

Australian pharmacy students' knowledge, attitudes, and behaviours regarding emergency contraception

DENISE L. HOPE^{1*}, H. LAETITIA HATTINGH^{1,2}, MICHELLE A. KING³

¹*School of Pharmacy, Griffith University, Gold Coast, Queensland, Australia*

²*School of Pharmacy, Curtin University, Perth, Western Australia, Australia*

³*School of Pharmacy and Menzies Health Institute Queensland, Griffith University, Gold Coast, Queensland, Australia*

Abstract

Background: Pharmacists are critical in providing timely access to emergency contraception (EC) and their knowledge and counselling on EC is paramount.

Aims: To describe pharmacy students' knowledge of, attitudes toward, and behaviours related to EC in the Australian context.

Methods: A questionnaire was distributed to five year levels of pharmacy students at an Australian university in 2011. Participants were asked multiple response and true/false questions on EC knowledge and behaviours. A 5-point Likert scale was used to determine attitudes about EC.

Results: Of 356 students present at survey distribution, 347 (97.5%) responded. Progression through the pharmacy programme correlated with increasing knowledge regarding EC for most questions ($p < 0.01$). As students advanced in the programme their self-perception of competence to counsel EC increased ($p < 0.001$) and they were more likely to agree that EC should be available without prescription, but with requisite pharmacist counselling ($p < 0.001$).

Conclusion: Focused teaching impacts on students' knowledge of EC and intentions to comply with professional responsibilities in supplying and counselling EC.

Keywords: *Australia, Emergency Contraception, Levonorgestrel, Pharmacy, Students*

Introduction

Emergency contraception (EC) is safe and effective treatment used to prevent pregnancy following unprotected sexual intercourse, due to contraceptive failure or error, failure to use any form of contraception or sexual assault (American College of Obstetricians Gynecologists, 2010). Unintended pregnancies may have devastating consequences for women's health and social wellbeing (Oringanje *et al.*, 2009) and ease of access to EC is essential (International Consortium of Emergency Contraception, 2013). However, misinformation and controversy regarding EC is common among patients and health care professionals (Wilkinson *et al.*, 2012).

At the time of research, the only EC preparation approved in Australia was levonorgestrel (Foran, 2002), available as either a single 1.5mg tablet or two 750mcg tablets (Postinor-1[®], Norlevo[®], Levonelle[®] and other bioequivalent brands). It has been accessible as a behind-the-counter (International Consortium of Emergency Contraception, 2013) Schedule 3 (S3) Pharmacist Only medicine since 1st January 2004. As opposed to unrestricted over-the-counter medicines supply, the behind-the-counter model requires direct pharmacist involvement in the determination of the appropriateness of EC supply (International Consortium of Emergency

Contraception, 2013). Pharmacists play a critical role in providing timely access to EC and their knowledge and counselling on the mechanism, use, safety and efficacy of EC is paramount (Ragland & West, 2009, Richman *et al.*, 2012).

Previous research has been conducted into the knowledge and attitudes toward EC of pharmacy students (Ragland & West, 2009; Hope *et al.* 2014) and broader populations of university students (Puri *et al.*, 2007; Vahratian *et al.* 2008; Hickey, 2009; Tajure, 2010; Miller, 2011), including Australian university students (Calabretto, 2009, Mohoric-Stare & De Costa, 2009). Other studies have investigated knowledge, behaviour and attitudes of adolescents (Cremer *et al.*, 2009, Johnson *et al.*, 2010; Wilkinson *et al.*, 2012, Wilkinson *et al.*, 2014) and patients (Aneblom *et al.*, 2002; Gainer *et al.*, 2003, Weaver *et al.*, 2009) as it relates to EC. Additionally, the knowledge and attitudes of health care professionals have been evaluated (Patel *et al.*, 2010; Miller *et al.*, 2011), including a number of studies that focused on pharmacists, both internationally (Bennett *et al.*, 2003, Borrego *et al.*, 2006; Cooper *et al.*, 2008; Richman *et al.*, 2012) and in Australia (Downing *et al.*, 2011, Hussainy *et al.*, 2011). Evidence from these studies demonstrates that misunderstanding and misinformation involving EC

*Correspondence: Ms. Denise L. Hope (BPharm MMedRes), *Lecturer, School of Pharmacy, Clinical Sciences 2, Gold Coast Campus, Griffith University, Queensland 4222, Australia. Tel: +61 7 5552 7339; Fax: +61 7 5552 8804. Email: d.hope@griffith.edu.au*

prevails. Alarming, one 2012 study identified that 56% of 272 Florida pharmacists surveyed believed that EC caused birth defects, with 46% of pharmacists believing that it caused abortion (Richman *et al.*, 2012). It is expected that health care professional misinformation could contribute to patients' misunderstanding.

This study was conducted at an Australian university, at which EC was included in the curriculum late in the fourth year of the pharmacy programme. Teaching on EC involved didactic and socratic lectures on the topic, which addressed the rationale for EC use, supply and counselling of EC (including sensitive history taking and patient questioning, dosing, adverse effects, follow-up advice and referral points), plus ethical case study lectures relating to EC provision. Fourth year students also dispensed EC in pharmacy practice workshops and prepared detailed patient counselling, consistent with legal and professional supply in Australia. The purpose of this study was to describe pharmacy students' knowledge of, attitudes toward, and behaviours related to EC in the Australian context.

Methods

A survey instrument, constructed and validated by the College of Pharmacy, University of Arkansas for Medical Sciences (UAMS) (Ragland & West, 2009) was adapted with permission of the authors for the Australian pharmacy context. Adaptation involved minor editing, e.g. Australian EC brand names and legal age of supply. This 16-question instrument contained multiple response and true/false questions designed to assess students' knowledge regarding EC, workplace experience and behaviours and demographic information (year level, gender, religious affiliation and primary practice site) (Ragland & West, 2009). Items assessing student attitudes and beliefs concerning EC were also adapted from the UAMS instrument and measured using a five-point Likert scale on which 1 = strongly disagree and 5 = strongly agree (Ragland & West, 2009). In analysis Likert responses for disagree (rating 1 or 2) and agree (rating 4 or 5) were combined to reflect either overall agreement or disagreement with the questions relating to attitudes and beliefs. Likert scale means reflected the trends toward disagreement (lower means, closer to zero) or agreement (higher means, closer to five) for particular attitude questions.

Knowledge questions assessed understanding of available forms of EC, timing of EC dosing, legality of supply in Queensland and Australia, mechanism of action of EC, available brands and pharmacists' right to refuse supply (Table I).

A convenience sample was obtained from five year levels of pharmacy students enrolled in the articulated three-year Bachelor of Pharmaceutical Science (BPharmaceutSci) and 1.5-year Master of Pharmacy (MPharm) programmes at Griffith University School of Pharmacy, Queensland, Australia, in April-May 2011. Questionnaires were distributed in a number of timetabled classes, some of which contained students from mixed

year levels. Students were requested to voluntarily and anonymously complete the surveys during a regularly timetabled class. Surveys were coded and data entered into Microsoft Excel[®]. *Chi*-squared, independent-sample t-tests and ANOVA were performed using SPSS[®]v.22 to compare responses between year levels with $p < 0.05$ considered as statistically significant. Institution ethics approval was granted PHM/05/11/HREC.

Table I: Questions related to Emergency Contraception Knowledge

Question	Correct Answer
Which of the following may be used as emergency contraception (EC)?	
Combination birth control pills (pills containing estrogen and progestogen) [COC as EC]	True
Progestogen-only birth control pills [POP as EC]	True
Intrauterine device (IUD) insertion within 5 days of unprotected intercourse [IUD as EC]	True
Medroxyprogesterone injection within 3 days of unprotected intercourse [Depo not as EC]	False
Which of the following statement(s) regarding the recommended timing of EC is TRUE?	
EC <i>must</i> be started within 24 hours of unprotected intercourse in order to be effective. [Not in 24 hr]	False
EC <i>may</i> be effective if started within 120 hours of unprotected intercourse. [Up to 120 hr]	True
Which of the following statement(s) regarding the availability of Levonorgestrel Emergency Contraception is TRUE?	
EC may be supplied in Queensland without a prescription to females > 16 years of age. [OTC Qld >16 yr]	True
EC is approved in Australia to be available with a prescription to females < 16 years of age. [Rx <16 yr]	True
EC works by disrupting a newly implanted ovum. [Disrupt ovum]	False
Postinor [®] , Norlevo [®] and Levonelle [®] are progestogen-only products approved for EC. [Brands of EC]	True
Levonorgestrel was previously known as RU-486 during pre-marketing studies. [Not RU-486]	False
Australian pharmacists have a legal right to refuse to supply EC based on moral or religious beliefs. [EC refusal]	True

EC emergency contraception; COC combined oral contraceptives; POP progestogen-only pill; IUD intrauterine device; Depo medroxyprogesterone depot injection; UPSI unprotected sexual intercourse; OTC over-the-counter (without prescription); Qld Queensland; Rx prescription required; RU-486 mifepristone

Results

Of 471 pharmacy students enrolled, 356 were present and 347 either partially or fully completed questionnaires; a response rate of 97.5% (Table II). All student responses were included in the analysis.

Females comprised 56.5% (n=196) of the students completing the survey demographic questions. Almost half of students (48.1%, n=167) identified as Christian, and of those, more than half (55.7%, n=93) were non-Catholic. A minority of students identified as Muslim (8.9%, n=31) and other religions (12.7%, n=44),

including Buddhism and Hindu. More than a quarter of students (28.0%, n=97) claimed no religion at all. Of the 51.5% (n=179) of students that indicated they worked in a pharmacy, 97.2% (n=174) worked in a community pharmacy, in a mix of independent and banner group pharmacies (independently-owned pharmacies with common branding). The proportion of students working in pharmacies increased with year level progression, from 10.8% (n=7) in year one to 89.5% (n=51) in year five (Table II). Of the study participants, 40.6% (n=141) reported previous involvement in the supply of EC.

Table II: Survey Distribution and Completion

Year Level (n)	Number Completed/ Distributed* (%)	Proportion of Total Completed %	Number of Students Working in Pharmacy (%)
1 (65)	68/68 (100.0)	18.7	7 (10.8)
2 (40)	36/36 (100.0)	11.5	9 (22.5)
3 (96)	97/99 (98.0)	27.7	52 (54.2)
4 (89)	89/89 (100.0)	25.6	60 (67.4)
5 (57)	57/64 (89.1)	16.4	51 (89.5)
Total (347)	347/356 (97.5)	100.0	179 (51.5)

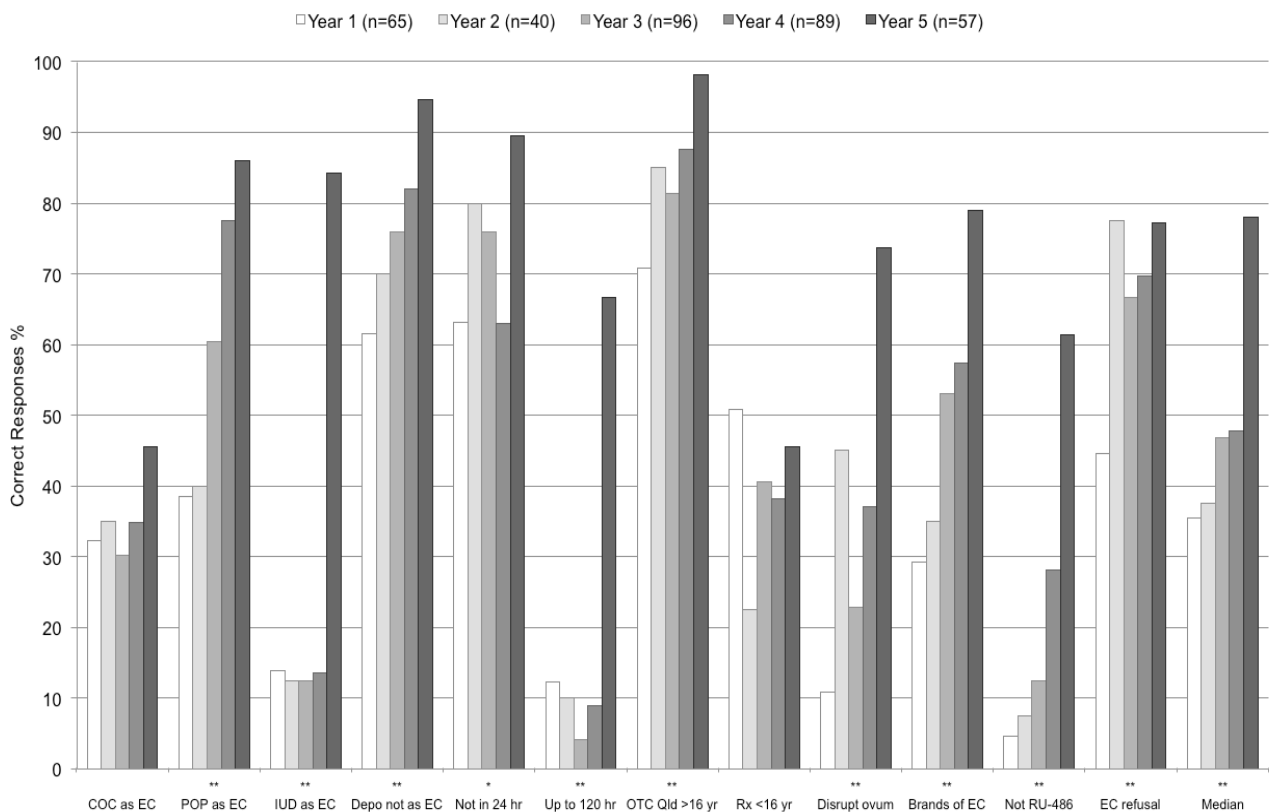
*The numbers distributed to years 1 to 3 differ from the self-reported year level due to mixed classes

Knowledge

Overall, correct responses increased as students progressed through the programme (Figure 1). All questions, except those about combined oral contraceptives being useful as EC and EC being available on prescription to females under 16 years of age, showed significant differences between year levels (*Chi-squared*; $p < 0.01$).

Responses other than correct answers included incorrect responses and “don’t know”. The proportion of students with incorrect knowledge generally decreased with year level progression. For example, students that falsely believed medroxyprogesterone depot injection could be used as EC within three days of unprotected intercourse progressively decreased from 38.5% (n=25) in year one to 5.2% (n=3) in year five. Likewise, students that incorrectly believed that EC works by disrupting a newly implanted ovum progressively decreased from 50.8% (n=33) in year one to 17.5% (n=10) in year five. This trend also applied to the incorrect belief that levonorgestrel was previously known as RU-486 during pre-marketing studies (RU-486 was actually the manufacturer Roussel Uclaf’s coding for the abortifacient drug mifepristone); with no year five students answering incorrectly. Not all responses trended clearly across year levels (Figure 1).

Figure 1: Correct Responses to Knowledge Questions by Year Level ($p < 0.001$ and * $p < 0.01$)**



Attitudes

Pharmacy students’ attitudes toward EC varied throughout degree progression. From year one to year five trends reflected increased agreement with questions relating to EC provision requiring pharmacist counselling and students’ feelings of competence to instruct patients (Figure 2). In contrast, from year one to year five trends reflected increased disagreement with EC provision not involving pharmacist counselling, EC promoting unsafe sex, EC discouraging regular contraceptive use and students’ discomfort at dispensing EC for moral or religious reasons.

The attitude questions related to EC promoting unsafe sex or discouraging regular contraception use displayed mixed results between agreement and disagreement for all year levels, with many students choosing the neutral stance on these issues. Compared to other attitude questions, where students usually had formed opinions by year five, there remained a substantial proportion of students that retained neutrality on these questions throughout (Figure 2). The means of Likert scale ratings revealed more consistent trends of increased or decreased agreement over time.

Overall mean Likert scale ratings and standard deviations were 4.25 (1.08) for non-prescription EC availability with pharmacist counselling; 1.74 (1.03) for non-prescription EC availability without pharmacist counselling; 2.77 (1.05) for EC promoting unsafe sex; 2.76 (1.03) for EC discouraging regular contraception use; and 3.26 (1.21) for feeling competent to instruct patients on appropriate EC use. The mean Likert scale ratings were significantly

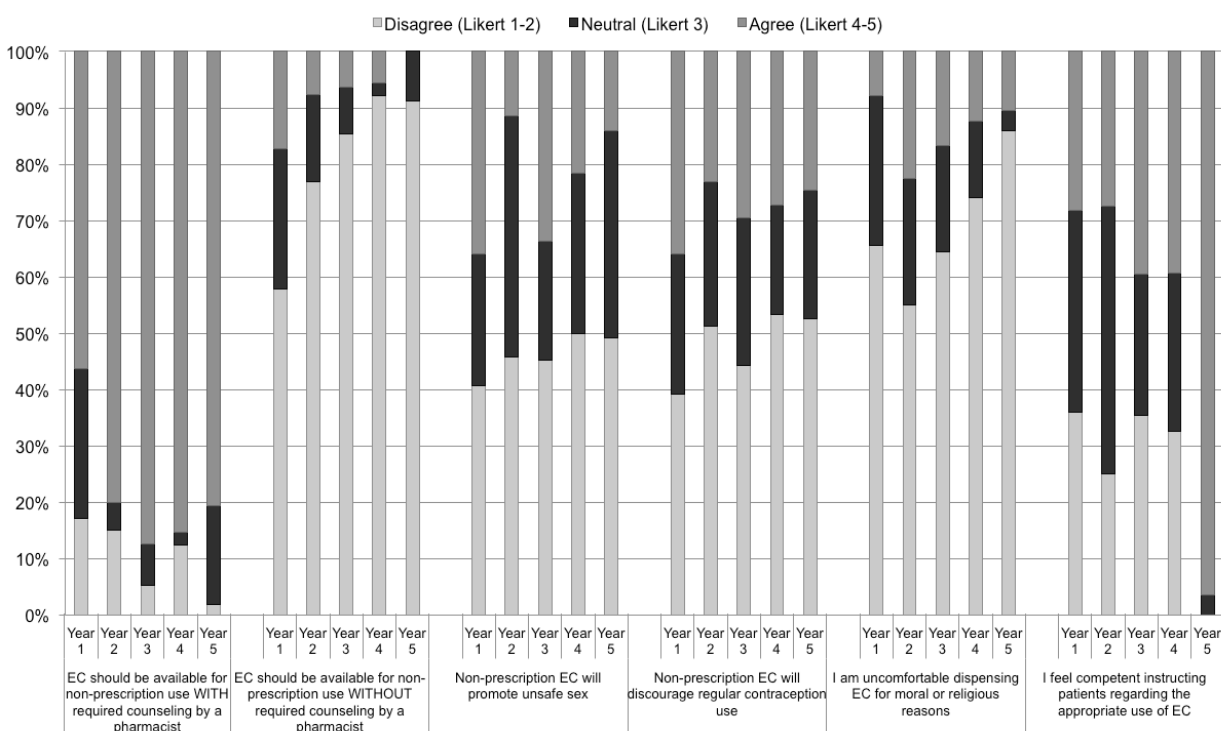
different between year levels for attitudes toward the availability of EC both with and without requisite pharmacist counselling, and for students’ feeling of competence to instruct on appropriate use of EC (*Chi-squared*; $p < 0.001$).

Behaviours

In response to the survey question “Have you ever supplied EC?” 53.6% of respondents (n=186) answered “No, I have never received a request for EC”. Only 2.0% (n=7) answered “No, but I have referred a patient to another pharmacy to obtain EC”. Of those that had supplied EC (40.6%, n=141), there was a trend toward increased provision as students progressed through year levels from 7.7% (n=5) of year one to 93.0% (n=53) of year five.

Responses to the question “What would you do if you were presented with a request for EC today?” revealed a general trend toward supplying EC as students progressed through year levels of the pharmacy programme, with the least likelihood of provision observed in year one (43.1%, n=28) and highest response toward provision in year five (94.7%, n=54). Few students reported that they would refuse to supply EC if requested with 1.5% (n=1) from year one and 5.0% (n=2) from year two. No respondents in years three, four or five stated that they would refuse to supply EC. Uncertainty in response to a request for EC was recorded by students answering “Not sure” in the questionnaire. This uncertainty was highest in year one students (41.5%, n=27), and trended downward to year five (3.5%, n=2).

Figure 2: Likert Scale Responses for Attitude Questions by Year Level



Discussion

Teaching impacted on students' knowledge of, and attitudes toward EC, their intention to comply with legal and professional responsibilities in supplying EC when appropriate, and their provision of detailed counselling. When interpreting knowledge and attitude results it is important to note that the core teaching on the topic of EC, including rationale for use, dose, counselling and referral points, was delivered late in year four of the pharmacy programme. Substantial knowledge increases were observed post-teaching in students' understanding of intrauterine devices (IUDs) being available for use as EC; that EC may be effective for up to 120 hours; that EC does not disrupt a newly implanted ovum and that levonorgestrel was not previously known as RU-486.

Despite some notable observations of changes in knowledge, student increases in correct knowledge and corresponding decreases in misinformation trended across all year levels, not only in response to directed teaching. This would be expected from increased exposure to all pharmacy courses over time and the fact that students were more likely to work in pharmacies the higher their year level of the programme (Table II). The highest percentage of year five students with correct knowledge related to a specific point of law, unique to the state of Queensland, that EC may only be provided as a non-prescription medicine to female patients over the age of 16 years ($n=56$, 98.2% correct). This high result may be accounted for by the repetition of this point of law across many courses and year levels, relating to the non-prescription supply of all Pharmacy Only and Pharmacist Only medicines in Queensland, and not limited to EC. Additionally, increases in pharmacy students' EC knowledge between years one and four could result from a number of avenues of exposure beyond the university setting: students' increased exposure to practice through clinical placement and employment, increasing general awareness of medication related topics and self-learning, *i.e.* through reading of pharmacy literature and attendance at presentations, and continuous professional development, to which students should be exposed throughout their studies (Rouse, 2004). Of some concern however, is the fact that the final year five students did not have a better understanding of certain aspects of EC, namely that combined oral contraceptives may be used as EC ($n=26$, 45.6% correct) and that EC is available to minors on prescription in Australia ($n=26$, 45.6% correct). The knowledge results for students in years one to four of this Australian study, before any explicit teaching on EC was conducted, indicated that the knowledge of students pre-teaching was similar to, or less than, Arkansas pharmacy students (Ragland & West, 2009). For example, the Arkansas students demonstrated much greater awareness of the American brand Plan B[®] being approved for non-prescription use as EC (82.1%, 98.7%, 98.6% and 87.9% respectively for years one to four) when compared to the Australian students' awareness of Postinor[®], Norlevo[®] and Levonelle[®] as approved EC brands (29.2%, 35.0%, 53.1% and 57.3% respectively for years one to four) (Ragland & West 2009).

Students also gradually improved attitudes across progressive year levels with noteworthy changes observed post-teaching related to the provision of EC with or without requisite pharmacist counselling, and in students' own feelings of competence to counsel on EC. Ragland & West (2009) found that only 26.7% of Arkansas pharmacy students felt competent to instruct patients on EC. While they associated this result with a lack of EC-specific teaching it is interesting to note that their result was lower than that obtained for any year level of this Australian study. Based on 95% confidence intervals calculated from overall means and standard deviations reported in the Arkansas study, all six attitude results were significantly different to those found in this Australian study.

Attitude improvements over time may be explained by professional inculcation brought about by pharmacy-specific teaching and practice exposure via pharmacy placements and employment. The importance of counselling was increasingly emphasised across a range of courses throughout the Australian pharmacy programme, in accordance with legislative and professional requirements (Pharmaceutical Society of Australia, 2010). However, one of the attitude results that lacked statistical significance in terms of changes in students' responses between year levels was discomfort in refusing EC supply on moral or religious grounds. This finding is surprising considering that students should be aware of their professional responsibilities and that refusal to supply medicine when therapeutic need exists is considered as unethical (Pharmaceutical Society of Australia, 2011). The year five students certainly demonstrated the least discomfort in dispensing EC (and declines of student discomfort were consistent from years two through five) but the lack of statistical significance may highlight the existence of conflict between moral, religious, professional and ethical beliefs that occur with EC provision, (Hope *et al.*, 2014) yet rarely with other medications. Of concern is the potential of students to actually refuse supply in practice if uncomfortable. In recent years there have been reports of some Australian pharmacists refusing to supply oral contraceptives, including EC, without appropriate referral, in contravention of ethical standards (Pharmaceutical Society of Australia, 2011; O'Brien, 2012). However, in this study, none of the respondents from years three, four or five stated that they would refuse supply if presented with a request for EC, demonstrating that their moral or religious discomfort would not outweigh their perceived professional responsibility to supply.

Unlike knowledge and other attitudes, responses related to students' opinions on EC promoting unsafe sex and EC availability discouraging regular contraceptive use did not differ significantly between year levels. These were interesting results as one might expect that post-teaching, students would better understand that current scientific evidence refutes any association between EC use and increased patient promiscuity, unsafe sex or lack of regular contraception use (Marston *et al.*, 2005), as these issues were emphasised in the teaching. The lack of

significance in results may indicate that, despite exposure to a profession, it is difficult for students to separate professional opinion from personal beliefs or moral judgment.

Strengths and limitations

Strengths of the study include the high response rate (97.5% of those in attendance), and the visible progression of students' knowledge and attitudes across the five sequential year levels of a pharmacy programme. It is possible however, that the higher year level students' knowledge of EC could have been impacted by practice exposure through employment and placement in pharmacies, in addition to EC teaching.

As this study was conducted in a single pharmacy school at one Australian university findings may not be generalisable to pharmacy students or health care students elsewhere. Future research could compare pharmacy students' knowledge, attitudes and behaviours from other countries to add to the understanding derived from the existing American and Australian studies. Additionally, international comparisons could further investigate the influence of social norms and religion on perceptions and behaviour.

Sample bias may have occurred due to the classes selected for questionnaire delivery for each student year level. For example, the least number of students that attended, and responded, were in year two where questionnaires were distributed during a timetabled lecture. Anecdotal experience would suggest that lectures are most often attended by the more conscientious students. This may have therefore skewed the results if those attending the class at the time of the questionnaire were higher achieving students, with more knowledge than their non-attending counterparts. When questionnaires were delivered during workshops, attendance was higher.

Current teaching strategies related to EC contribute to producing students with appropriate knowledge and positive attitudes regarding EC provision. However, additional education could help address knowledge gaps of pharmacy students related to the role, mechanism and impact of EC use. This study demonstrated that focussed teaching impacts on students' knowledge of EC as well as their compliance with legal and professional responsibilities in supplying and counselling EC.

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