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Original Research

Factors influencing pharmacy students' attitudes towards pharmacy practice research and strategies for promoting research interest in pharmacy practice

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ABSTRACT[*]

Objectives: To (1) investigate the relationships between students' characteristics and their (a) perceptions of research in general and (b) attitudes towards pharmacy practice research; (2) identify strategies that could be used by pharmacy educators to promote research interest in pharmacy practice; and (3) identify perceived barriers to the pursuit or completion of a pharmacy practice research degree.

Methods: A survey was administered to all students enrolled in each year of the four-year pharmacy undergraduate program, University of Sydney, Australia. Perceptions of research in general were measured using 4 items on a five-point semantic-differential scale and attitudes towards pharmacy practice research were measured using 16 items on a five-point Likert scale. Student characteristics were also collected as were responses to open-ended questions which were analysed using content analysis.

Results: In total 853 students participated and completed the survey (83% response rate). Participants' characteristics were associated with some but not all aspects of research and pharmacy practice research. It appeared that positive attitudes and perspectives were influenced strongly by exposure to the 'research' process through projects, friends or mentors, previous degrees or having future intentions to pursue a research degree. Results from both the quantitative and qualitative analyses suggest positive attitudes and perceptions of research can be nurtured through the formal inclusion in research processes, particularly the utility of practice research in clinical practice across the four years of study. Participants indicated there was a lack of awareness of the needs, benefits and career opportunities associated with pharmacy practice research and voiced clear impediments in their career path with respect to the choice of practice research-related careers.

Conclusions: Future research should investigate changes in perceptions and attitudes in a single cohort over the four-year degree, other factors influencing students' perceptions and attitudes, and evaluate the effectiveness of research promoting strategies and programs.

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INTRODUCTION

Beyond conventional dispensing, pharmacists are increasingly providing a range of health services, disease management support programs, health promotion and prevention activities.[1-2] To inform health policy and ensure the sustainability of new roles a robust evidence base of clinical efficacy and cost-effectiveness is needed through high-quality practice research.[3] Practice research is a fundamental driver for expansion and innovation in professional practice. Active participation of practitioners in such research program is vital. However, at present, participation of community pharmacists in practice research is limited and many pharmacists are reluctant to engage with healthcare researchers in new empirical studies.[4-7] From studies conducted to characterise 'research engaged' pharmacy practitioners, it is evident that those who choose to be involved are motivated by factors such as a special interest in research or research topic, a belief that research is important and that it will benefit the patient.[4-7]

Whilst pharmacy practitioners have a crucial role to play in research implementation, the research itself is usually conceived and directed by healthcare researchers who serve as a vital link between high quality research, training of future practitioners and innovations in healthcare practice. Such researchers are trained jointly in research and patient care by academic educators. Unfortunately, it appears that a shortage of qualified academic educators projected through workforce mapping in Australia and other countries could pose problems to the future advancement of the profession. [8-10]

A profession's mindset is formed by influences during undergraduate education and subsequent professional experience through the process of socialisation.[11-13] Numerous forces, both formal and informal, have been proposed to influence the socialisation process.[11] This process evolves primarily through social interactions with reference groups such as faculty members, practitioners, preceptors and peers, which shape the students' professional and maturational values and attitudes.[11] Since professional socialisation is influenced by academic interactions and practice

experiences, pharmacy education is a critical component of the process.

Pharmacy education is evolving rapidly worldwide, with significant changes to the education curricula, strategies and modes of delivery.[10,14-16] Academic programs are held accountable for "preparing graduates to conduct research and scholarly activity".[17,18] Pharmacy students' attitudes towards postgraduate research have been investigated in the past, however these early studies were conducted at a time when the goals and objectives of the profession and the practice of pharmacy were vastly different and postgraduate education mainly involved laboratory-based research in pharmaceutics, pharmacology or medicinal chemistry.[19-22] Our team recently completed and published the findings of a cross-sectional survey of undergraduate students' perceptions of research in general and attitudes towards pharmacy practice research at each stage of the undergraduate program in an Australian setting (University of Sydney).[23] In Australia, the University of Sydney is one of the leading centres for Pharmacy education, and in the discipline of pharmacy practice there is a focus in raising awareness about practice-based research conducted in the faculty during the four-year undergraduate program.[18] With regards to research exposure, a limited number of opportunities are available for students to engage in practice-based research activities through a summer vacation program and through the Bachelor of Pharmacy Honours program. Students are also introduced to aspects of practice research in lectures throughout the pharmacy practice curriculum, although the research is infrequently an explicit focus of the lecture. Given the key role pharmacy practice research plays in evidence-based health care and advancing the profession, developing a cohort of students willing to embrace the challenge of practice-based research is important.

In our recent cross-sectional survey, an objective of the first phase of the study was to validate a measure of 'attitudes to practice research' in an Australian cohort of pharmacy students. Among the key findings of this first phase were that although the majority of students recognised the need for research, they found it to be difficult and were divided in their opinions regarding the attractiveness of research and their interest in.[23] Most students agreed that practice research played an important part in the profession and curriculum but almost half of the cohort indicated they would not enjoy engaging in practice research and expressed a lack of confidence in their abilities to do so.[23] The study did not explore factors that influenced attitudes to research nor did it probe for students' recommendations to improve the current situation.

In this manuscript, we describe the results of the second study phase. The specific objectives were to: (1) investigate the relationships between students' demographic and educational characteristics and their (a) perceptions of research in general and (b) attitudes towards pharmacy practice research; (2) identify strategies that could be used by pharmacy educators to promote research interest in pharmacy practice; and (3) identify perceived barriers to the pursuit or completion of a pharmacy practice research degree.

METHODS

The study utilised a cross-sectional design and data were collected using a survey. All students enrolled in each year of the four-year pharmacy undergraduate program at the University of Sydney in Australia were invited to complete a voluntary, anonymous survey during tutorial times in October 2009. Completion of the survey instrument implied informed consent. Ethics approval was obtained from the University of Sydney Human Research Ethics Committee prior to commencement of the study.

The survey instrument

The survey used to assess students' perceptions of research in general and attitudes towards practice research comprised three sections and included two open-ended questions (not reported in previous manuscript).

Section 1 ('Perceptions of Research in General' bipolar scales): contained four semantic-differential scales formed by bipolar adjectives anchoring a five-point scale from 0-4: (i) difficult-easy, (ii) unnecessary-necessary, (iii) repelling-attractive, (iv) boring-attractive, where a rating of 2 was neutral.

Section 2 ('Attitudes to Pharmacy Practice Research' scale): included a definition of pharmacy practice research and contained 19 items. Following factor analysis in the first study phase, the 19-item scale was reduced to 16-items yielding five factors.[23] Responses were recorded on a five-point Likert scale (0=strongly disagree, 2=neutral and 4=strongly agree) (Appendix 1).

Section 3 (demographic and educational characteristics): contained 15 items and included age, gender, nationality, marital status, educational loan and scholarship status, and whether or not respondents had: (i) a previous degree or intended to pursue another degree or a postgraduate research degree after completing the undergraduate program; (ii) involvement in a research project during their education; (iii) a mentor, a family member, or a friend involved in research; (iv) an intention to practice pharmacy after completing their graduate (intern) year training.

In addition, respondents were asked to indicate (1) what strategies they felt could be used by faculty to promote research interest in pharmacy practice and (2) what they perceived as barriers to the pursuit or completion of a pharmacy practice research degree.

Data Analysis

PASW Statistics (Version 18) was used for all statistical analyses. For all outcome variables, normality tests were conducted using the Kolmogorov-Smirnov test. For correlations, scatterplots were examined to ensure no violation of normality, linearity and homoscedasticity. Mean

Table 1. Demographic and educational characteristics of respondents (n=853)

Characteristic	Total
Age in years: Mean (SD)	20 (1.9)
	n (%)
Gender (Female)	536 (63)
Married	37 (4)
Born in Australia	447 (52)
Educational loan	427 (50)
Scholarship recipient	115 (14)
Previous degree	49 (6)
Intend to pursue another degree	350 (41)
Intend to pursue a postgraduate research degree	173 (20)
Involvement in a research project during degree	334 (39)
Mentor involved in research	119 (14)
Immediate family involved in research	91 (11)
Other family involved in research	106 (12)
Friends involved in research	349 (41)
Intend to practice on completing the graduate year	713 (84)

factor scores were calculated by summing responses for individual items within a factor and dividing by the number of items included in the factor. In addition to descriptive statistics, Spearman's rank-order correlations were performed to examine the relationship between two continuous variables that were not normally distributed. Differences in perceptions of research in general and attitudes to practice research by demographic and educational characteristics were analysed using independent sample t tests for normally distributed variables, and the Mann-Whitney U test for variables that were not normally distributed. Proportional data were analysed using the Chi-squared test. The relative importance of various variables on attitudes to each of the five factors (constructs) of pharmacy practice research was assessed by multiple linear regression using the backward step-wise method. A two-tailed significance level of 0.05 was used for all analyses. Open-ended question responses were grouped into general themes after content analyses and the most commonly reported themes tabulated.

RESULTS

The overall response rate for undergraduates was 83% (853/1033): 84% (238/284) of year one, 83% (198/239) of year two, 80% (212/264) of year three and 83% (205/246) of year four.

The demographic and educational characteristics of the total sample have been described in detail elsewhere[23] and are summarised in Table 1.

Mean ratings on the "Perceptions of Research in General" bipolar scales and mean factor scores on the 16-item "Attitudes to Pharmacy Practice Research" scale for the total sample have been published elsewhere. [23]

Although certain demographic and educational characteristics were found to be significantly associated with perceptions of research in general, these associations were not observed on all four bipolar scales (Table 2). There was no relationship between participants' characteristics and perceived level of difficulty/ease of research. Marital status, scholarship status, the intention to pursue another degree (non-research), having distant family members involved in research, and/or the intention to practice pharmacy after completing the graduate (intern) year were not associated with perceptions of research in general.

Attitudes towards pharmacy practice research and student characteristics

Differing participants' demographics and certain educational characteristics were found to be significantly associated with attitudes to various aspects of pharmacy practice research (Table 3). Educational loan status, scholarship status, the intention to pursue another degree (non-research) and/or having distant family members involved in research were not associated with attitudes to any of the five aspects of pharmacy practice research.

Table 2. Relationships between perceptions of research in general and student characteristics (n=853)

Characteristics	Difficult/ Easy		Unnecessary/ Necessary		Repelling/Attractive		Boring/ Interesting	
	Test statistics	p-value	Test statistics	p-value	Test statistics	p-value	Test statistics	p-value
Age (years)	*ns*	*ns*	0.08	**0.02** [b]	*ns*	*ns*	*ns*	*ns*
Gender (Females=536; Males=317)	*ns*	*ns*	2.32	**0.02** [a]	*ns*	*ns*	*ns*	*ns*
Born in Australia? (No=400; Yes=447)	*ns*	*ns*	*ns*	*ns*	2.99	**<0.001** [a]	2.11	**0.04** [a]
Educational loan? (No=426; Yes=427)	*ns*	*ns*	-3.94	**<0.001** [a]	*ns*	*ns*	*ns*	*ns*
Previous degree? (No=804; Yes=49)	*ns*	*ns*	-2.17	**0.03** [a]	*ns*	*ns*	-2.73	**<0.01** [a]
Intend to pursue a post-graduate research degree? (No=680; Yes=173)	*ns*	*ns*	*ns*	*ns*	-6.67	**<0.001** [a]	-5.43	**<0.001** [a]
Involvement in a research project? (No=519; Yes=334)	*ns*	*ns*	-2.40	**0.02** [a]	*ns*	*ns*	*ns*	*ns*
Mentor involved in research? (No=734; Yes=119)	*ns*	*ns*	-4.01	**<0.001** [a]	-2.36	**0.02** [a]	-3.10	**<0.01** [a]
Immediate family involved in research? (No=762; Yes=91)	*ns*	*ns*	*ns*	*ns*	-2.81	**<0.01** [a]	-2.15	**0.03** [a]
Friends involved in research? (No=504; Yes=349)	*ns*	*ns*	*ns*	*ns*	-2.20	**0.03** [a]	*ns*	*ns*

[a] Independent sample *t* test [b] Spearman's rank-order correlation

Table 3. Relationships between attitudes to pharmacy practice research and student characteristics (n=853)

Characteristics	Factor 1† (Inclusion of PPR in the curriculum)		Factor 2† (Engaging in PPR activities)		Factor 3† (Confidence in abilities to do PPR)		Factor 4† (Faculty involvement of students in PPR)		Factor 5† (Role of PPR in the profession)	
	test	p-value	test	p-value	test	p-value	test	p-value	test	p-value
Age (years)	-0.12	**<0.001** [a]	0.14	**<0.001** [a]	*ns*	*ns*	0.08	**<0.01** [b]	*ns*	*ns*
Gender (Females=536; Males=317)	*ns*	*ns*	3.90	**<0.001** [a]	-3.68	**<0.001** [a]	*ns*	*ns*	*ns*	*ns*
Married? (No=816; Yes=37)	*ns*	*ns*	*ns*	*ns*	-2.43	**0.02** [a]	*ns*	*ns*	*ns*	*ns*
Born in Australia? (No=400; Yes=447)	*ns*	*ns*	*ns*	*ns*	*ns*	*ns*	3.92	**<0.001** [a]	*ns*	*ns*
Previous degree? (No=804; Yes=49)	*ns*	*ns*	*ns*	*ns*	-2.24	**0.03** [a]	*ns*	*ns*	*ns*	*ns*
Intend to pursue a post-graduate research degree? (No=680; Yes=173)	-3.63	**<0.001** [a]	-3.69	**<0.001** [a]	-2.41	**0.02** [a]	*ns*	*ns*	*ns*	*ns*
Involvement in a research project? (No=519; Yes=334)	*ns*	*ns*	-1.96	**0.05** [a]	-4.63	**<0.001** [a]	-2.01	**0.05** [a]	*ns*	*ns*
Mentor involved in research? (No=734; Yes=119)	*ns*	*ns*	-2.90	**<0.01** [a]	-2.82	**<0.01** [a]	*ns*	*ns*	*ns*	*ns*
Immediate family involved in research? (No=762; Yes=91)	*ns*	*ns*	*ns*	*ns*	-3.24	**<0.01** [a]	*ns*	*ns*	*ns*	*ns*
Friends involved in research? (No=504; Yes=349)	-2.12	**0.03** [a]	-4.75	**<0.001** [a]	-2.03	**0.04** [a]	*ns*	*ns*	*ns*	*ns*
Intend to practice pharmacy on completing the graduate year training? (No=140; Yes=713)	*ns*	*ns*	-4.04	**<0.001** [a]	*ns*	*ns*	*ns*	*ns*	-3.35	**<0.01** [a]

PPR = Pharmacy practice research
[a] Independent sample *t* test [b] Spearman's rank-order correlation † Factor scores derived by the regression method

Predictors of attitudes towards pharmacy practice research

The results of the multiple linear regression in Table 4 show three variables to be significantly related to attitudes to Factor 1 and these explained 5.9% of the total variance (F=15.85, P<0.001); four variables related to attitudes to Factor 2 explaining 7.5% of the total variance (F=16.25, P<0.001); four variables related to attitudes to Factor 3 explaining 5.6 % of the total variance (F=12.650, P<0.001); one variable related to attitudes to Factor 4 and Factor 5 explaining 1.8 % of the total variance (F=15.35, P<0.001) 1.5 % of the total variance (F=11.22, P=0.001) respectively. The most important predictor of attitudes concerning: the inclusion of practice research in the curriculum (Factor 1) was Year 1 of study; engaging in practice research activities (Factor 2) was having friends in research; and confidence in abilities to do practice research (Factor 3) was involvement in a research project during education. The only predictor of attitudes regarding faculty staff support of practice research (Factor 4) was being born overseas, and for the role of practice research in the profession (Factor 5) was intention to practice pharmacy on completing graduate training.

Students' qualitative feedback

Strategies that could be used by pharmacy educators to promote research interest in pharmacy practice most commonly reported by undergraduate pharmacy students included: providing more comprehensive information about practice research including the needs, benefits and career opportunities associated with practice research through brochures, videos or an interactive website; inviting students, postgraduates or academic staff members involved in practice research to share their experiences in lectures or tutorials; integrating more 'hands on' practice research activities into the curriculum and experiential placements earlier in the course; and providing more summer vacation scholarships, internships and incentives.

The majority of respondents indicated more than one potential barrier to the pursuit or completion of a pharmacy practice research degree. Lack of interest or motivation, time taken to complete the research degree, lack of financial support, desire to practice pharmacy or pursue other interests, and perception that research is too difficult were perceived barriers to the pursuit or completion of a research degree in pharmacy practice most commonly reported by the pharmacy students.

DISCUSSION

This study investigated factors influencing undergraduate pharmacy students' views regarding research, particularly pharmacy practice research at a time where the profession of pharmacy and the scope of its professional practice have undergone major changes. Our results revealed that participants' demographics and educational characteristics were associated with some but not all aspects of research and practice research. It appeared that positive attitudes and perspectives were influenced strongly by exposure to the 'research' process through projects, friends or mentors, previous degrees or having future intentions to pursue a research degree. Results from both the quantitative and qualitative analyses conducted in our study suggest positive attitudes

Table 4. Multiple regression results of various variables on attitudes to each aspect of pharmacy practice research (n=853)

Variables	Standardised regression coefficient	*t* value	p-value
Factor 1 (Inclusion of PPR in the curriculum)			
Intend to pursue a postgraduate research degree (No =0, Yes =1)	0.105	3.115	0.002
Year 1 versus others (Year 1 =1, Others =2)	**-0.178**	**-4.996**	**<0.001**
Year 2 versus others (Year 2 =1, Others =2)	-0.162	-4.535	<0.001
Constant (Factor 1 score†)		5.463	<0.001
Factor 2 (Engaging in PPR activities)			
Gender (Female=0, Male=1)	-0.121	-3.643	<0.001
Intend to pursue a postgraduate research degree (No =0, Yes =1)	0.129	3.900	<0.001
Friends involved in research ((No =0, Yes =1)	**0.145**	**4.372**	**<0.001**
Year 3 versus others (Year 3 =1, Others =2)	-0.122	-3.668	<0.001
Constant (Factor 2 score†)		2.776	0.006
Factor 3 (Confidence in abilities to do PPR)			
Gender (Female=0, Male=1)	0.130	3.901	<0.001
Married (No =0, Yes =1)	0.073	2.178	0.030
Involvement in a research project during education (No =0, Yes =1)	**0.147**	**4.390**	**<0.001**
Immediate family involved in research (No =0, Yes =1)	0.099	2.941	0.003
Constant (Factor 3 score†)		-5.212	<0.001
Factor 4 (Faculty involvement of students in PPR)			
Born in Australia (No =0, Yes =1)	**-0.133**	**-3.916**	**<0.001**
Constant (Factor 4 score†)		2.834	0.005
Factor 5 (Role of PPR in the profession)			
Intend to practice on completing the graduate year training (No =0, Yes =1)	**0.114**	**3.349**	**0.001**
Constant (Factor 5 score†)		-3.062	0.002

PPR = Pharmacy practice research †Factor scores derived by the regression method

and perceptions of research can be nurtured through the formal inclusion of students in research processes, particularly the utility of practice research in clinical practice across the four years of study. Participants indicated there was a lack of awareness of the needs, benefits and career opportunities associated with practice research and voiced clear impediments in their career path with respect to the choice of practice research-related careers. Given that globally, it has been suggested that uptake of research pathways by new entrants to the pharmacy profession, especially in the area of practice research, is low, these results may provide a way forward for pharmacy educators to help mould a cohort of students willing to embrace the challenge of practice-based research.

In the current study, although females rated research as more necessary and held more positive attitudes towards engaging in practice research activities, they felt less confident in their abilities to undertake practice research than males. These results mirror previous findings involving undergraduate medical[24] and chiropractic[25-26] students and from a 1992 study involving fourth year pharmacy[22] students in the US. Given the increasing number of females entering the undergraduate program[27], this lack of confidence to undertake practice research may potentially lead to a fewer number of female pharmacists willing to participate in practice research as well as mentors and academic educators available to female pharmacy undergraduates in the future. Although certain influencing demographics such as gender, may be regarded as un-modifiable, they can inform pharmacy educators in designing targeted interventions to help inculcate more positive attitudes and perceptions, and improve confidence and skills where needed.

One of the interesting findings in this study phase was that perceived degree of difficult/ease of research was not associated with either student demographics or educational characteristics. Students' perceptions that research was difficult and challenging could be the result of a lack of awareness of what research is all about. However it is known that interactions with faculty members, practitioners, preceptors and peers can strongly influence and shape perceptions positively towards reseach.[11] Since the majority of students are introduced to some aspects of practice research in lectures, perhaps a more frequent and greater focus on the 'research' processes may help increase students' awareness of research and change their perceptions. Further investigation of the nature of social interactions, internal and external to the educational experience, influencing perceptions of a single cohort over the full four years is warranted.

The results suggested that some types of exposure of students to research during undergraduate education may be associated with more positive attitudes and greater confidence in undertaking practice research. This finding is aligned with those from previous studies conducted with chiropractic[26-27] and medical[25] undergraduates who possessed previous research experience. However, most participants in this study, either with or without research experience, indicated that they recognised the important role pharmacy practice research played in the profession which is consistent with findings among medical[25] and nursing[28-29] students as well as community pharmacists. For example, pharmacists who had previous research experience were more likely to be motivated and interested in participating in all aspects of research, found the research experience rewarding and were more willing to do it again compared to those who had no previous research experience.[5] Moreover, most pharmacists, either with or without previous research experience indicated that they recognised the value and importance of research towards advancing the profession.[5,6,30-31]

Having been born overseas was also an important predictor of attitudes regarding the extent to which faculty staff exhibit behaviour that can increase students' interest in practice research. It has been proposed that individuals entering the socialisation process bring with them certain personalities, values, norms and expectations gained from previous experience and education, and the next step in the process is career choice, which is affected by such factors as early work experience and family.[11] Hence, these differences in attitudes may be due to different underlying personal values, attitudes and motives for choosing a pharmacy career, previous and concurrent experiences within the pharmacy practice environment, as well as the influence of reference groups during the pharmacy program.

Almost half the participants in this study seemed to feel that awareness, motivation and experience in practice research was lacking. In particular, they revealed that an awareness of the needs, opportunities and rewards associated with practice research might stimulate research interest in pharmacy practice. Similar findings have been reported by pharmacy undergraduates[22], and graduates[32] regarding research in general, which found that 'better career opportunities', intellectual satisfaction' and 'more challenging work' were among the top three factors for having stimulated the pursuit of postgraduate education. Given the influence of research exposure on moulding attitudes and expectations about research related participation and careers, many faculty-led pharmacy programs in the US[33-36] have been developed to address the issue of underexposure of graduates to practice research. Such programs involve inviting pharmacy students to participate in courses designed to engage students in experiencing research[33,34] one on one mentoring with research experienced mentors[35,36] and undertaking actual research projects in clinical subjects.[36] Most such efforts have resulted in bridging the chasm between students' awareness about research and the research world in clinical pharmacy.

In line with well-known behaviourist approaches such as the theory of reasoned action, our study suggested that more positive views of practice research were found in students who intended to pursue a postgraduate research degree after completing the undergraduate program, i.e. that attitudes towards research are associated with the intention of 'doing' research. A longitudinal study, which traces the same cohort over time, is necessary to clarify the true impact of progression through the four-year curriculum on students' attitudes towards practice research. Curricular changes incorporating effective programs/strategies and more research-enhanced teaching can shape subjective norms and help facilitate pro-research perceptions and student attitudes over time, and should be monitored in the future.

Another interesting finding in our study was that the intention to practice pharmacy on completing the graduate year training appeared to be associated with positive attitudes towards the role practice research played in the profession, unlike exposure to research. Participants in this study, who intended to practice pharmacy on becoming registered pharmacists, indicated that they clearly recognised the vital role practice research played in the profession, possibly because they would want professional pharmacy practice to be at the cutting edge and to have up-to-date clinical knowledge that is sustained through high quality research and innovations in healthcare practice.

A key contribution of our study has been the identification of a series of student-suggested strategies for promoting research interest in pharmacy practice.. While there is some evidence supporting the effectiveness of research promoting strategies in the published literature[33-36], no studies have tested the effect of such strategies in the Australian pharmacy setting. Thus, identification and implementation of effective practice research promoting strategies may enable undergraduates to become better prepared to endorse the importance of community research and the role it plays in achieving evidence-based practice, propel more students toward postgraduate education in practice research, and subsequently, provide a larger pool of individuals available to academia and the Australian healthcare industry.

This study also identified important barriers to the pursuit or completion of a practice research degree as including lack of interest or motivation, time taken to complete the research degree, lack of financial support, desire to practice pharmacy or pursue other interests and perception that research is too difficult. These findings are consistent with previous studies.[19-22,37,38] Hence, appropriate interventions will be needed to help overcome barriers and facilitate greater social interaction of reference groups so as to enhance research-related career options for students in the future.

The limitations of the study were associated with the cross-sectional design, as it did not allow us to infer causality. Additionally, the study included participants from one Australian undergraduate pharmacy program and study results were based on self-report, thus the findings may be overestimated as a result of social desirability bias. Moreover, a small amount of total variance was explained by each of our regression models (between 1.5 and 7.5%).

Our investigations of students' perceptions and attitudes have formed the basis for future work in this area, which will look at changes in perceptions and attitudes in a single student cohort over the full four years of the degree. Further research into factors, internal and external to the educational experience, influencing students' perceptions and attitudes to pharmacy practice research needs to be investigated and strategies for stimulating research interest evaluated for their effectiveness.

CONCLUSIONS

In conclusion, the main contribution of this research has been to identify factors influencing

undergraduate pharmacy students' attitudes towards practice research, research promoting strategies and barriers to the pursuit or completion of a practice research degree. Integrated programs that explicitly focus on research must be developed and effective research promoting strategies must be implemented, in light of the emphasis placed on practice research at the undergraduate level.39 In so doing, we can not only improve the level of participation of pharmacy practitioners in community research and the quality of practice research, but also provide a larger pool of individuals available to academia and the healthcare industry in the future.

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CONFLICT OF INTEREST

The Author(s) declare(s) that they have no conflicts of interest to disclose.

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FACTORES QUE INFLUYEN EN LAS ACTITUDES DE LOS ESTUDIANTES DE FARMACIA HACIA LA INVESTIGACIÓN EN FARMACIA PRÁCTICA Y ESTRATEGIAS PARA PROMOVER EL INTERÉS EN INVESTIGAR EN FARMACIA PRÁCTICA

RESUMEN

Objetivos: (1) Investigar la relación entre las características de los estudiantes y su (a) percepción de la investigación en general, (b) actitudes hacia la investigación en farmacia práctica, (2) identificar las estrategias que podrían ser usadas por los educadores de farmacia para promover el interés en la investigación en farmacia práctica; y (3) identificar las barreras percibidas para elegir o completar un grado en investigación en farmacia práctica.

Métodos: Se administró un cuestionario a todos los estudiantes matriculados en cada año de los cuatro años del programa de grado de farmacia de la Universidad de Sídney, Australia. Se midieron las percepciones de la investigación en general usando 4 ítems de una escala semántica-diferencial de 5 puntos, y se midieron las actitudes hacia la investigación en farmacia práctica usando una escala de Likert de 5 puntos con 16 ítems. También se recogieron las características de los estudiantes en respuestas abiertas que fueron analizadas mediante un análisis de contenido.

Resultados: En total 853 estudiantes participaron y completaron el cuestionario (83% tasa de respuesta). Las características de los participantes se pudieron asocial con algunos, pero no con todos, los aspectos de la investigación y de la investigación en farmacia práctica. Resultó que las actitudes y las perspectivas positivas estaban fuertemente influenciadas por la exposición al proceso de 'investigación' a través de proyectos, amigos o mentores, graduaciones previas o intenciones futuras de iniciar un grado de investigación. Los resultados de los análisis cualitativos y cuantitativos sugirieron que las actitudes y las percepciones positivas pueden ser alimentadas a través de la inclusión formal en procesos de investigación, particularmente la utilidad de la investigación práctica en la práctica clínica durante los cuatro años de estudios. Los participantes indicaron que había una falta de consciencia de las necesidades, beneficios y oportunidades de carrera asociadas a la investigación de farmacia práctica, y enunciaban impedimentos claros en su carrera de progreso en relación a la elección de carreras de investigación en farmacia práctica.

Conclusión: Futuras investigaciones deberían analizar los cambios en percepciones y actitudes en una cohorte durante los cuatro años de estudios, otros factores que influyen las percepciones y actitudes de los estudiantes, y evaluar la efectividad de estrategias y programas de promoción de la investigación.

Palabras clave: Investigación; Selección de Profesión; Actitud; Educación en Farmacia; Estudiantes de Farmacia; Australia

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