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Australian Pharmacy Practice with a Focus on Different Practice
Settings and Background Knowledge**

Author

Tiralongo, Evelin, Braun, Lesley A., Wilkinson, Jenny M., Spizer, Ondine, Bailey, Michael, Poole, Susan, Dooley, Michael

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Evelin Tiralongo, *Griffith University*

Lesley A. Braun, *Monash University*

Jenny M. Wilkinson, *Charles Sturt University*

Ondine Spizer, *Alfred Hospital*

Michael Bailey, *Monash University*

Susan Poole, *Alfred Hospital*

Michael Dooley, *Alfred Hospital*

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Exploring the Integration of Complementary Medicines into Australian Pharmacy Practice with a Focus on Different Practice Settings and Background Knowledge

Evelin Tiralongo, Lesley A. Braun, Jenny M. Wilkinson, Ondine Spizer, Michael Bailey, Susan Poole, and Michael Dooley

Abstract

The widespread use of complementary medicines (CMs) within the general community, the health benefits and risks, and the role of pharmacists as advocates of appropriate use of medicines make it imperative to identify how pharmacists meet customers' CM information needs and lead quality use of medicine practices in regards to CMs within the pharmacy setting. A self-administered questionnaire was completed by 736 Australian pharmacists as part of a larger study on the use of CM within pharmacy practice. Personal use of CMs was common (76%). Most pharmacists saw CM counselling as their professional obligation, however, mainly regarding safety aspects. Only 24% of pharmacists always asked customers presenting with prescription medicines about concomitant CM use. Only 34% of pharmacists personally recommended CMs and less than 20% notified the respective Australian agency about an adverse drug reaction. On average, pharmacists only achieved about 50% of the knowledge score in a CM knowledge test on clinically proven benefit of CMs and CM-drug interactions. Most pharmacists supported undergraduate (76%) and additional CM education for pharmacists (85%). Many differences between hospital and community pharmacists, pharmacists working in pharmacies with or without an employed naturopath and pharmacists with and without CM training were noted and discussed.

KEYWORDS: complementary medicines, pharmacist, pharmacy practice, naturopath, quality use of medicines, hospital pharmacists, community pharmacists, integrative medicine

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INTRODUCTION

Herbal medicines, minerals, vitamins, nutritional and dietary supplements, also referred to as complementary medicines (CMs), have become increasingly popular in the US, UK, Canada and Australia, with self-medication making up the majority of use (Eisenberg et al., 1998; McFarland 2002; Xue et al., 2007; Zollman & Vickers, 1999). In most countries pharmacies supply CMs (Boon, 2005; Xue et al., 2007) and consumers expect pharmacists to be knowledgeable about them (Boon, 2005; Kwan et al., 2008).

Although the specific scope of practice of pharmacists is defined by country-specific legislation, pharmacists in all countries are primary care providers who are readily accessible to patients and are dispensing and compounding medicines together with providing information that prevent, identify or resolve drug-related problems (al-Shaqha & Zairi, 2001; Prayle & Brazier, 1998). Moreover, they have been trained in areas such as pathophysiology and pharmacology which gives them the background necessary to interpret and evaluate clinical studies (Boon, 2005). As such, pharmacists help patients to determine when self-medication is appropriate and identify when the expertise of another healthcare professional is needed. Therefore, pharmacists should be best positioned to give evidence-based information on CMs and determine if a CM product is safe and appropriate.

This is recognised by some professional pharmacy organizations (i.e. in the US, Canada and the UK) where it is a clearly defined professional role and responsibility to offer patients advice and information on CMs (Boon, 2001; Kroll, 2004; Miller et al., 2000; Royal Pharmaceutical Society of Great Britain, 1999). Although the Pharmaceutical Society of Australia includes clinical knowledge on CMs and customer counseling into their competencies standards for pharmacists (PSA, 2003), the decade old position statement on CMs highlights that *“the provision of complementary medicines is at the discretion of individual pharmacists who must exercise their professional judgement”* (PSA, 1997).

Although some pharmacist surveys have indicated that most pharmacists consider it important to have CM knowledge and to be able to provide information to patients (Chang et al., 2000; Koh, Teo, & Ng, 2003; Naidu et al., 2005), Canadian and US studies report that only about half of the practicing pharmacists have positive attitudes towards CMs (Kwan et al., 2006; Welna et al., 2003). Furthermore, the ability of many pharmacists to take on the professional responsibility towards CM counseling is limited as studies investigating the knowledge of practicing pharmacists revealed that they generally rate their CM knowledge as inadequate and are not confident in answering patient enquiries (Braun & Cohen, 2007; Chang et al., 2000; Koh et al., 2003; Naidu et al., 2005; Semple et al., 2006).

For health professional students it has been shown that personal familiarity with CM is associated with both higher knowledge scores (Freyman et al., 2006; Yeo et al., 2005) and willingness to refer others to CM (Hon et al., 2004; Kreitzer et al., 2002). Also, in one study examining the attitudes of medical students, it was found that the ability to counsel on CMs may be influenced not only by knowledge, but also by additional factors such as self motivation and perceptions of their professional role, as well as overall beliefs and attitudes (Lie & Boker, 2004).

A recent study showed that pharmacists' perceptions of their professional responsibilities with regards to CMs are influenced by the changing behaviours and expectations of the 'new consumer' (Kwan et al., 2008; Traulsen & Noerreslet, 2004) who is information strong (well-informed) and information seeking (inquisitive), has a desire for self empowerment and decision making, and strives for holistic and integrative healthcare (Hirschhorn, 2006). So far one American study reported that pharmacists' actions with regards to CM differed on the basis of professional and practice setting characteristics, as well as personal experience of CM use (Brown et al., 2005).

The aims of this study were to identify pharmacists' ability to meet the CM information needs of customers and lead Quality Use of Medicine (QUM) practices in regards to CMs within the Australian pharmacy setting. Particular attention was paid to the differences between hospital and community pharmacists, pharmacists who worked in pharmacies with or without an employed naturopath and pharmacists with and without CM knowledge.

METHODS

SETTING AND SAMPLE

An anonymous, self-administered questionnaire was sent to 4376 pharmacists in Australia. Australian pharmacists' registration boards in all states and territories provided information about the number of registered pharmacists. An independent mailing house applied proportional random sampling to facilitate an equal distribution of surveyed pharmacists amongst states and territories.

QUESTIONNAIRE

The 41 item questionnaire consisted of: 1) demographic information, 2) pharmacists' recommending behavior towards CMs, 3) pharmacists communication about CMs with customers, 4) general attitudes towards CMs and the role of the pharmacist, 5) CM knowledge, 6) CM information sources, and 7) perceived CAM education needs. The questionnaire was adapted from previous

surveys (Braun & Cohen, 2007; Naidu et al., 2005; Semple et al., 2006) and a report (Easton, 2007).

Section four of the questionnaire (12 items on attitude and role of the pharmacist) used a 5-point Likert scale. Four of the knowledge questions in section five had possible responses of 'yes', 'no' and 'unsure'. Other items were either multiple choice answers or lists where multiple options could be ticked.

The questionnaire was pre-tested by members of pharmacist focus groups and a convenience sample of pharmacists at the Alfred Hospital, Melbourne, Australia.

DATA COLLECTION

Data collection took place between February and March 2009. Data were manually entered into a SurveyMonkey™ online survey, either directly by the respondents or from paper copies returned by mail. Data entry was completed in April 2009. Consent was implied upon agreement to complete the questionnaire. Ethical clearance for the study was obtained through the Human Research Ethics Committee of all institutions involved.

DATA ANALYSIS

Descriptive and inferential statistics were calculated using SAS version 9.1 (SAS Institute Inc., Cary, NC, USA). Differences in proportions between groups were compared using chi-square test for equal proportions or Fisher's exact test where numbers were small. Continuous, normally distributed variables were compared using Student's t-test and reported as means, while non-normally distributed variables were compared using Wilcoxon rank-sum tests and reported as medians and interquartile range (IQR). To reduce the chance of type I errors, a p-value of 0.01 was considered to be statistically significant. The percentages were calculated based on the number of respondents who answered the question.

RESULTS

RESPONSE RATE

The response rate was 16.8% with 736 responses being received.

DEMOGRAPHICS

Overall, 60% (n=443) of the respondents were women with an average age of 45 years. Most of the respondents (94%, n=672) had completed their undergraduate

degree in Australia with the mean year of graduation being 1984. Use of CMs was common in this group with 76% (n=537) reporting use in the last 12 months.

Seventy one percent (n=514) of the respondents usually worked in community pharmacy, 18% (n=129) in hospital pharmacy, 5% (n=36) as consultant pharmacists and 6% (n=46) stated that they were employed in industry, academia, public service and army. Nearly all respondents' workplaces stocked CM products; either a large variety (n=241, 46%) or a limited range (n=212, 42%), with a small number of pharmacies carrying the specialised 'practitioner only' CM products (n=32, 6%) and liquid herbal medicines (n=21, 4%).

PHARMACIST'S COMMUNICATION ABOUT CMs WITH CUSTOMERS

Twenty four percent of pharmacists stated they *always* asked customers presenting with prescriptions if they take CMs. One third of pharmacists reported asking customers '*often*' and one third asked '*sometimes*'. When asked for the reasons for not asking all customers presenting with prescriptions about their CM use, 41% of all respondents indicated that they forgot to ask, 33% thought they don't have the opportunity, 26% didn't think it was relevant, 25% assumed that the customer would tell them, 25% felt it was too time consuming and 14% had no confidence to discuss CMs.

PHARMACISTS' RECOMMENDING BEHAVIOUR TOWARDS CMs

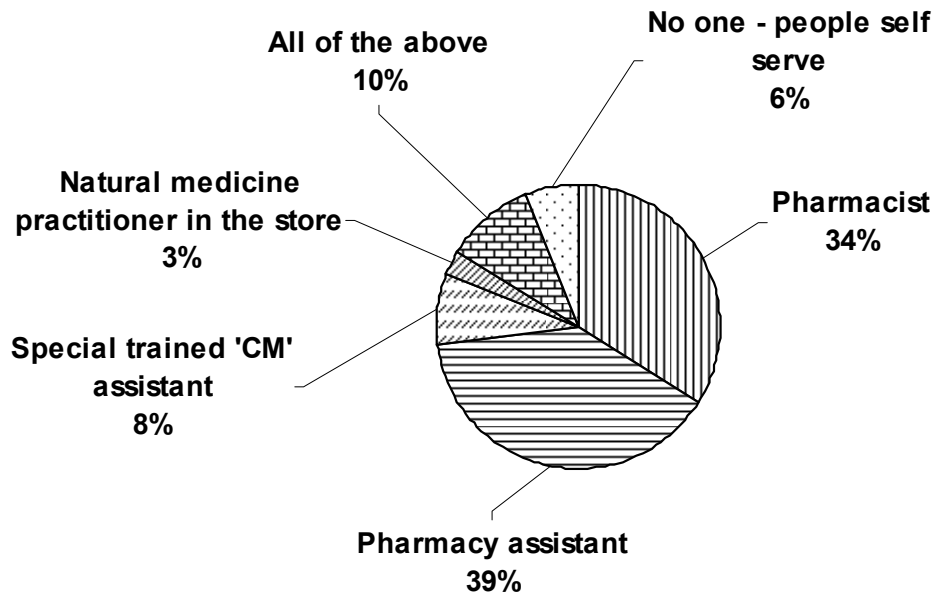


Figure 1: Who recommends CM products in the pharmacy?

Thirty-nine percent of pharmacists (n=204) reported that mainly pharmacy assistants recommended CMs with a further 34% (n=179) stating they personally recommended CMs. Other sources of CM recommendation are illustrated in Figure 1.

Factors preventing pharmacists from recommending CMs were identified by 100 respondents with 52% (n=52) reporting that insufficient knowledge and 46% (n=46) indicating that lack of sufficient information sources was a barrier to recommending CMs as standard practice. Other reasons are listed in Figure 2.

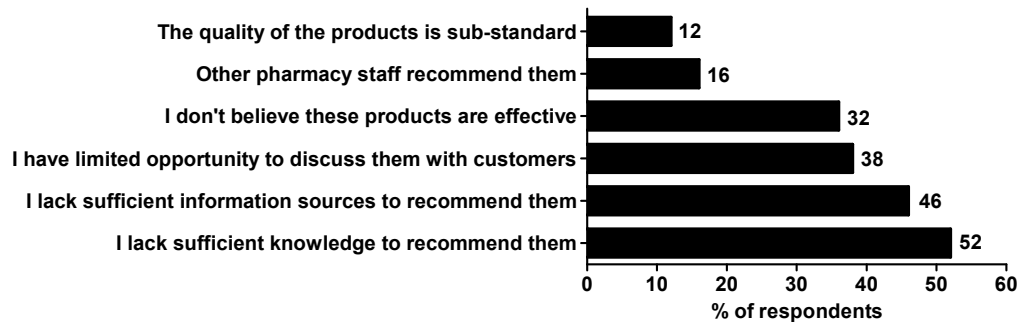


Figure 2: Factors preventing pharmacists from recommending CM products (up to 3 possible responses)

Overall, pharmacists personally recommended multivitamins (88%, n=427), glucosamine (83%, n=401), fish oil (82%, n=397) and probiotics (73%, n=254). The least recommended product was kava kava (0.6%, n=3).

ADVERSE REACTION REPORTING

Overall, in the last 12 months 23% (n=160) of pharmacists had been notified of an adverse reaction to CMs by a customer. Of those pharmacists notified of an adverse reaction, 68% (n=109) stated they had noted the information in the patient's profile/notes, 35% (n=56) referred the customer to a medical practitioner, 17% (n=27) notified the Australian Adverse Drug Reaction Advisory Committee (ADRAC), 15% (n=24) notified the manufacturer and 13% (n=21) did nothing.

CM KNOWLEDGE TEST

The knowledge component of the questionnaire comprised two parts. In part 1 pharmacists' responded to the question: "Which of the following CMs have clinically proven benefits for the listed indications?" They were presented with a

grid of 23 questions and could respond 'yes', 'no' or 'unsure' for four indications and five CMs. A correct answer was awarded 1 point giving a maximum correct score of 23. In the second part they were asked "Which of the following CMs induce a clinically significant interaction with the listed medications?" They were presented with a grid of 16 questions and could respond 'yes', 'no' or 'unsure' for four conventional medicines and four CMs. The maximum correct score was 16.

Responses were received from 91% of pharmacists. The mean correct score obtained for part 1 (clinically proven benefit) was 15.2 (66%). The mean correct score for part 2 (CM-drug interactions) was 5.0 (32%). Overall, the mean aggregate score for both parts of the knowledge test was 20.5 (53%).

Pharmacists that reported having undertaken self-directed learning achieved a significantly higher mean aggregate score than pharmacists who had not undertaken self-directed learning about CMs (20.6 ± 0.4 vs. 15.2 ± 0.7 , $p < 0.0001$).

Those pharmacists who reported having attended undergraduate CM lectures also attained a significantly higher score compared with those that did not (22.1 ± 0.5 vs. 17.8 ± 0.4 , $p < 0.0001$). Similarly, those pharmacists that had attended manufacturer or professional seminars achieved significantly higher knowledge scores compared to others (20.5 ± 0.4 vs. 17.3 ± 0.6 , $p < 0.0001$).

More recent graduates also performed significantly better in the knowledge section than other graduates. Those having graduated within the last 1-5 years achieved a mean score 2.3 points higher than those who graduated earlier (21.9 ± 0.7 vs. 19.6 ± 0.4 , $p = 0.006$). Additionally, pharmacists that graduated more than 20 years earlier had a 1.9 points lower mean score than the mean for other pharmacists (19.9 ± 0.8 vs. 21.8 ± 0.4 , $p = 0.003$).

CM INFORMATION SOURCES

Professional reference texts were used as sources of CM information by 56% of pharmacists, followed by CM textbooks (48%) and the internet (43%). In comparison to Australian trained pharmacists, significantly more overseas trained pharmacists reported using online databases such as PubMed as an information source (36% vs. 19%; $p = 0.0001$).

When assessing CM information resources the majority of pharmacists (70%) considered the scientific basis of the information provided as the most important factor. Other important factors were the availability of the CM information online or on the desktop computer (38%), information to be endorsed by professional associations (35%), the availability of a wide range of information (34%), the availability of traditional and scientific information (33%), and frequent updates (30%).

Randomised controlled clinical trials (RCTs) were considered ‘*essential*’ or ‘*important*’ by most (97%) pharmacists. Published case studies, traditional use or epidemiological studies were also considered ‘*essential*’ and ‘*important*’ by 80%, 78% and 81% of the pharmacists, respectively.

CM TRAINING AND FUTURE EDUCATION

Overall, only 10% of the respondents had a formal degree, certificate or diploma in CM. The majority of pharmacists (73%) gained CM knowledge through self-directed learning. Moreover, 42% obtained their knowledge from manufacturer seminars, 30% in professional seminars and 28% in undergraduate courses. Seventy six percent of the respondents thought that it was very important for undergraduate pharmacy students to learn about evidence based CMs and 85% of pharmacists were interested in further training.

As a delivery method 53% of the pharmacists preferred short online courses, face-to-face seminars (45%) and self-directed learning through journals (43%). Other delivery methods were endorsed by a third of respondents or fewer: electronic newsletters (34%), weekend workshops (23%) and online postgraduate courses (22%).

The ideal amount of time for the training was seen by the majority of respondents (40%) to be 1-2 hours per month. Overall, most pharmacists favoured this training to be offered by professional organisations (60%), a CM training college (24%) or an Australian university (22%).

PHARMACISTS’ ATTITUDES TO CMS

The survey asked all respondents whether they would describe their pharmacy practice as providing integrative care which was defined in the survey as ‘*recommending CMs together with conventional medicines as part of standard practice*’. About half the respondents (47%, n=251) considered their pharmacy practice as integrative care and a similar proportion (43%, n=231) thought that they partly provide integrative care. Overall, pharmacists generally agreed with the attitudinal statements in the questionnaire relating to CM products within pharmacies, except for the statement that the advertising of CM products in Australia is sufficiently well regulated (Table 1).

Table 1: Pharmacist responses to attitudinal statements about CMs and pharmacy practice

	Responses				
	SA N (%)	A N (%)	U N (%)	D N (%)	SD N (%)
CM products are an important part of the financial business of retail pharmacy	168 (24)	366 (53)	118 (17)	37 (5)	7 (1)
Customers are now expecting more information about CM products from their pharmacist than 5 years ago	260 (37)	361 (52)	61 (9)	18 (3)	0 (0)
Pharmacists have a professional responsibility to counsel customers about CM products	264 (38)	363 (52)	51 (7)	19 (3)	4 (1)
Pharmacists should play a greater role in providing customers with safety and drug interaction information about CM products	306 (44)	337 (48)	45 (6)	10 (1)	5 (1)
Pharmacists should play a greater role in recommending CM products	146 (21)	302 (43)	176 (25)	63 (9)	14 (2)
I am confident about the quality of Australian made CM products	95 (14)	324 (46)	212 (31)	64 (9)	6 (1)
The advertising of CM products in Australia is sufficiently well regulated	24 (3)	144 (20)	293 (42)	168 (24)	7.2 (10)
CM products should be accompanied by more detailed product information	278 (40)	366 (52)	35 (5)	19 (3)	2 (0)
Clinically proven CM products should have a 'tick of approval' from a recognized government body with expertise in complementary medicine	359 (51)	254 (36)	49 (7)	29 (4)	8 (1)
Community pharmacies would benefit by employing a natural therapist to provide customer information	106 (15)	261 (37)	193 (28)	108 (15)	34 (5)
Pharmacists should record customers use of CMs in their medication profile/ patient notes	176 (26)	374 (53)	104 (15)	38 (5)	8 (1)
Naturopaths and herbalists should be formally registered to safeguard the public	360 (51)	289 (41)	34 (5)	13 (2)	7 (1)

SA= strongly agree; A=agree; U=unsure; D=disagree; SD=strongly disagree

*% of the total number of respondents for that statement

EMPLOYMENT OF NATUROPATHS IN THE PHARMACY SETTING

Eighteen percent (n=95) of the 525 community pharmacists reported that their pharmacy currently employs a naturopath. Of these community pharmacists, 64% (n=63) described the service provided by naturopaths as valuable, whereas 3% (n=3) reported it was not. Approximately half of the community pharmacists (51%, n=261) stated they would consider employing a naturopath.

All pharmacists were asked what factors they would consider important if contemplating employing a naturopath. Most (84%, n=427) of the total sample stated that having the appropriate tertiary qualifications was important. This was followed by *'if they will increase product sales'* (64%, n=325) and *'if they are a member of a professional association'* (63%, n=320).

Pharmacists reported that the average number of hours per week a naturopath worked in the pharmacy ranged from 1 to 60 hours, with an overall average of 18.7 hours. In most cases naturopaths were utilised to provide advice to customers about CMs (87%, n=93), to conduct consultations for customers in a private room (73%, n=68) and act as a source of information (61%, n=57). Less commonly, naturopaths fulfilled other tasks (5%, n=5) such as stock control and sales, and some pharmacists reported that they were themselves a naturopath.

Of the 95 pharmacists that reported working in pharmacies with a naturopath, 73% (n=69) stated that they referred customers to the naturopath. They also personally referred to naturopaths for general information about CMs, specific questions about weight loss products, product brands and herb-drug interactions. Of the 95 pharmacists that reported working in pharmacies with a naturopath, 64% (n=61) described the service provided by naturopaths as valuable, 24% (n=23) as somewhat valuable, and only 3% (n=3) thought that the service was not valuable.

DIFFERENCES BETWEEN PHARMACIES WITH AND WITHOUT A NATUROPATH

Pharmacies that employed a naturopath were significantly more likely to stock a large variety of CM products (68% vs. 41%; $p<0.0001$) and to stock 'practitioner only' CM products (15% vs. 4%; $p=0.0001$), whereas they were significantly less likely to stock a limited range of CM products (6% vs. 47%; $p<0.0001$).

Significantly less pharmacy assistants (20% vs. 43%; $p<0.0001$) and pharmacists (14% vs. 38%; $p<0.0001$) recommended CM products in pharmacies employing a naturopath compared to pharmacies without a naturopath. Additionally, more pharmacists who work in pharmacies employing a naturopath strongly agreed with the statement that community pharmacies would benefit by employing a naturopath to provide customer information (40% vs. 12%; $p<0.0001$).

In pharmacies employing a naturopath significantly fewer pharmacists did not ask customers with prescriptions about CM (9% vs. 22%; $p=0.005$). Significantly more pharmacists in pharmacies with a naturopath recommended coenzyme Q10 (52% vs. 34%; $p=0.001$), weight loss products (24% vs. 12%; $p=0.002$) and kava kava (3% vs. 0%; $p=0.006$) compared to other pharmacies.

Significantly more pharmacists who worked in a pharmacy with a naturopath reported using a CM specific textbook (61% vs. 44%; $p=0.002$) or a CM practitioner as an information source (44% vs. 6%; $p<0.0001$). In addition, significantly fewer of these pharmacists used standard professional reference texts (43% vs. 60%; $p=0.002$), pharmacy specific journals (26% vs. 41%; $p=0.009$) or the World Wide Web in general (e.g. Google) (28% vs. 44%; $p=0.004$) to obtain CM information.

Pharmacists working in pharmacies with a naturopath were significantly more likely to have a degree in CM (20% vs. 8%; $p=0.0008$).

No differences in knowledge score were seen between those pharmacists working in pharmacies employing a naturopath and pharmacies without.

DIFFERENCES BETWEEN HOSPITAL AND COMMUNITY PHARMACISTS

Significantly more female pharmacists were working in hospital than in community pharmacies (78% vs. 57%; $p<0.0001$), and significantly more hospital than community pharmacists completed their undergraduate education in the UK (10% vs. 3%; $p=0.0007$). Significantly fewer hospital than community pharmacists used CMs (58% vs. 80%; $p<0.0001$). Significantly more hospital than community pharmacists reported that they *always* ask customers presenting with prescriptions if they take CMs (33% vs. 18%; $p=0.0002$).

Significantly fewer hospital than community pharmacists were told of an adverse reaction to a CM product by a patient/customer (14% vs. 25%; $p=0.009$), and significantly more community pharmacists notified the product manufacturer of an adverse reaction to their product (5% vs. 0%; $p=0.007$).

Hospital pharmacists attained a significantly lower median score about the proven benefits and potential interactions of popular CMs than community pharmacists (score [IQR]: 21[10-25] vs. 23[14-27]; $p=0.006$).

Hospital and community pharmacists had different opinions about several facets of CM integration. Fewer hospital pharmacists strongly agreed (5% vs. 15%, $p=0.003$) or agreed (25% vs. 52%; $p<0.0001$) with the statement '*I am confident about the quality of Australian made CMs*'. However, significantly more hospital pharmacists strongly agreed with the statement that '*Pharmacists should record customers use of CMs in their medication profile/patient notes*' (43% vs. 18%; $p<0.0001$).

Hospital pharmacists were less likely to have had CM training through a seminar by a product manufacturer (21% vs. 48%; $p < 0.0001$) or the profession (17% vs. 32%; $p = 0.0008$), and were significantly more likely to have no CM knowledge (19% vs. 6%; $p < 0.0001$).

More hospital than community pharmacists reported using databases such as PubMed (36% vs. 14%; $p < 0.0001$) and specific websites (22% vs. 11%; $p = 0.0005$) as CM information sources and significantly fewer hospital pharmacists used reference texts such as MIMS and the Australian Pharmaceutical Formulary (APF), (42% vs. 59%; $p = 0.0006$) and pharmacy specific journals (e.g. Australian Pharmacist) (25% vs. 39%; $p = 0.003$). Additionally, significantly fewer hospital pharmacists used CM journals (6% vs. 24%; $p < 0.0001$) and manufacturer literature, seminars and/or representatives (13% vs. 34%; $p < 0.0001$) as a source of CM information.

Significantly more community than hospital pharmacists reported that information gained from colleague recommendation, personal experience and customer feedback was important (43% vs. 22%; $p < 0.0001$; 59% vs. 39%; $p < 0.0001$; 64% vs. 43%; $p < 0.0001$). More hospital than community pharmacists reported that it was important that CM information was not produced by manufacturing companies (32% vs. 17%; $p = 0.0003$).

DIFFERENCES BETWEEN PHARMACISTS WITH AND WITHOUT PRIOR CM KNOWLEDGE

Pharmacists who indicated that they had undertaken self-directed training on CM products were more likely than those without training to be asked by customers for advice on CMs 1-4 times/day (26% vs. 14%; $p = 0.0001$), to ask customers with prescriptions about their CM use (32% vs. 19%; $p = 0.0003$), to note an adverse drug reaction in the patient file (17% vs. 10%; $p = 0.008$) and to use CM textbooks (49% vs. 36%; $p = 0.001$), CM practitioners (13% vs. 6%; $p = 0.008$) and pharmacy specific journals (38% vs. 24%; $p = 0.0002$) as CM information sources.

DISCUSSION

In our study the use of CMs by community pharmacists (80%) mirrors that found for the general Australian population (Braun et al., 2010; Xue et al., 2007; Zhang et al., 2007). As primary care providers, pharmacists are at the forefront of patient care providing information and guidance to patients about safe and effective use of all medicines, including CMs. However, in this study we found that only 50% of Australian pharmacists asked customers presenting with prescriptions ‘*always*’ or ‘*often*’ whether they are using CMs, mainly because they forget to ask. Similarly, American pharmacists documented CM use by

patients in only 11.0% (Brown et al., 2005) or 24% of cases (Dolder et al., 2003). In addition while almost all respondents in this study considered their practice of pharmacy as wholly or partly integrative care (i.e. *'recommending CMs together with conventional medicines as part of standard practice'*) half the respondents recommended CMs only a few times a week or less. Moreover, there was a stronger agreement among pharmacists to counsel customers on safety aspects of CMs, than directly recommending CMs suggesting that pharmacist see their role with respect to CMs as rather exclusively focused on safety issues.

Given the growing amount of evidence outlining the benefits as well as the possible adverse and side effects of CMs (Izzo & Ernst, 2001; Raschetti et al., 2005) pharmacists have an obligation to include CM counselling into their routine practice (Boon, 2001; Kroll, 2004; Miller et al., 2000; Royal Pharmaceutical Society of Great Britain, 1999). However, we found that more pharmacy assistants than pharmacists advise customers on CM products in the pharmacy which can be seen as a sign that pharmacy owners and managers need to restructure the pharmacy practice environment so that pharmacists are able to meet their professional obligations (PDL, 2007).

INFORMATION SOURCES

In our study Australian professional reference texts such as MIMS and APF were used as sources of CM information by most pharmacists. However a recent review of CM information sources conducted by the National Prescribing Service (NPS) in Australia did not identify any of these professional texts as high quality resources for CM information (NPS, 2009). Further, lack of time and opportunity to become familiar with the relevant new evidence have been described as barriers to the high reading workload necessary to keep abreast of new innovations and maintain present knowledge (Grol & Grimshaw, 2003). Importantly, an increased workload has also been identified as a barrier to CM-orientated practice independently of provider views (Hirschhorn & Bourgeault, 2005).

Together these findings strongly suggest that the availability and inclusion of evidence based CM information into professional handbooks and guidelines is of utmost importance for the integration of CM into patient care.

INTERACTION/ADVERSE DRUG REACTION

A Canadian study found that 47% of community pharmacists had identified a potential interaction between a natural health product and a drug; however only 2% were reported to Health Canada (Charrois et al., 2007). Similarly, in our study 25% of community pharmacists described that a customer reported an adverse reaction to a CM product, with only 3% reporting it to ADRAC.

ATTITUDES

Although some pharmacist's surveys have indicated that most pharmacists consider it important to have knowledge about CMs and to be able to provide information to patients (Chang et al., 2000; Koh et al., 2003; Naidu et al., 2005), Canadian and US studies report that only about half of the practicing pharmacists have positive attitudes towards CMs (Kwan et al., 2006; Welna et al., 2003). Although the majority of pharmacists in our study strongly agreed on their professional obligation to counsel on CMs, the majority of issues on which pharmacists agreed or strongly agreed were related to safety aspects of CMs (tick of approval, pharmacist's ability to counsel on interactions, formal registration of naturopaths to safeguard the public, more detailed product information). However, pharmacists performed poorly in the knowledge test especially in the part involving CM-drug interactions.

HOSPITAL VS. COMMUNITY PHARMACY SETTING

Similar to the CM use by Australian hospital pharmacists reported in a previous study (Brown, Roufogalis, & Williamson, 2009), our study found a much lower CM use by hospital than community pharmacists. It also confirms findings from previous studies which suggested that pharmacists working in community/out-patient settings were more likely to both use CMs and to recommend CMs to patients (Montbriand, 2000; Welna et al., 2003). In our study hospital pharmacists scored overall lower in the CM knowledge test than community pharmacists including questions on interactions of very common CMs such as fish oil, glucosamine and coenzyme Q10. Similarly, an Australian study among hospital pharmacists described low knowledge scores, especially regarding interactions (Brown et al., 2009).

In contrast, an Asian study found no significant differences in knowledge between those who sold or did not sell herbal medicines, or community vs. non-community settings (Chang et al., 2000). In addition both community pharmacists and hospital pharmacists were reported to be willing to adopt professional responsibilities for CM use (Chang et al., 2000; Koh et al., 2003). Similarly, 80% of hospital pharmacists in Nigeria believed phytopharmaceuticals were safe and could be effective if properly administered (Fakeye & Onyemadu, 2008).

The differences in attitudes and actions between hospital and community pharmacists may also be explained by the fact that a hospital environment represents a lesser individual autonomy and greater peer and administrative oversight than a community pharmacy setting. These factors at least, have been found to be structural constraints for CM use and referral among physicians,

nurses and midwives, when comparing hospital and non-hospital settings (Hirschhorn & Bourgeault, 2005, 2008). Furthermore, hospital pharmacies work without direct consumer demand and do only stock a small variety of CM products which may limit its application and use. A study on midwives noted that the hospital setting itself limits the range of available options to mothers (Burns et al., 2000).

In our study only a low number of hospital pharmacists (33%) always asked customers about their CM use, however, this was still significantly more than community pharmacists (18%). These numbers were overall lower, but similar in trend to one Canadian study which found that 71% of hospital pharmacists asked patients about CM use vs. 29% of community pharmacists (Montbriand, 2000). Brown et al., (2005) also reported that CM use is not routinely documented by American community pharmacists, whereas it has been found that CM use was recorded in the patient history by Australian hospital pharmacists (Braun & Cohen, 2007). These results indicate the presence of some specific strategies for CM documentation in the Australian hospital setting, but that the overall effectiveness of these strategies is still too low. So far, no national Australian hospital policy regarding either the management of admitted CM users or hospital CM documentation exists. That appropriate documentation would improve quality use of CMs was shown by Brown et al. (2005) who found that pharmacists' rate of inquiry about CM use increased significantly when this information could be documented in patient profiles.

INTEGRATION OF NATUROPATHS INTO THE PHARMACY SETTING

This study has investigated the incorporation of naturopaths into the pharmacy setting. Whilst only 18% of surveyed pharmacists reported that a naturopath is currently employed at their place of work, our results indicate that the number of pharmacies doing so may increase in the future as approximately half of respondents stated they would consider employing naturopaths, in particular those with appropriate tertiary qualifications. Moreover, pharmacists who worked in pharmacies with naturopaths strongly agreed that community pharmacies would benefit employing a naturopath to provide customer information.

In pharmacies with a naturopath, even fewer pharmacists were involved in advising customers about CMs. Potentially this could be seen as a problem as it suggests that pharmacists have largely transferred the responsibility of CM counseling to the naturopaths. On the other hand, significantly more pharmacists working in pharmacies that employed a naturopath were using high quality CM information resources, had a higher awareness of CM use by customers with a prescription and were also likely to have a degree in CM. Whether this indicates a positive influence of naturopaths on pharmacist behaviour or whether

pharmacists with a positive attitude towards CMs are more likely to employ a naturopath, or both, remains to be identified.

KNOWLEDGE AND EDUCATION

Overall there is still a high demand for a more structured approach to CM education, given that insufficient knowledge was the reason for over 50% of the surveyed pharmacists not to recommend CM products as standard practice. Our findings are similar to past Australian surveys which revealed that pharmacists generally rate their CM knowledge as inadequate and are not confident in answering patient enquiries (Braun & Cohen, 2007; Semple et al., 2006). Lack of knowledge and insufficient training has also been reported as barriers in other countries (Brown et al., 2005; Kemper et al., 2006; Koh et al., 2003).

Several studies which evaluated pharmacists' actual knowledge about CMs report low or moderate knowledge test scores (Braun & Cohen, 2007; Chang et al., 2000; Kemper et al., 2003; Kemper et al., 2006); however pharmacists with previous continuing education scored significantly higher than those without prior education (Chang et al., 2000). Perhaps in recognition of their lack of knowledge the majority of pharmacists in this study endorsed the need for additional CM training. Similarly, overseas studies report on pharmacists' interest in future training with figures ranging from 51% (Fakeye & Onyemadu, 2008) to 84% (Dolder et al., 2003). Various delivery models would be acceptable, however more than half of the pharmacists preferred short online courses. Given that any training, whether self-directed, through a manufacturer or through a professional organisation increased knowledge scores significantly, the design of the course should be secondary to the aim that CM information is presented unbiased as training may aid in the internalisation of values and attitudes towards CMs (Wilkinson & Simpson, 2002).

In addition, our study showed that a large percentage of respondents (76%) thought that it was very important for undergraduate pharmacy students to learn about evidence based CMs. This result is similar to findings from previous overseas and Australian surveys who found that 90% (Koh et al., 2003) and 80 % (Naidu et al., 2005) of pharmacists would like CM training included. Lately some progress towards the integration of CM into undergraduate curricula has been made and our study confirms this as recent graduates achieved a higher knowledge test score than pharmacists who graduated earlier.

DIFFERENCES BETWEEN PHARMACISTS WITH AND WITHOUT CM KNOWLEDGE – EFFECT ON CORE SKILLS

Sociological research suggests that CM education may also lead to practitioners with higher self awareness, improved core competencies such as evidence based practice, enhanced cultural competency and patient centred care (Gaylord & Mann, 2007; Hirschhorn, 2006). Our study confirms this research showing for example that pharmacists with prior CM knowledge were more likely to ask customers with prescriptions about their CM use and to mark an adverse drug reaction in the patient file. International studies have made similar observations (Brown et al., 2005; Dolder et al., 2003) thus making it highly desirable that every pharmacist has some core CM knowledge.

LIMITATIONS

As the method involved a self-administered survey, response bias is likely with those displaying greater interest in CM more likely to respond. All data collected in this study was retrospective and may suffer from recall bias. With respect to the knowledge questions, researchers obtained the ‘correct’ answers from two texts. The use of other generally used, authoritative texts may have provided a slightly different set of ‘correct’ answers however there is no reason to expect major differences would have been found.

CONCLUSION

In this study most pharmacists saw CM counselling as their professional obligation, however, this was primarily concerned with safety aspects. It gives a clear indication that an appropriate integration of CMs in Australian pharmacy practice is lacking and QUM principles are not always met with regards to CMs. Clear professional guidelines and practice standards, and the inclusion of CM information into professional texts and guidelines, as well as CM training to pharmacy students and practitioner should be made available. Moreover, this study confirms previous findings that CM education may also lead to practitioners with improved core competencies. Thus, it is desirable that every pharmacy practitioner has some core CM knowledge.

Given that this study identified many differences between hospital and community pharmacists, it is essential to consider different practice settings when outlining the optimal integration of CM into pharmacy practice. This study also reported on the incorporation of naturopaths into the pharmacy setting. In future the scope of professional practice for pharmacists and naturopaths would have to

be clearly defined in order for both groups still meeting their professional responsibilities.

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