Objectives: Barriers have prevented full integration of advanced practice pharmacists (APPs) into collaborative practice in some areas despite evidence describing their value. APPs in North Carolina can be recognized as Clinical Pharmacist Practitioners (CPPs) under a collaborative practice agreement and provide comprehensive medication management under physician supervision. This study describes the perceptions of physicians regarding the barriers and benefits of integrating CPPs into interprofessional teams and compares physician and CPP perceptions.

Methods: This prospective descriptive study surveyed CPP supervising physicians in North Carolina. The questionnaire consisted of 17 multiple-choice and free-response questions. Questions included demographics, perceived benefits and challenges of incorporating CPPs into health care teams, and services provided by CPPs. Findings were compared with previously published data that assessed CPP perceptions about the same topics to gain insight into common perspectives of team members.

Results: Fifty-six physicians (23.1%) responded, identifying enhanced clinical outcomes (87.5%), access to drug knowledge (58.9%), and creation of a multidisciplinary model for learners (57.1%) as the top benefits of working with CPPs. Primary barriers included limited reimbursement (60.7%) and billing difficulties (51.8%). More CPPs acknowledged provider acceptance as a barrier (25.9% vs. 3.6%; \( P = 0.001 \)). Twelve physicians (21.4%) and no CPPs identified space as a barrier.

Conclusion: Physicians identified enhanced clinical outcomes, access to drug knowledge, and creation of a multidisciplinary model for learners as the top benefits of incorporating CPPs into teams, and billing difficulties and limited reimbursement were the primary barriers. These findings were similar to the perceptions of CPPs, with exceptions being that physicians were more concerned about space limitations and CPPs noted that provider acceptance may be difficult. These findings may provide guidance to providers desiring to establish collaborative practice.

The need for team-based provision of quality cost-effective care is an important component of health care reform. Incorporating pharmacists into health care teams has been shown to improve patient safety and clinical outcomes while lowering the cost of care. Despite the value proposition of the profession, pharmacists are often not fully integrated into multidisciplinary health systems. The U.S. health care system is transforming, and patient-centered medical homes (PCMHs) and accountable care organizations (ACOs) provide opportunities for pharmacists to play a significant role. ACOs seek to improve quality and costs to populations of patients through coordinated care. The PCMH, based in primary care, provides comprehensive, patient-centered, coordinated, and accessible care with a commitment to quality and safety. Pharmacists in these environments have provided services such as comprehensive medication management (CMM), education, medication access assistance, medication reconciliation,
annual wellness visits, chronic care management, transitions of care, and quality improvement initiatives.\textsuperscript{8,13}

Pharmacists in many states may practice in multidisciplinary care models through collaborative practice agreements (CPAs) with physicians, which identifies them as advanced practice pharmacists (APPs) under a defined protocol to perform assessments, order tests, administer drugs, and initiate, modify, and monitor medication regimens.\textsuperscript{11,14,16-17} CPAs vary in scope based on state legislation, practice environment, and pharmacist training.\textsuperscript{18} Some states, such as Washington, provide prescriptive authority via laws that allow prescriber-approved protocols,\textsuperscript{19} and others, such as New Mexico, require an advanced certification process.\textsuperscript{20} Expanded scope of pharmacy practice has long been recognized within the federal sector, such as with the Veterans Health Administration.\textsuperscript{21} Despite momentum that has been gained in the collaborative practice arena, challenges remain. For example, the number of APPs in North Carolina remains small. As of August 2017, only 2.3\% of practicing pharmacists in North Carolina were APPs (written personal communication, North Carolina Board of Pharmacy, August 8, 2017).

Previous studies have indicated that pharmacists have encountered several barriers to integrating into teams, including physician acceptance of the role and reimbursement challenges.\textsuperscript{22-24} Although knowledge of physician perceptions of APPs is limited, published studies have noted that physicians feel that APPs provide clinical, educational, and efficiency benefits.\textsuperscript{25,26} Barriers include lack of understanding pharmacists’ roles, pharmacist availability, and space.\textsuperscript{26,27} More information is needed on physician attitudes regarding APPs to provide guidance to pharmacists and physicians working toward collaborative practice.

Objective

Objectives were to determine the perceptions of physicians regarding barriers and benefits of integrating APPs in North Carolina into health care teams and evaluate any differences between the attitudes of physicians and APPs.

Methods

The Clinical Pharmacist Practitioner (CPP) model in North Carolina was examined, because attitudes of CPPs have been previously published.\textsuperscript{22} The Clinical Pharmacist Practitioner Act permits pharmacotherapy management by a qualified pharmacist under supervision of a collaborating physician, including assessing, ordering, adjusting, and substituting medications and ordering medication-related tests per written protocols.\textsuperscript{28}

An electronic questionnaire was sent to all 176 currently licensed CPPs in 2014 that requested them to forward the survey to CPPs.\textsuperscript{22} The survey on perceived successes and challenges identified by CPPs\textsuperscript{22} consisted of 17 multiple-choice and free-response questions. Successes and challenges identified by CPPs through free response in the historical cohort were used to create questions with similar wording. Additional questions were guided by practice models described in the literature,\textsuperscript{7} results from a 2011 survey of CPPs,\textsuperscript{29} and the authors’ practice experiences. Respondents were queried regarding demographic information, scope of services provided by CPPs, and perceived benefits and barriers of working with CPPs. Free text responses identified unique responses and were categorized and counted. Use of multiple-choice questions permitted more than 1 answer when applicable. Three family physicians, uninvolved in the study, who work closely with CPPs but were not their supervisors, reviewed the survey to assess content validity, which resulted in minimal wording changes. To assess common perspectives of team members, comparisons were made with the previous study of CPP perceptions of successes and challenges,\textsuperscript{22} which was considered to be the historical cohort.

During the study period, the term CMM was not routinely recognized. Collaborative drug therapy management (CDTM) and medication therapy management (MTM) were defined on the survey as disease state management supervised by a physician and medication optimization consultations, respectively.

Descriptive statistics were calculated to analyze demographic data and response frequency. Recorded variables included age, gender, practice specialty, years in practice, practice size, region size, and affiliation with an academic health center. Comparison of responses of supervising physicians to a previously surveyed cohort of CPPs\textsuperscript{22} was evaluated by means of a Fisher exact test. A Fisher exact test was used to determine any associations between demographic variables and physician responses. Analyses were conducted with the use of SPSS Statistics (version 21; IBM Corp., Armonk, NY), with a significance threshold of \( P < 0.05 \). This study was deemed to be exempt by the Institutional Review Board.

Results

Three CPP e-mail addresses were returned as invalid, resulting in an adjusted sample size of 242 physicians. Fifty-six physicians (23.1\%) responded. There was an equal distribution of respondents by gender (\( n = 28 \) [50.0\%] each), with a majority being white (\( n = 50; 89.3\% \)) and located in an area with more than 100,000 people (\( n = 35; 62.5\% \)). One-half practiced in family medicine (\( n = 28; 50.0\% \)), and most were affiliated with an academic medical center (\( n = 51; 91.1\% \)). Health systems were the most common type of practice setting (\( n = 28; 50.0\% \)).

Primary beneficial services provided by CPPs included CDTM (\( n = 54; 96.4\% \)), MTM (\( n = 47; 83.9\% \)), and medication affordability assistance (\( n = 36; 64.3\% \); Table 1). The top 3 benefits of working with CPPs were enhanced clinical outcomes (\( n = 49; 87.5\% \)), access to drug knowledge (\( n = 33; 58.9\% \)), and creation of a multidisciplinary model for learners.
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