awareness of the specific state legal regulation they should adhere to when writing a prescription. Yet only one respondent (who had not completed a PHRD) correctly stated the *Medicines and Poisons Regulation*.

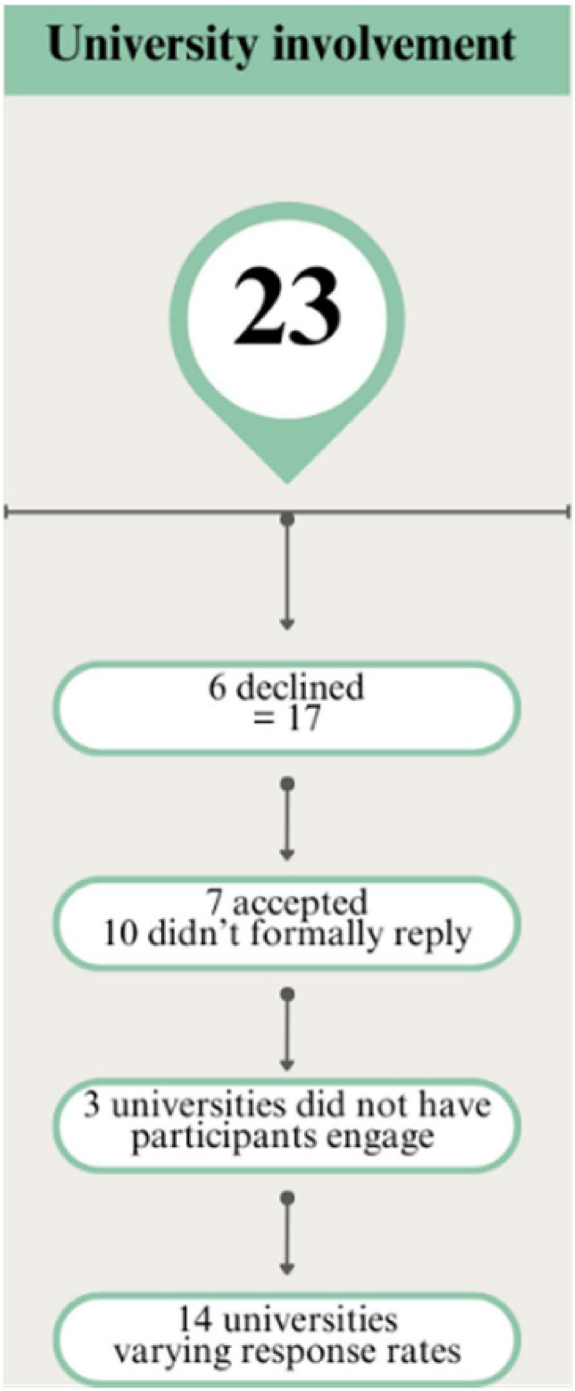

Fig. 2 Flowchart of university involvement

Six of the 18 respondents had completed a prior health related degree.

Education modality

The question pertaining to mode of education on prescription writing accepted multiple responses which were not ranked. Learning on placement was more desirable than all other options. Workshops/hands-on experiences, and tutorials were also selected by a larger proportion of participants, whereas didactic teaching and self-directed study were least selected (see Table 4).

Educator

The question about the discipline of education provider enabled multiple responses which were not ranked. Pharmacists were more desired as educators by final-year

Table 1 Demographics of final-year medical student respondents from Australian and NZ participating universities in 2022

Location	Participants ($n=174$)
Australia	123 (71%)
New Zealand	51 (29%)
Gender	
Female	114 (66%)
Male	60 (34%)
Age	
< 20	0 (0%)
21–25	104 (60%)
26–30	49 (28%)
> 31	21 (12%)
Previous Health Degree[a] (PHRD)	
Yes	28 (16.09%)
No	146 (83.91%)

[a] Participants who did not complete the degree were removed. Of those who had completed a prior health-related degree, there was no clear pattern in the type of degree, and the majority had worked to some capacity (see Table 2)

Table 2 PHRD's of participants

Degree	Participants, $n=28$[a]	Worked	Didn't work
Medical science, Biomedical science, Health science and Science related	15	10	5
Pharmacy	4	1	3
Physiotherapy	3	3	NA
Sport and exercise science	1	1	NA
Radiography and Medical imaging	3	3	NA
Occupational Therapy	1	1	NA
Paramedic science	1	1	NA
Nursing	2	2	NA
Health administration	1	1	NA
Nutrition and Dietetics	1	1	NA
Dental surgery	1	1	NA

[a] Some participants may have completed more than one degree

Table 3 Final-year medical students self-perceived confidence and preparedness to hand-write and electronically write a prescription, comparing those who have completed a prior health-related degree ($n = 28$) to those who have not ($n = 146$)

	Not agree	Agree	Odds Ratio (95%CI), p value
No-PHRD Confident HW	93 (64%)	53 (36%)	1.755 (0.778–3.960), ns
PHRD – Confident HW	14 (50%)	14 (50%)	
No-PHRD Confident E	74 (51%)	72 (49%)	1.028 (0.458–2.308), ns
PHRD – Confident E	14 (50%)	14 (50%)	
No-PHRD Prepared HW	74 (51%)	72 (49%)	0.571 (0.247–1.321), ns
PHRD—Prepared HW	18 (64%)	10 (36%)	
No-PHRD Prepared E	96 (66%)	50 (34%)	0.524 (0.199–1.375), ns
PHRD—Prepared E	22 (79%)	6 (21%)	

HW – Hand-written prescription; E – Electronic prescription; PHRD – Prior health-related degree, $P > 0.05$—ns

Table 4 Desired education modalities for prescription writing selected by final-year medical student respondents ($n = 174$)

Education modalities	Participants selecting each modality option, n (%)
Placement	143 (82.2)
Workshops / hands-on	138 (79.3)
Tutorials	118 (67.8)
Case-based learning	86 (49.4)
Opportunistic	65 (37.4)
E-learning resources	61 (35.1)
Problem-based learning	55 (31.6)
Self-directed	23 (13.2)
Didactic	22 (12.6)

Participants could select more than one response to education modality

Table 5 Desired professional background of educator for prescription writing selected by final-year medical student respondents ($n = 174$)

Educator professional background	Participants selecting each educator option, n (%)
Pharmacist	161 (92.5)
Medical intern / junior doctor	130 (74.7)
Senior Doctor	92 (52.9)
Pharmacologist	27 (15.5)
Academic staff	25 (14.4)
Nurse Practitioner	19 (10.9)
Self / Peers	9(5.2)
Dentist	2 (1.1)

Participants could select more than one response to professional background of educator

Table 6 Desired time during medical degree for prescription writing education to be delivered as selected by final-year medical student respondents ($n = 174$)

Desirable time to educate during medical degree	Participants selecting each time option, n (%)
Final year	117 (67.2)
Every year	71 (40.8)
Middle of degree	63 (36.2)
After graduation / intern year	56 (32.2)
1st year	4 (2.3)

Participants could select more than one response to timing of education

medical students (see Table 5). Junior and senior doctors were also selected by a larger proportion of participants.

Timing of prescribing education

The question about timing of education within the medical degree also allowed multiple responses which were not ranked. The final year of medical education was more desired as an appropriate time to receive education (see Table 6), with all other options selected by less than 50% of participants.

Discussion

This study demonstrated many final-year medical students feel a lack of preparedness and confidence to electronically- and hand-write a medication prescription. The result is unsurprising as previous studies also show students feel unprepared given the level of responsibility required [1]. Internationally, guidelines exist for the development and accreditation of medical education programs [17–19] but do not describe targeted education or assessment on prescribing. Additionally, targeted education on outpatient or discharge prescriptions compared to inpatient ordering has been found to be inadequate [13].

Eighteen of 28 QLD respondents from this study stated awareness of the legal regulation pertaining to writing a prescription. However, further probing elicited only one respondent who could name the regulation (this respondent did not have a PHRD). Awareness of and ability to name the regulation are two distinct areas of knowledge where only the latter knowledge enables a prescriber to refer to the correct document when adhering to the legal requirements. Prescribing should be recognised as a privileged skill rather than an inherent right, so that the utmost care is ensured, and adherence to all safety and legal requirements occur. Currently, once registered with the appropriate national organisation graduates from a medical degree have the right to prescribe medications. Thus, medical students must be adequately

equipped with the appropriate level of knowledge and confidence to prescribe as a junior doctor, adhering to all legal requirements per state regulation.

Participants with a PHRD felt their medical degree had not adequately prepared them to write a medication prescription either handwritten and electronically. This subset of participants may be more aware of their scope of practice and recognise their limitations in knowledge and understanding. Comparing those who did and didn't have a PHRD shows those without a PHRD felt more prepared to electronically and handwrite a prescription (see Table 3) further supporting the Dunning-Kruger effect in this group. An anomaly is their self-perceived lack of confidence to electronically and handwrite a prescription. We recommend specific education and assessment standards on prescribing skills should be introduced to improve the preparedness and confidence of medical students to prescribe, irrespective of having a PHRD.

Education modalities preferred by participants in this study were placement experiences, workshops/hands-on practice, and tutorials (see Table 4). Results from the AMC intern preparedness survey documents factors to increase preparedness for prescribing [1]. In descending order of self-perceived effectiveness, these factors include teaching supporting online resources, practical training, exposure to prescribing in clinical situations, teaching how teamwork and interprofessional relationships support safe prescribing, teaching pharmacology and therapeutics and preparing for the Prescribing Skills Assessment [1]. Our results align with the AMC survey regarding desired educational modalities reported by participants. This study reinforces the need for mixed-model education, incorporating active learning styles (hands-on experiences).

Pharmacists were the preferred educators identified by participants to teach prescription writing in our study (see Table 5). The other highly ranked educators being junior and senior doctor's links closely with the preferred education modality being placement experiences and having access to these educators in this environment. The educator options provided to students were based on some of those who can be accredited prescribers across Australia and New Zealand and those who have been known and studied to teach the skill of prescribing. The preference for pharmacists suggests they are highly regarded as educators and can prepare medical students to be legally responsible, safe, and efficient prescribers as they transition to junior doctors. Pharmacists have previously been recognised as an underutilised part of the healthcare team with the knowledge and skills required for prescription writing education [20]. The AMC survey stated education provided by pharmacists increases preparedness to prescribe [1] and our results also support the utilisation of pharmacist in the education process.

Participants indicated a preference to receive prescribing education from pharmacists in their final year of medical education (see Table 6). This transition period from medical student to junior doctor is likely to have the greatest impact in preparing them to prescribe when they become junior doctors. The proximity of the preferred timing of education and engaging in prescription writing as junior doctors likely predisposes their appreciation and urgency to acquire the skill. Only 32.2% selected to receive education after graduation/during their intern year orientation, which may be too late. Teaching medication prescribing is multilayered and multidimensional (see Fig. 1). The skill of writing a prescription cannot be learnt quickly and so it is taught to pharmacists throughout their degree for knowledge consolidation. Therefore, mandatory education throughout the medical degree plus a refresher course and assessment before commencing practice as a junior doctor would reinforce prescribing skills.

There is justification for separating the teaching of clinical decision-making from the skill of prescribing. Although essential to patient care, the two skills are not assessed equally rigorously. Formal and mandated education and assessment on the skill to prescribe are lacking even in the case of the UK Prescribing Safety Assessment (PSA) and the international Prescribing Skills Assessment. The largest segment in the PSA is the prescribing component which assesses participants on the clinical choice of medication, dose, route, frequency, and duration with prompting factors and a formulary that searches the online domain when characters are typed in each field. However, the PSA fails to teach or assess the difference between an inpatient order and a discharge or outpatient prescription—an important distinction for the clinical care of the patient. The authors argue, that whilst the PSA and Prescribing Skills Assessment are steps in the right direction to ensure quality assessment of prescribing skills amongst medical students internationally, it overlooks the need to teach the hands-on fundamental skills necessary to writing a safe and legal prescription (in conjunction with clinical decision-making). Clinical knowledge was ranked as a lower priority than practical training and exposure to real-life scenarios by participants in the AMC survey [1]. The lower ranking of clinical knowledge supports the argument that the skill of prescribing is multifactorial and should be taught as a supportive topic to clinical knowledge rather than classified as a single entity and termed 'prescribing'. Focused education will assist students in translating knowledge into practice when transitioning to a junior doctor position. Understanding the key concepts of

writing a prescription and building this into the curriculum as a compulsory component may assist in preparing and building students' confidence prior to registration as authorised prescribers.

This study has some limitations, as well as strengths which support future study recommendations. The low response rate was a major limitation of this study despite multiple attempts at contacting and recruiting through medical schools. The wide geographical coverage was a strength. Presented data is comparable to larger national reports within Australia and NZ, establishing representativeness of respondents for our study [1, 15, 16]. Due to the low response rate, some Likert scale data was grouped, which may have affected the findings. This study did not look at medical students from other year levels or further abroad than NZ, which should be addressed in future studies. The strengths of this study are the survey questioning techniques and having pilot tested the survey with other doctors, pharmacists, and previous medical students to ensure content and face validity. Strengths also include the survey response options allowing multi-selection for improved data collection, and not contributing to publication bias by presenting only positive results. To our knowledge, this is the first Australian and NZ survey to investigate two components; firstly, final-year medical students' self-perceived confidence and preparedness to handwrite, and electronically generate a medication outpatient or discharge prescription, and secondly, seek their views on three potential factors that may influence education delivery on the skill of prescription writing. The results from this survey will inform the development of a targeted intervention focusing on all three components, being a pharmacist-led multimodal education package to final-year medical students.

This study demonstrates that final-year medical students' continued lack of self-perceived preparedness and confidence to prescribe may be due to their lack of knowledge regarding the foundational skills and legal regulations to write a prescription. Once understood, prescribing skills and knowledge can be applied to any facet of medication prescribing, both electronic and handwritten, making the process efficient and effective. Mandated education on prescribing is paramount and a step towards achieving medication without harm as promoted by the World Health Organisation [15]. Medical students must be provided with appropriate education by well-regarded educator(s) at an ideal time during their medical degree to become prepared and confident prescribers as junior doctors.

Further studies are needed to assess final-year medical students' applied skills to prescribe in correlation to their perceived preparedness and confidence. Interventions should incorporate multimodal educational sessions delivered by a pharmacist in the final year of medical education and assess changes in prescribing skills and behaviours. A longitudinal review of prescribing skills should evaluate the effectiveness of the implemented education with regards to knowledge retention.

Conclusion

Final-year medical students recognise their self-perceived lack of preparedness and confidence to write a medication prescription. Student deficits in preparation and confidence to prescribe may contribute to unsafe medication practice as junior doctors, worse health outcomes for patients and increased pressure on health systems. These are encouraging factors to embed mandatory, focused multimodal education, by a pharmacist on the skill of prescription writing into medical education curriculums.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12909-025-07061-6.

Supplementary Material 1: Appendix 1. Copy of survey developed through REDCap® and distributed through the Australian medical schools to final year medical students

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Clinical trial number

Not applicable.

Authors' contributions

SM designed the study, created the online survey, analysed and interpreted the data, and wrote the paper. SP, TP, AJM and TSG all provided contributions to the concept of the study and have assisted with draft reviews of the paper. SP also assisted with review of online survey design and data interpretation. AJM additionally assisted with review of data analysis by SM and has contributed with assistance in publication submission. All listed authors have approved the submitted version. All authors have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

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Data availability

The datasets generated and/or analysed during the current study are not publicly available due to maintaining anonymity of participants and participating medical universities, but may be available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approvals were granted by the following committees: James Cook University Human Research and Ethics Committee (H8669), Auckland Health Research Ethics Committee (AH24452), and University of Otago Human Ethics Committee (D22/110). The University of Tasmania medical school internally reviewed and approved the study. The study was reviewed and accepted by the other participating university medical schools. This study was supported by MDANZ. Research carried out for this study adhered to the Declaration of Helsinki.

Participants partaking in this anonymous voluntary survey provide informed consent.

Consent for publication

Participants were advised that data will be used in research publications and reports prior to consenting to start the voluntary survey.

Competing interests

The authors declare no competing interests.

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