Assessing Medication Safety in PharmD Education in the U.S.

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ACPE Standards in Didactic Courses

Medication Dispensing, Distribution and Administration[1]
Preparation, dispensing and administration of prescriptions, identification and prevention of medication errors and interactions, maintaining and using patient profile systems and prescription processing technology and/or equipment, and ensuring patient safety. Educating about appropriate medication use and administration.

Patient Safety[1]
Analysis of the systems- and human-associated causes of medication errors, exploration of strategies designed to reduce/eliminate them, and evaluation of available and evolving error-reporting mechanisms.

Introduction and Objectives

Medication safety and the management of medication errors plays a vital role in the education of pharmacists.[2-4] The coursework dedicated to these areas equip pharmacists with the knowledge to effectively minimize preventable medication errors. It also gives needed guidance on utilizing available resources to promote medication safety. It is crucial to gain insights into the extent and quality of medication error delivery in the current colleges/schools of pharmacy.

The primary objective of our survey is to measure the current state of medication error (ME) coursework in PharmD programs at ACPE-accredited colleges and schools of pharmacy in the United States.

The secondary objective is to assess the quantity and quality of medication safety instruction in these programs.

Methods

An electronic questionnaire was developed and distributed using the QuestionPro platform. The target participants were CEO Deans of pharmacy schools, whose contact information was obtained from the ACPE (Accreditation Council for Pharmacy Education) website.[5] The questionnaire consisted of 16 major questions that collected information of institution and the topics of ME including unit dose, error detection methods, automation, and technology.

The survey was initiated by sending an email containing a shared link to the electronic questionnaire to the CEO Deans of pharmacy schools. Two reminder emails were subsequently sent, approximately two weeks apart, to encourage participation. Additionally, the curriculum assessment committee chairs in pharmacy schools were invited to participate in the survey.

Descriptive analyses of the collected data were performed using Stata/SE 18.0 software.

Results

A total of 47 complete responses were received, representing a diverse set of institutions , with a majority responses from teaching institutions (N=33, 70%).

Private For-profit
N=2, 4%

Private Not-for-profit
N=25, 53%

Public
N=20, 43%

Research (R2: High research activity)
N=5, 11%

Research (R1: Very high research activity)
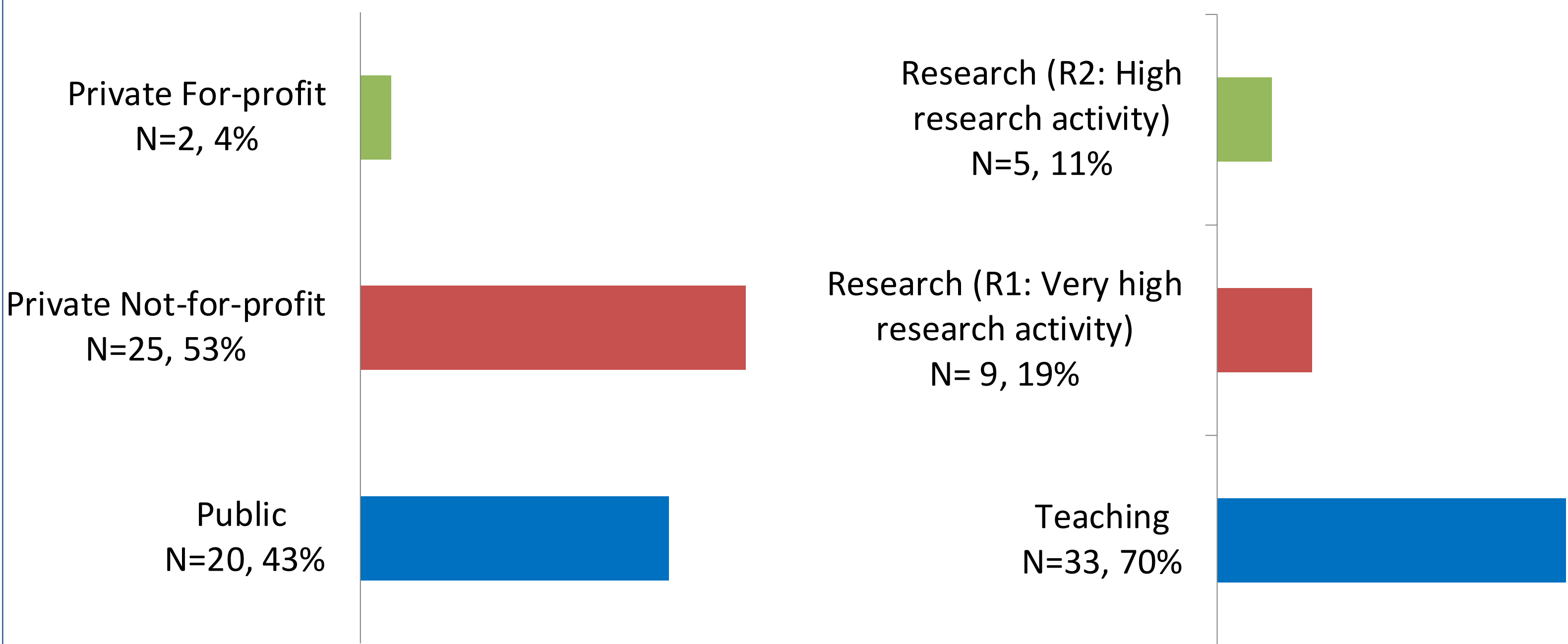N= 9, 19%

Teaching
N=33, 70%

Figure 1. Participated Institution Characters

Ninety-three percent of the institutions covered the topic of Medication Errors with a median of 8 hours (Interquartile range: 6-15hours) in the core curriculum.

- less than 15 hours total
- 16-20 hours total
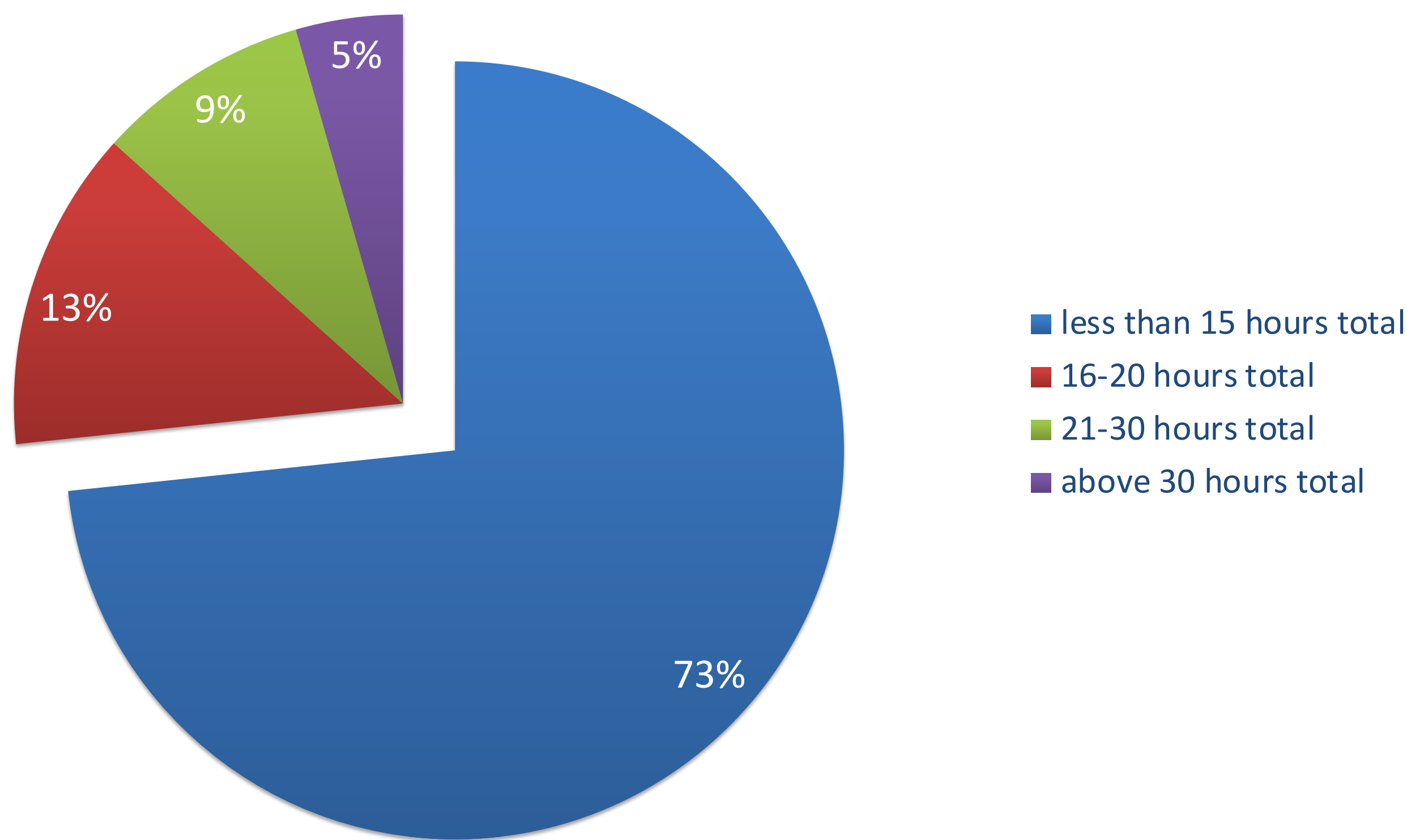- 21-30 hours total
- above 30 hours total

5%
9%
13%
73%

Figure 2. Teaching Hours of Medication Errors Related Topics in Core Curriculum

Fifty percent of research institutions offered more than 15 hours of Medication Errors, while only 21% of teaching institutions (7 out of 33) did (P<0.05).

The core curriculum covered Medication Errors related topics, with electronic health record (92%), computerized physician order entry (87%), and barcoding (74%) being ranked as the primary subjects.

Seven (15%) institutions offered ME-related electives, such as medication safety, achieving medication safety through informatics, and patient safety in medication use systems.

Table 1. Outcomes of Medication Safety in PharmD Education

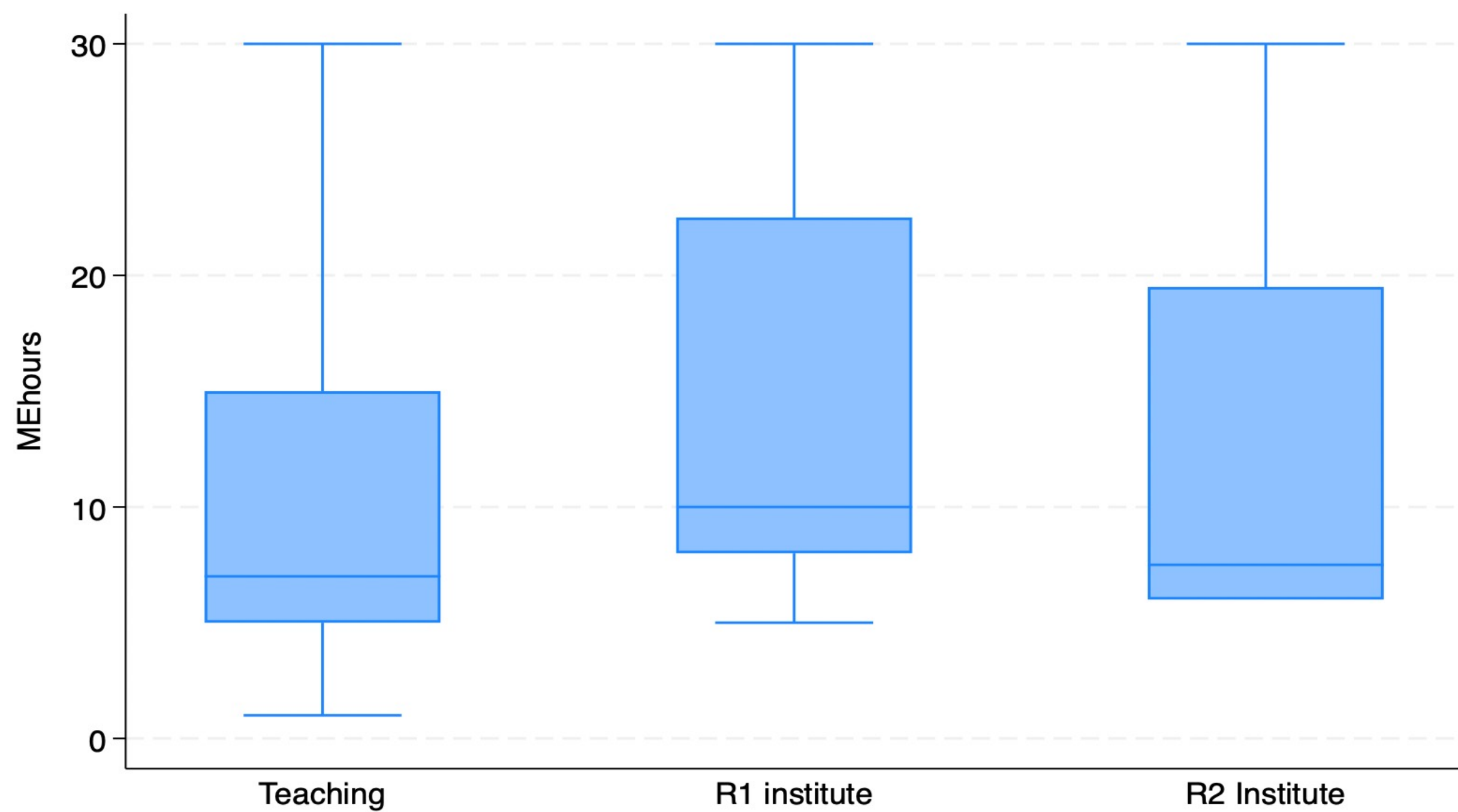| Questions	Core Curriculum	Elective course(s)	Both
Are quality improvement techniques addressed or covered within the course(s)?	35 (74.5%)	1 (2.1%)	7 (14.9%)
Is the optimization of safety and efficacy of medication use systems addressed in the course(s)?	37 (78.7%)	2 (4.3%)	6 (12.8%)
Are medication and error detection methods addressed in the course(s)?	36 (76.6%)	2 (4.3%)	3 (6.4%)
Is the role of pharmacists in improving quality deficits in medication use systems addressed in the course(s)?	33 (70.2%)	1 (2.1%)	6 (12.8%)
Are students provided with opportunities to participate in interprofessional collaborations with the goal of improving the quality of care for the patient within the course(s)?	30 (63.8%)	3 (6.4%)	2 (4.3%)
Is the interpretation of medical literature to improve the quality of patient care addressed in the course(s)?	31 (66.0%)	2 (4.3%)	5 (10.6%)

Figure 3. Lecture Hours of Medication Errors between Teaching and Research Institutions

Discussions

The primary findings of the study reveal that the Medication Safety subjects of automation and technology, such as Computerized Provider Order Entry (CPOE), Electronic Health Records (EHR), and Barcoding, were more frequently covered in core curricula.

Research institutions allocated more teaching hours in Medication Errors compared to teaching institutions.

Electives on Medication Errors were offered by less than twenty percent of the institutions.

Limitations of this study include the low response rate and potential estimation issues when requesting teaching hours of Medication Errors.

Limitations

This survey provides information about teaching medication safety in PharmD programs at ACPE-accredited colleges and schools of pharmacy in the U.S.

Contact

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