PEDIATRIC RESIDENT EDUCATION AND NEEDS ASSESSMENT IN CLINICAL PHARMACOLOGY

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ABSTRACT

Objective
To identify perceived and unperceived educational needs of residents to organize a seminar series in clinical pharmacology.

Method
All pediatric residents (48) and all attending general pediatric staff (20) were sent structured questionnaires with potential seminar topics. Data from previous pharmacy chart audits and complaints lodged with patient care representatives were analyzed as the environmental scans.

Results
There was a 75% response rate from both residents and staff. The responses were very similar and the only significant difference was the response to a seminar on correcting electrolyte imbalances which the residents favoured ($p = 0.005$). The environmental scans identified pain management as one of the main areas needing improvement.

Conclusion
Perceived learning needs of residents are similar but not identical to those identified by the faculty. Environmental scanning can be used to identify unperceived learning needs.

Key words*: medical education, needs assessment, residents, clinical pharmacology, environmental scan*

Prescribing medications is a major constituent in traditional medicine and doctors need to know what they prescribe. Medical therapy leads to disabling injuries in 3.7% of hospitalized patients (1133 out of 30,195), and drug complications were the most common type of adverse event accounting for 19% of those injuries.[1] Medication errors are common and occur at a frequency of 5.3 per 100 medication orders.[2] A prospective cohort study in pediatric inpatients found 5.7% medication errors (616 errors in 10,778 orders for 1120 patients), 1.1 % potential adverse drug reactions and 0.24% reported adverse drug reactions.[3] Nineteen percent of the reported adverse reaction and 93-94% of the potential adverse reactions were deemed preventable.[3]

Medical students, interns and residents have classified pharmacology as one of the courses of great relevance.[4] The American Boards of Medical Specialists, and the Royal Colleges of Physicians and Surgeons (Canada and UK) evaluate residents' knowledge in clinical pharmacology for certification. Apart from the glaring reports on medication errors there are only a few studies, such as a questionnaire survey in 1978, which assess the need for clinical pharmacology teaching for residents.[5]

Education programs in clinical pharmacology have been implemented and

their impact evaluated for special groups such as psychiatric residents and staff.[6,7] We felt that our study will help us establish an educational program in clinical pharmacology with an ultimate goal of improving patient care.

In the current climate of consumer-driven services, educator's face increasing pressure to plan learning activities based on the identified needs of the target audience.[8] A needs assessment is a systematic process to collect and analyze information on what a target group needs to learn.[9] The type, purpose, timing and the target audience usually guide the needs assessment methods chosen by educators.

Educators often combine data from different needs assessment methods (triangulation), to identify the learning needs of the target audience.[10, 11] Various methods of needs assessment and some of the situations when these could be used in postgraduate medical education have been described in the literature (Table 1).[12] Teaching without considering the learning needs may result in information overload, which can be counter productive.[13, 14]

There is an increasing effort to use needs assessment for resident education. A study from Dublin describes the use of questionnaires and semi-structured interviews conducted as a national medical educational needs' assessment of interns to develop an intern education and training program. [15]

Another Canadian study describes a successful core curriculum initiative for postgraduate medical education using surveys.[16] Needs assessment by residents and faculty are also used to evaluate and modify training programs.[17] None of these studies have compared the perceived needs of the learners and the educators, nor have they addressed the unperceived needs. When residents in our tertiary care pediatric hospital expressed a need for clinical pharmacology teaching we conducted a needs assessment to identify learning needs and to plan the subject content for a seminar series in clinical pharmacology. The objective of this study was to identify the educational needs of the residents and the attending staff; and to identify unperceived learning needs using environmental scans.

TABLE 1 Types of Needs Assessments

Types of Needs Assessments	Advantages for postgraduate medical training	Purpose
Questionnaires	Sample large groups	Identify seminar topics
Interviews	Identify individual learning needs	Plan remedial training
Focus groups	Evaluate program and identify areas of discrepancy.	Improving or modifying existing teaching strategies.
Chart audits	Identify areas of weakness in a cohort of residents	Identify common medication errors
Chart-stimulated recall	Identify individual learning needs	Evaluate problem solving skills
Standardized patients	Identify learning needs in attitude, or behavior.	Identify learning objective for topics such as ethics, acute care, counseling,
Environmental scans	Identify educational objectives. Evaluate previous educational activities	Plan educational activities that are relevant

METHODS

Potential resident focused seminar topics were identified after individual and group discussions with pediatric residents and staff.

The residents were interviewed as small groups; staff members were interviewed individually.

The interviews were conducted in this manner for convenience and all identified seminar topics were included in the questionnaire. Structured questionnaires with potential seminar topics in clinical pharmacology related to paediatric subspecialties, basic pharmacology, teaching of practical subjects (e.g. correction of electrolyte imbalances) and a section for any other topic(s) of interest were sent by internal mail to all paediatric residents (n=48), and all attending general paediatric staff (n=20).

The residents and staff were sent reminders after 2 weeks. Chi-square or Fischer exact tests were used to analyze nominal data. We conducted an internal environmental scan by analyzing medication errors identified from previous pharmacy chart-audits and interviewing patient-care representatives regarding medication-related complaints.

The pharmacy reviews all inpatient prescriptions and summarizes actual and potential medication errors annually and the chart audit for 2000-2001 was used. Patient care representatives are part of a centralized service that responds to all complaints from patients and parents attending the hospital. Patient care representatives log all complaints in a database.

The patient care director shares this information with the departments and individuals against whom the complaints were lodged in order to improve patient care and patient satisfaction. We interviewed one of the directors regarding the common parental complaints related to medications, based on all the complaints received the previous year.

TABLE 2 Questionnaire Survey Results – *Clinical Pharmacology*

Clinical Pharmacology	**Residents (n=36)**	**Staff (n=15)**	
Seminar Topics	**Yes**	**Yes**	**p value**
Neurology	100%	87%	0.08
Cardiology	97%	87%	0.20
Infectious Diseases	94%	80%	0.14
Correcting electrolyte imbalances	94%	60%	0.005
Nephrology	92%	87%	0.62
Respirology	92%	80%	0.34
Gastroenterology	92%	87%	0.62
Development	86%	80%	0.67
Hematology & Oncology	83%	80%	0.70
Rheumatology	81%	80%	1.00
Transplantation medicine	67%	40%	0.11

TABLE 3 Questionnaire Survey Results – *Basic Pharmacology*

Basic Pharmacology	Residents (n=36)	Staff (n=15)	
Seminar Topics	**Yes**	**Yes**	**p value**
Adverse drug reactions	97%	93%	0.50
Drug interactions	97%	93%	0.50
Medication errors	86%	93%	0.65
Bedside drug kinetics	75%	80%	0.99
Principles of pharmacology & therapeutics	75%	73%	0.99

TABLE 4 Environmental Scan Results (ascending order of priority)

Patient Care Representatives	Pharmacy Chart Audits
Pain management	Analgesics and pain management
Drug interactions	Anti-infective agents
Adverse drug reactions	Cardiac medications
	Anticoagulants
	Anti-epileptic agents

RESULTS

There was a 75% response rate from both residents and staff (Tables 2&3). The only topic that generated a different response between the residents and the staff was the seminar on correcting electrolyte imbalances, which the residents favored ($p = 0.005$). Four residents and one staff identified psychiatric medications and 3 residents separately identified pain medications, drugs in the neonate, and herbal medicines as areas for additional learning needs. In general residents perceive a greater need for seminars than did the staff physician.

Pharmacy chart audits identified pain medications, anti-infective agents, cardiac drugs, heparin, and anti-epileptic agents as areas of actual and potential medication incidents in decreasing order. The patient-care representatives identified pain management, drug side effects, and drug interaction to be areas of parental dissatisfaction as per complaints lodged by parents regarding medication administration within the past year (Table 4). The confidential nature of this information restricts further details from the environmental scan.

DISCUSSION

Time, money, and administrative support may be limited in any educational activity. It is difficult to decide how much of the limited resources should be spent on needs assessment. a careful needs assessment, however, is an important first step in planning educational intervention for any learner.

Residents are time-constrained learners, due to the numerous 'on-call duties' and heavy service loads in most programs; their time investment should be given serious thought.[18, 19]

In our survey the attending staff was able to identify most of the learning needs of the residents. Surveying the supervisors may be an option to identify learning needs if surveying the learners is not feasible within a given period.

The internal environmental scans identified pain management as one of the main areas needing improvement in our institution.

It is interesting to note that pain management was not identified as an important learning need from our discussions or the surveys. The published literature suggests that pain management is a widespread problem, which is often unrecognized by medical staff, but educating the medical staff improves pain management.[20, 21, 22]

This study does not completely assess all possible unperceived educational needs. The pharmacy chart audits and parental complaints about issues with medications were not analyzed in greater detail due to concerns with the confidentiality and ethical issues of releasing certain types of data. As mentioned in the literature, environmental scans may produce information that is less valid or objective than that obtained from direct contact with the target group; the interpretation of the data may be limited by the interpreters' perspectives, and concerns regarding confidentiality and ethics limit releasing certain types of data.[23]

However, environmental scans are very efficient sources of data collection since most of this information is already collected for other purposes and this information can be used for educational purposes in conjunction with other methods of needs assessment.

Following this survey, a seminar series for pediatric residents will be conducted weekly for 3 consecutive months in a problem based learning format. A pre-test assessment at the beginning of the course will be used to identify other areas of weakness and the course will be modified to accommodate additional learning needs. Regular evaluations and post-test results will be used to evaluate the course.

CONCLUSION

Perceived learning needs of pediatric residents for clinical pharmacology are similar but not identical to those identified by the faculty. Environmental scanning can be used to identify unperceived learning needs. An educational activity that does not address the needs of the learners would lead to diminished attendance and cease to serve its purpose.

However, the authors wish to caution the medical community that educational activities based only on learner identified needs may be inadequate as unperceived needs will not be addressed.

We feel that appropriate needs assessment by educators and program directors for curriculum development and resident education would help the learning to be relevant and facilitate improved patient care.

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