

Canadian University Faculties of Pharmacy: Undergraduate Curriculum Survey of Geriatric Content

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The present geriatric content of undergraduate education in Canadian pharmacy schools was examined. A 35-item survey covering a range of educational topics was sent to relevant faculty members at each of the Canadian schools of pharmacy. All nine Canadian faculties of pharmacy responded. Only three schools had a separate geriatric course, the rest had integrated geriatric content. Both clinical and didactic courses were taught primarily by pharmacy faculty, and rarely by medicine faculty. Established guidelines surrounding inappropriate prescribing practices in the elderly were specifically taught in most schools. Innovative strategies included role playing, geriatric therapeutics "hot-lines" manned by pharmacy students, geriatric education modules, and geriatric pharmacology textbooks written by faculty members. The variability in the geriatric curriculum could be addressed with a mandatory geriatric issues pharmacy course. Partnerships with academic divisions of geriatric medicine and clinical pharmacology could further enrich the educational experience for pharmacy and medical students.

INTRODUCTION

Medications are powerful, but potentially dangerous in the treatment of multiple diseases in elderly individuals. Adverse drug reactions have been reported as being the fourth leading cause of death behind heart disease, cancer and stroke(1). Most serious adverse drug reactions are dose related, and over 85 percent of these occur in the elderly. Medications that were appropriately prescribed at a younger age may now have risks that outweigh their benefits(2-6). Elderly patients may have issues of non-compliance with complicated medication regimens, medication side-effects, drug-drug interactions, and drug-disease interaction. These risks are increased in elderly patients who may have cognitive, physical and sensory impairments(7). For these reasons, a well-informed pharmacist is an important "care of the elderly" team member and educational resource for physicians, health professionals, caregivers and the elderly themselves.

Geriatricians, internists and family practitioners often rely on a pharmacist's expertise when prescribing for their elderly patients. A pharmacist's recommendations and assistance for appropriate drug therapy, patient education, drug histories, and surveillance for adverse drug events are highly regarded. Pharmacists have been shown to have an important contribution to medical students(8). However, in a U.S. survey conducted by Simonson and Pratt(9) it was reported that 80 percent of pharmacy graduates felt that their formal education in pharmacy did not adequately prepare them for geriatric pharmacy practice. More recently, certificate courses have been developed and offered in the U.S. for the accreditation of those pharmacists who provide care for the elderly(10). Interestingly, some Canadian pharmacists also take this U.S. accreditation

exam, if only to gain recognition for geriatric skills they have acquired whether in clinical practice, or in pharmacy school. Internationally, pharmacists who specialize in geriatric care can be certified by the Council for Certification in Geriatric Pharmacy and carry the designation of Certified Geriatric Pharmacist (CGP). In Canada, corporate accreditation programs have been set up to train and develop consultant pharmacists in the delivery of pharmaceutical care to the growing geriatric population.

In contrast to these certification programs, the geriatric content of the curriculum taught to undergraduate pharmacy students across Canada is largely unknown to those who care and prescribe for the elderly. The purpose of this project was to better define the present geriatric content of undergraduate education in Canadian pharmacy schools. Our primary goal was to understand what is taught to pharmacists on geriatric topics at the undergraduate level, and identify innovative teaching and learning initiatives implemented in individual schools that could be used by other schools of pharmacy, as well as undergraduate medical students across Canada.

METHOD

This project was conducted during March and April, 1999. A 35-item survey, divided into five sections, was developed using an iterative process with input from practicing and academic pharmacists and geriatricians. The topics covered in the five sections included: (i) teaching geriatric pharmacology and therapeutics; (ii) geriatric curriculum content; (iii) clinical and

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Table I. Separate geriatric component to the undergraduate curriculum

Separate geriatric course	Number of schools (n=9)
Mandatory	1
Elective (with limited enrolment)	2
No separate course	6
Material integrated across several courses	9

Table II. Geriatric content taught to pharmacy students

Method	Number of schools (n=9)
Didactic teaching	9
Small group discussions	5
Problem based learning (PBL)	6
Standardized patients or families	3
Student presentations	5
Student seminars	2
Other method (practice laboratory, Role-playing session experiential learning)	4

placement experience; (iv) innovative teaching strategies; and (v) feedback. The five pages of the survey instrument along with a one page cover letter were sent by facsimile (FAX) and electronic mail to a faculty member of each of the Canadian faculties of pharmacy identified by the Dean as having both interest in, and knowledge of, geriatric issues and the geriatric curriculum content at their school. The responses were collated and analysed using simple quantitative (frequency) and qualitative (content analysis) statistics. Unanswered questions or unclear responses were clarified in a follow-up electronic letter.

RESULTS

All nine deans and/or deans' offices of pharmacy schools responded to our request for the name of the person most knowledgeable about the geriatric content of their undergraduate curriculum. All nine of these faculty members returned completed surveys.

Geriatric Pharmacology/Therapeutics

All nine schools stated that they had coverage of geriatric materials incorporated in other courses. Only three faculties offered courses concentrating exclusively on geriatric topics (Table I). No schools made use of audio/video cassette instruction or computer aided instruction, or used distance education. The methods used to teach geriatric content are summarized in Table II.

Three schools indicated that collections of case studies were available for their students. Two indicated that conferences were available for their students to attend, and another two indicated that they had collections of journal articles available. Three faculties indicated that no geriatric related educational materials or resources were made available to their students. While only one school noted that nursing home clerkships were an important teaching resource, eight of nine schools had such clerkships available for their students. Individual schools noted such resources as textbooks published by faculty, faculty with a special interest in geriatrics (or those with large geriatric practices), geriatricians and other medical faculty with a special interest in geriatrics as resources available for students to utilize.

Geriatric Curriculum Content

There was substantial variance in the coverage of a variety of geriatric pharmacy topics. Most pharmacy schools indicated good coverage of the pharmacokinetic/pharmacodynamic changes in the elderly, polypharmacy, and the incidence and prevalence of disease in the elderly. Fewer faculties reported covering health promotion and well being, adverse drug reactions, and the principles of 'smart pharmaco-architecture' in the elderly (Table III). The time spent teaching therapeutics appeared to reflect the more prevalent conditions in the general population rather than geriatric issues. For example, cardiovascular therapeutics (median seven hours, range 0-18 hours) and neurological therapeutics (median six hours, range 0-14 hours) received the most hours. Eight schools stated that there should be more or much more emphasis on geriatric content in their present undergraduate curriculum. The single school that answered "same" already had a mandatory course in geriatric pharmacy, along with relationships with their university's division of geriatric medicine. The second part of the question which invited respondents to provide a written reply, was "If more or much more, which topics and which years?" Comments from respondents were as follows:

- "All students need a separate geriatric course rather than an elective course only offered to half the class."
- "A specific geriatric course should be implemented...three credit course. Also we need to offer a course in geriatrics for our practicing pharmacists."
- "Health promotion...incidence and prevalence of disease...patterns of drug use...polypharmacy."
- "Topics is not the issue — we are adding a course dealing with the general issues surrounding different patient populations."
- "Not necessarily more topics, but more exposure to geriatric patients earlier in the program."

Four schools did not provide a written comment

Table III. Hours of the undergraduate education allocated to geriatric topics

Topic	No. of schools (n=9)	Average (hrs.)	Median No. hrs.	Range (hrs.)
Incidence and prevalence of disease in the elderly	8	3.6	2	0-10
Patterns of drug usage	7	2.8	4	0-6
Health promotion & well-being	5	2.0	1	0-8
Pharmacokinetics & pharmacodynamic changes that occur with aging	9	5.4	5	0.5-14
Adverse drug reactions & drug interactions with the elderly	5	1.8	1	0-7.5
Principles of "smart" pharmaco-architecture	4	0.6	0.5	0-2
Polypharmacy	8	2.3	1	0-8

Table IV. Clinical rotations in geriatrics, in geriatric rehabilitation units (GRUs), geriatric assessment units (GAUs), or long term care settings.

Specific geriatric clinical experience	Number of schools with opportunities (n=9)
Clinical Pharmacy Rotations in Geriatrics	
Mandatory	1
Elective	4
Elective by chance alone	1
None	3
Clinical Pharmacy Rotations on GRUs or GAUs	
Mandatory	0
Elective	6
Elective by chance alone	2
None	1
Clinical Pharmacy Rotations in Long Term Care Settings	
Mandatory	2
Elective	4
Elective by chance alone	2
None	1

Clinical and Placement Experiences

Specific clinical rotations for undergraduate pharmacy students in geriatrics, in geriatric rehabilitation units, geriatric assessment units and long-term care settings are outlined in Table IV. Three schools had their undergraduate pharmacy students assigned to a geriatric preceptor, to whom they were responsible for reporting issues regarding specific geriatric patients under their care. At four schools, preceptors were available for counseling and to act as resource people. Respondents for two of the schools were unable to determine if their students had either a mandatory or elective preceptor. Opportunities for communication skills practice with clients, with caregivers, and strategies to improve medication adherence were commonly available but not mandatory. The one school that did not offer any of these, indicated that such opportunities would become available in their new curriculum. Only three schools indicated that there were special geriatric related electives available in that school's home city, with only a single school indicating that out-of-town experiences were available.

Critical Appraisal/Innovative Teaching

Just over half of the schools taught their students the critical appraisal skills needed to review published clinical guidelines. Just over half reviewed previously published specific geriatric guidelines for inappropriate prescribing of medications in older persons. Two schools mentioned that they were in the process changing their curriculum to incorporate the teaching of critical appraisal in the near future. Table V outlines innovative programs on geriatric topics and issues provided by the various faculties.

Feedback

Open-ended comments by several respondents (written often as marginalia in their faxed replies) emphasized that at several schools of pharmacy, issues dealing with the elderly are integrated into the pharmacokinetics and pharmacodynamics courses, rather than being dealt with in a separate course. One

school has plans for an updated curriculum with more geriatric content beginning in the 1999-2000 school year. Their revised curriculum was used in the final analysis. Some respondents commented that the survey instrument was relatively inflexible to adequately capture the geriatric content of courses where geriatric issues are integrated into, but are not the primary focus of the course. One respondent, in commenting on this topic, wrote:

“We found it very difficult to estimate contact time with students given that geriatrics is not directly targeted in any course (with the exception of the geriatric pharmacy elective).”

Another respondent wrote:

“...it was not written from the point of view of a pharmacy school curriculum (at least not ours). We have always integrated material (*e.g.*, therapeutics) more than what appeared to be described here so it was not possible to “break out” the number of hours associated with geriatrics as you suggested (*e.g.*, for a particular area we would discuss all patient presentations, but would suggest it is more prevalent in the x age groups and therefore one should consider...). It is also “team taught” so I haven’t any more accurate info.”

Another commented:

“I have had a wonderful experience teaching and developing our geriatric course. The inter-professional cooperation has been outstanding from all members—geriatricians, family physicians, nutritionists, social workers, grief counsellors, nurses and the geriatric patients. All have been willingly cooperative and been brave to allow me to experiment with different learning opportunities . . . the students have benefited greatly. Medical students should be given the opportunity to work with pharmacy students in the resolution of drug-related problems, especially with the elderly. This is one area of practice where the health care team works really well.”

DISCUSSION

In their document entitled: “The NACA Position on Gerontology Education”(11), the National Advisory Council on Aging (NACA) identified the need for enhanced gerontology education in Canada, especially in the health and human service fields. This survey of the nine Canadian schools of pharmacy is consistent with the NACA recommendation to inventory and analyse the “breadth, depth and focus of gerontology content in post-secondary program curricula.” This was the first formal survey of the geriatric content in the undergraduate curriculum of the nine Canadian schools of pharmacy. Of the previous published literature in this area, most has focused on the experiences of schools of pharmacy in the United States(9). A 1988 news article in the Canadian Pharmacists Journal reported that there was “... no formal course on geriatric care” taught in any of the faculties of pharmacy across Canada at that time(12). In 1982, Simonson and Pratt(13), using a survey design similar to ours, found that 16 of 72 U.S. pharmacy schools offered no course work in geriatrics whatsoever. In 1986, they updated their previous survey

Table V. Innovative programs on geriatric topics and issues

Faculty	Innovation
Memorial University of Newfoundland	Case study assignments in polypharmacy and adverse drug reactions (ADRs). Limited number of geriatric placement experiences in psychiatric hospitals and other long-term care settings. Working with the faculty of medicine to develop a course on evidence-based medicine and pharmacy.
Dalhousie University	None specified, although the curriculum is to be changed to a PBL format for which geriatric topics will be included. Very interested in developing partnerships with academic divisions of geriatric medicine.
Université Laval	A mandatory fourth year course in drug care in the elderly. A textbook written by a faculty member with a strong interest in geriatrics is used as a resource (Gilles Barbeau). Elective rotations on GAUs and other special geriatric experiences. In addition, the faculty offers continuing education courses for practicing pharmacists on drug use in the elderly.
University of Montreal	Faculty member with a fellowship in geriatrics, with joint appointment with McGill's Division of Geriatric Medicine. Publishes 3+ case reports per year on a geriatric topic observed in the clinical setting. Formal discharge care plans.
University of Toronto.	Standardized elderly patients. Very interested in developing partnerships with academic divisions of geriatric medicine
University of Manitoba	Faculty members with a defined interest in geriatric issues. A fourth year elective course in drug care in the elderly. All students have a mandatory preceptor with an interest in geriatric issues. Eight hours of participation with an educational "hot-line" aimed at elderly medication consumers and their caregivers ("MILE"). In the student experiential rotations, some will be exposed to long-term care facilities. Special student seminars which include participation of "Into Ageing Game," and a student presentation "Knowledge is the Best Medicine" to seniors' groups.
University of Saskatchewan	Faculty members with a defined interest in geriatric issues, in particular a clinical assistant professor who practices in the Geriatric Assessment Unit and Geriatric Day Hospital. Elective GAU/GRU experiences.
University of Alberta	Non specified, though mention of the recent appointment of a PharmD clinician with a specific interest in geriatrics. Extremely interested in developing partnerships with academic divisions of geriatric medicine.
University of British Columbia	Relationships with UBC's Geriatric Medicine program, with a cross-appointed pharmacy faculty member. Elective fourth year course in drug care in the elderly. Mandatory experiential rotations in long-term care facilities. Elective GAU/GRU experiences. Special geriatric placement experiences on site, and at other locations. Pharmacy students are responsible for a particularly assigned nursing home patient for 4 months and gain skills in compliance, communication, and the development of their treatment plans.

and found that only nine of 72 U.S. pharmacy schools required students to take a course which focused on geriatrics(14); 68 of the schools offered some courses with geriatric content primarily as an elective; and in 19 schools it was possible for a student to graduate from pharmacy with no exposure to geriatrics. Geriatric pharmacology and therapeutics is integrated throughout the undergraduate curriculum at all nine Canadian schools of undergraduate pharmacy. However, a pharmacy course that focussed specifically on geriatrics was mandatory at only one school, and an elective course with a capped enrolment was available at two schools (Table I). Courses were taught primarily by pharmacy faculty, and rarely by medicine faculty such as geriatricians, clinical pharmacologists, and family physicians.

Available resources for undergraduates with an interest in geriatric issues were highly varied from school to school. Understandably, not all pharmacy schools have the benefit of having medical school faculty available for traditional teaching due to geographical constraints. However, several faculties of pharmacy in close proximity to faculties of medicine had no formal interaction between the two undergraduate schools, suggesting that there are opportunities for joint teaching ventures on geriatric topics. The curriculum content also showed variability in the emphasis placed on particular geriatric medical topics. Topics organized by medical systems show that

while all topics are covered, there was a wide divergence in the number of undergraduate hours devoted to these topics. Special geriatric topics such as polypharmacy and the pharmacodynamic changes that occur with ageing were discussed at many but not all schools. Only in some schools was there the option of undergraduate pharmacy students to participate in clinical experiences in long term care settings, geriatric assessment units and geriatric rehabilitation units. Only one school had a mandatory placement rotation in a long-term care setting, with three other schools offering elective geriatric placement experiences by chance not choice.

The ability to interpret and apply the skills of critical appraisal, particularly towards geriatric practice guidelines(15,16), were discussed at many, but not all schools. Discussion of inappropriate medication prescribing practices in the elderly, however, took place at all nine schools.

Identified innovative strategies included "Standardized Patients and Families" (*i.e.*, role-playing), geriatric therapeutics "hot-lines" operated by pharmacy students, geriatric education modules, and placements in geriatric rehabilitation or assessment units. Unique resources included faculty with a strong interest in geriatrics and geriatric pharmacy textbooks written by pharmacy faculty.

An area which was not specifically addressed in this survey was the extent to which geriatrics was taught in the context

of pharmaceutical care, specifically the recent trend in pharmacy practice towards greater patient focused care. In addition to learning new information about therapeutics in the elderly, students must develop the essential skills required in the provision of comprehensive pharmaceutical care including conducting medication histories, assessing client data to identify potential and actual problems, and developing and documenting a strategy for intervention and follow-up. Future surveys of the undergraduate pharmacy curriculum should identify innovative teaching strategies of this new philosophy of practice. It is interesting to note that U.S. licensing exams and associated preparatory materials are increasingly being used by Canadian pharmacists to enhance and test their clinical knowledge of geriatric topics. There are other ways to achieve these goals. Increasing the number of geriatric questions on medical licensing exams has been one strategy that has been successfully used to change medical residency curricula, and this same strategy could be used on Canadian pharmacy licensing exams. If students are to be tested on geriatric topics, the curricula will change to ensure that such topics are covered in all schools. There was interest from most of the responding academic pharmacists to include more geriatrics related content in the undergraduate curriculum. There is clearly interest in partnerships between academic divisions of geriatric medicine and clinical pharmacologists to help meet these goals, through the promotion of shared teaching and rotations.

CONCLUSION

Undergraduate pharmacy students should have exposure to geriatric topics and issues prior to their placement experiences. Pharmacy programs that do not have elective courses that emphasize geriatric topics may consider reviewing their curricula to see if they reflect the needs of their undergraduate students and society, and to pursue partnerships with other academic divisions to meet these new training goals. The growing numbers of older citizens, the expanding amount of chronic disease that they endure, and the expanding pharmacopea available to the practicing physician makes it essential that both physicians and pharmacists acquire the necessary skills to meet the present and growing challenge.

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