

Marquette University
e-Publications@Marquette

College of Nursing Faculty Research and
Publications

Nursing, College of

1-1-2005

Medical Students' Knowledge of Midwifery Practice After Didactic and Clinical Exposure

Lisa Hanson

Marquette University, lisa.hanson@marquette.edu

Jackie Tillett

Aurora Sinai Medical Center

Russell S. Kirby

University of Alabama, Birmingham

Accepted version. *Journal of Midwifery & Women's Health*, Vol. 50, No. 1 (January-February 2005):
44-50. DOI. © 2005 Wiley. Used with permission.

Marquette University

e-Publications@Marquette

College of Nursing Faculty Research and Publications/Department of Nursing

This paper is NOT THE PUBLISHED VERSION; but the author's final, peer-reviewed manuscript. The published version may be accessed by following the link in the citation below.

Journal of Midwifery & Women's Health, Vol. 50, No. 1 (2005): 44-50. [DOI](#). This article is © Wiley and permission has been granted for this version to appear in [e-Publications@Marquette](#). Wiley does not grant permission for this article to be further copied/distributed or hosted elsewhere without the express permission from Wiley.

Medical Students' Knowledge of Midwifery Practice After Didactic and Clinical Exposure

Lisa Hanson

College of Nursing, Marquette University, Milwaukee WI

Abstract

Information concerning the student outcomes of interdisciplinary education is limited. The purpose of this study was to identify the knowledge of third-year medical students regarding the practice of certified nurse-midwives (CNMs). A 1-page survey instrument was developed and pretested. The instrument was administered as a pre- and posttest at the beginning and end of 7 Obstetrics and Gynecology rotations at 2 medical school clinical campuses of a large Midwestern medical school. Direct interaction with CNMs improved knowledge of collaborative practice arrangements and roles. This was particularly evident in knowledge areas related to CNM prescriptive authority. The medical students who had direct experience with CNMs expressed more interest in working with them in the future than those who lacked the exposure. Collaborative, interdisciplinary education of medical students appeared to promote improved understanding of roles and capabilities.

INTRODUCTION

Health professionals can learn to collaborate in a number of ways. Frequently, collaboration occurs because systems or circumstances require it. Historically, students from various health care disciplines

have little formal contact with members of other disciplines during their education.¹ Proponents of future-oriented approaches to health professional education have recommended that interdisciplinary collaboration should be an essential component of medical student educational experiences.² Specifically, it was recommended that education programs achieve a 25% target of interdisciplinary educational offerings in their curricula, and that students should independently seek interdisciplinary environments for work and study.² The Council on Graduate Medical Education (CGME)³ further recognized that interdisciplinary education can facilitate collaborative practice and that this practice is essential for the future of health care.

Interdisciplinary education is defined as an educational experience in which a member of 1 profession actively participates in the formal education of another.⁴ For this study, the term interdisciplinary education referred to certified nurse-midwives (CNMs) serving as clinical and didactic faculty for medical students. The purpose of this article is to describe medical students' knowledge of midwifery practice following didactic and clinical exposure to nurse-midwives.

REVIEW OF THE LITERATURE

Interdisciplinary collaborative practice arrangements improve the overall quality of health care services rendered.⁵ Interdisciplinary practice requires shared responsibility and authority, open communication, and joint decision making.⁶⁻⁸ The benefits of collaboration for consumers, practitioners, health care systems, and payers have been de-scribed.⁶ Collaborative approaches to health care are particularly useful in meeting the needs of complex and diverse client populations.⁶⁻⁹ Health care visits can be tailored to meet individual needs by enhancing the focus of specialty practitioners while taking advantage of the complementary expertise of colleagues.⁴ Patient compliance and satisfaction are noted positive outcomes of team approaches to care.¹⁰ Systems and payers, in turn, benefit from improved appointment show rates, increased efficiency, and decreased hospitalizations and emergency room usage.¹⁰ It is for all these reasons that the fourth report of the PEW Health Professions Commission identified the ability to work in interdisciplinary teams as one of the 21 competencies for the 21st century.²

The use of multidisciplinary faculty in medical school education leads to greater understanding and respect within health care teams¹¹ and enhances components of professionalism such as empathy, altruism, and compassion.¹² Examples of multidisciplinary faculty teams who have jointly developed medical school curricula have been published.¹²⁻¹⁴ However, educational outcomes have proved difficult to measure.^{15, 16} Long-term follow-up of graduates would be required to assess the impact of the changes on the future practices of physicians and other professionals.

Graduates of obstetrics and gynecology residencies will likely practice in collaborative teams that include physicians, nurse-practitioners (NPs), physician assistants (PAs), CNMs, and certified midwives (CMs).¹⁷ The concept of working in interdisciplinary teams is best learned during graduate medical education. Specifically, an early introduction to CNMs/CMs during medical education may encourage physicians to seek collaborative practices with mid-wives following graduation.^{9, 18}

Exemplars of well-functioning academic nurse-midwifery service models in the 1990s detailed the role and function of midwives involved in the didactic and clinical education of medical students and residents.¹⁹⁻²¹ Roles as educators are more formalized in practices where CNMs are employed as

faculty in medical schools. However, midwives' teaching roles tend to be less structured when CNMs happen to be in practices at the same institution where medical students rotate for their obstetrician/gynecologist clerkships. Occasionally, these arrangements raise concerns among members of both professions about training “the competition” versus preparing future colleagues. Alternatively, CNMs have the opportunity to participate in creating future physician consultants who understand the midwifery practice role.

Harmon and associates surveyed medical schools in 1994 and described CNMs' participation in undergraduate and graduate medical education.²² More than half (54%) of the 129 allopathic medical schools surveyed used CNM educators formally in their obstetrician/gynecologist clerkships. An additional 18% of the schools were considering adding CNMs to the teaching faculty. It is clear that midwives can continue to have significant involvement in graduate medical education. Most CNMs (80%) who were involved in medical education viewed their participation as congruent with their philosophies of practice. The participation of midwives in the education of future physician collaborators allows opportunities to model the interpersonal skills necessary to work with other providers within the interdisciplinary team.²³ Furthermore, interdisciplinary education promotes learning about the unique contributions of team members from each discipline to the comprehensive mission of the health care system.⁶

Although descriptions of midwives' contributions to graduate medical education have been published,^{22, 24} studies that document student outcomes of midwives' participation are needed. The purpose of this study was to identify the knowledge of third-year medical students about CNMs as a result of exposure to clinical and didactic collaborative education conducted by CNMs. The hypothesis of the study was that medical students who have didactic and clinical educational experiences with CNMs will have greater knowledge of midwifery practice following their rotations.

METHODS

The study was conducted at 2 campuses of a large Midwestern medical school and was approved by the Institutional Review Board of Sinai Samaritan Medical Center, Milwaukee, WI. One medical school campus included CNMs formally in the didactic and clinical education of the third-year medical students during their clinical rotation; the other campus did not. Medical students who were assigned to participate in an obstetrician/gynecologist rotation at the former comprised the experimental group for the study. These students attended an orientation session in which the CNM service and faculty role were discussed. The CNM didactic exposure included two 1-hour lectures (normal antepartum and intrapartum, followed by postpartum management). Clinically, the medical students were assigned to an outpatient clinic for a 4-hour experience each week with 1 of the 11 CNMs throughout the duration of the 6-week rotation. The students were also encouraged to work with the CNM who was on call as a part of 24-hour in-house intrapartum service coverage. Medical students assigned themselves to women during labor, including the CNM clients. CNMs generally required that the medical students participate in labor support and management as well as the actual birth. Medical students were encouraged to work with CNM clients, unless the client declined their participation or if a nurse-midwifery student was already assigned to a particular laboring woman. Actual intrapartum exposure to CNMs was variable among the medical students.

The control group consisted of medical students at the other clinical campus, geographically separated by its location in another city. Although midwives practiced at the facility where the control group medical students had their obstetrician/gynecologist clinical rotations, their clinical experiences did not formally involve midwives as faculty or preceptors.

A 1-page survey instrument was developed to elicit knowledge about the practice of nurse-midwifery. The survey instrument is presented in the [Appendix](#). Because the objective of the investigation was to measure medical students' knowledge of nurse-midwifery practice, norm-referenced items were developed to represent areas of midwifery practice that the students would likely be exposed to during their clinical rotations. Examples included CNM roles in management of second-stage labor and prescribing pharmacologic therapies. Items were also developed to measure students' knowledge of collaborative practice. The questions were constructed in a fixed-choice, true or false format for ease of use and comparison between groups of students. Survey questions were carefully reviewed by the research team and then pilot tested with department faculty, staff, and students to ensure common meanings. The instrument was pretested with 1 medical student to ensure clarity of wording.

The paper and pencil pre- and posttests were administered to all third-year medical students before and after their 6-week obstetrician/gynecologist clinical rotations for a 1-year period by a medical school staff person who explained the purpose of the study. Participation was optional, and students indicated consent to participate by completing the instrument. Pre- and posttests were matched and compared for each student by use of a unique identification number.

Student pre- and posttest responses on the 2 tests were compared within and between groups to identify differences in knowledge concerning CNM practice. Descriptive statistics were used for the analysis of the paired comparisons. Statistical comparisons were performed by using the χ^2 test or Fisher's exact test as appropriate, while interval level comparisons were performed with student's t test for difference of means. Statistical analyses were performed by using SAS V9.0 for Windows. All tests were performed by using $P < .05$, two-tailed.

RESULTS

Sixty-one medical students entering a third-year clerkship were assigned an obstetric rotation at the experimental site, and 63 students completed rotations in the control site. Identical tests were administered to the students at the start and finish of each rotation. In the experimental group, 47 of the 61 students completed both tests. A total of 14 students in the experimental group and 19 in the control group either failed to complete both tests or provided insufficient information for their tests to be linked anonymously. Students whose tests were incomplete did not differ from those who completed both tests in age, gender, or prior experience with nurse-midwives. Analyses were conducted by using only the study subjects who completed both the pre- and posttests.

The experimental group and the control group were similar in demographic composition and prior exposure to CNMs ([Table 1](#)). No student in either group had prior exposure to CNMs. During the study period, students in the control group had no CNM lectures during their rotations, and only 1 had a single clinical experience with a CNM. Experimental group students experienced 2 CNM lectures and averaged 5 weekly 4-hour clinical experiences with CNMs during the 6-week rotation.

Table 1. Demographic Characteristics of Experimental and Control Groups

	Experimental Group (n = 47)	Control Group (n = 44)	P Value
Age (y), mean (SD)	24.9 (1.9)	25.8 (3.8)	.17
Gender (%)			.37
Female	38	48	
Male	62	52	

Comparison Between Groups

Pretest results revealed that both the experimental and control group of students were aware that CNMs independently manage normal birth; that they practice in collaboration with physicians (including obstetricians and family practice physicians); that CNMs can teach medical students how to manage normal birth; and that they believed that birth was a normal process. The analysis of pretest responses to the 5 questions concerning CNMs' use of pharmacotherapeutics (prescriptive authority, analgesia, anesthesia, oxytocin, and contraception) revealed that both groups of students had minimal baseline knowledge in these areas.

There were 11 significant differences between the post-test responses of the experimental group compared with the control group on the 22 true or false questions, including the specifics about CNMs' use of pharmacotherapeutics (Table 2). Two of these significant differences were specific to second-stage management (“The second stage best shortened by strong pushing efforts” and “CNMs' cut and repair episiotomies”). The remaining comparisons revealed that significantly more of the students in the experimental group became aware of CNMs' collaborative practice arrangements and capabilities (e.g., CNMs provide prenatal care to adolescents). In addition, the experimental group maintained their awareness that CNMs work in collaboration with obstetricians and family practice physicians, whereas the control groups' understanding of this declined on the posttest. Control group students ended their rotations with a significantly lowered expectation that CNMs could teach the management of normal birth, whereas the students in the experimental group did not demonstrate any decline on this measure.

Table 2. Pre- and Posttest Responses to Knowledge of Certified Nurse-Midwife (CNM) Practice

Knowledge Area From Question on Instrument	Pretest			Posttest		
	Control Group (n = 44) n (%)	Experimental Group (n = 47) n (%)	P Value	Control Group (n = 44) n (%)	Experimental Group (n = 47) n (%)	P Value
Physicians must be present for CNM-attended births.	2 (4.5)	2 (4.3)	.95	2 (4.5)	0 (0.0)	.23
Physicians are ultimately responsible for the care that CNMs provide.	15 (34.1)	22 (46.8)	.22	12 (27.3)	25 (53.2)	<.05
Birth is a normal process.	42 (95.5)	46 (97.9)	.54	40 (90.9)	46 (97.9)	.15
The second stage of labor is best if it is shortened	11 (25.0)	5 (10.6)	.07	25 (56.8)	16 (34.0)	<.05

Knowledge Area From Question on Instrument	Pretest			Posttest		
	Control Group (n = 44) n (%)	Experimental Group (n = 47) n (%)	P Value	Control Group (n = 44) n (%)	Experimental Group (n = 47) n (%)	P Value
with strong pushing efforts.						
Episiotomy preserves the woman's perineum.	11 (25.0)	13 (27.7)	.77	6 (13.6)	13 (27.7)	.11
CNMs write prescriptions.	15 (34.1)	22 (46.8)	.22	15 (34.1)	44 (93.6)	<.001
CNMs provide prenatal care to adolescents.	36 (81.8)	41 (87.2)	.48	32 (72.7)	42 (89.4)	<.05
CNMs conduct cesarean births.	1 (2.3)	2 (4.3)	.99	1 (2.3)	1 (2.1)	.99
CNMs cut and repair episiotomies.	28 (63.6)	19 (40.4)	<.05	26 (59.1)	38 (80.9)	<.05
CNMs work in collaboration with obstetricians and family practice physicians.	42 (95.5)	46 (97.9)	.54	37 (84.1)	46 (97.9)	<.05
CNMs most often conduct home birth.	17 (38.6)	16 (34.0)	.65	9 (20.5)	4 (8.5)	.11
CNMs prescribe epidurals.	13 (29.5)	11 (23.4)	.51	15 (34.1)	34 (72.3)	<.001
CNMs provide all contraceptive methods and services.	23 (52.3)	29 (61.7)	.36	20 (45.5)	40 (85.1)	<.001
CNMs can bill directly.	36 (81.8)	37 (78.7)	.71	40 (90.9)	42 (89.4)	.80
CNMs can teach medical students how to manage a normal birth.	42 (95.0)	47 (100.0)	.23	36 (81.8)	47 (100.0)	<.01
CNMs care for women with private insurance.	41 (93.2)	44 (93.6)	.93	41 (93.2)	44 (93.6)	.93
CNMs prescribe labor analgesia.	25 (56.8)	26 (55.3)	.88	27 (61.4)	47 (100.0)	<.001
CNMs care only for "low-risk" women.	15 (34.1)	16 (34.0)	.99	23 (52.3)	25 (53.2)	.93
CNMs augment labor with oxytocin.	15 (34.1)	19 (40.4)	.54	18 (45.5)	43 (91.5)	<.001
CNMs use only the modified lithotomy position.	2 (4.5)	5 (10.6)	.28	5 (11.4)	4 (8.5)	.65
Most CNMs have a master's degree.	35 (79.5)	43 (91.5)	.11	37 (84.1)	45 (95.7)	.07

Knowledge Area From Question on Instrument	Pretest			Posttest		
	Control Group (n = 44) n (%)	Experimental Group (n = 47) n (%)	P Value	Control Group (n = 44) n (%)	Experimental Group (n = 47) n (%)	P Value
Desire to work with CNMs in the future.	39 (98%)	42 (91%)	.91	32 (80%)	42 (91%)	.08

Comparison Within Groups

Comparisons of pretest and posttest results within each group were examined to view trends in knowledge change (Table 3). There were 2 changes within the control group and a total of 8 changes within the experimental group that reached statistical significance ($P < .05$). In the control group, there was a decline in the number of students who believed that CNMs were able to teach medical students how to manage a normal birth. Significantly more students in both groups believed that the second stage is best shortened via strong pushing efforts at the end of the obstetric rotation. More students in the experimental group believed that CNMs can cut and repair episiotomies, augment labor with oxytocin, prescribe epidurals and labor analgesia, write prescriptions, and provide all contraceptive methods and services on the posttest. Furthermore, there was a significant decrease in the misstatement that most CNM-attended births occur at home in this group.

Table 3. Pre- and Posttest Comparisons Within Groups

Knowledge Area From Question on Instrument	Control Group			Experimental Group		
	Pretest (n = 44) n (%)	Posttest (n = 44) n (%)	P Value	Pretest (n = 47) n (%)	Posttest (n = 47) n (%)	P Value
Physicians must be present for CNM-attended births.	2 (4.5)	2 (4.5)	.99	2 (4.3)	0 (0.0)	.49
Physicians are ultimately responsible for the care that CNMs provide.	15 (34.1)	12 (27.3)	.49	22 (46.8)	25 (53.2)	.54
Birth is a normal process.	42 (95.5)	40 (90.9)	.41	46 (97.9)	46 (97.9)	.99
The second stage of labor is best if it is shortened with strong pushing efforts.	11 (25.0)	25 (56.8)	<.01	5 (10.6)	16 (34.0)	<.01
Episiotomy preserves the woman's perineum.	11 (25.0)	6 (13.6)	.18	13 (27.7)	13 (27.7)	.99
CNMs write prescriptions.	15 (34.1)	15 (34.1)	.99	22 (46.8)	44 (93.6)	<.001
CNMs provide prenatal care to adolescents.	36 (81.8)	32 (72.7)	.31	41 (87.2)	42 (89.4)	.75
CNMs conduct cesarean sections.	1 (2.3)	1 (2.3)	.99	2 (4.3)	1 (2.1)	.99
CNMs cut and repair episiotomies.	28 (63.6)	26 (59.1)	.66	19 (40.4)	38 (80.9)	<.001
CNMs work in collaboration with obstetricians and family practice physicians.	42 (95.5)	37 (84.1)	.08	46 (97.9)	46 (97.9)	.99

Knowledge Area From Question on Instrument	Control Group			Experimental Group		
	Pretest (n = 44) n (%)	Posttest (n = 44) n (%)	P Value	Pretest (n = 47) n (%)	Posttest (n = 47) n (%)	P Value
CNMs most often conduct home birth.	17 (38.6)	9 (20.5)	.07	16 (34.0)	4 (8.5)	<.01
CNMs prescribe epidurals.	13 (29.5)	15 (34.1)	.65	11 (23.4)	34 (72.3)	<.001
CNMs provide all contraceptive methods and services.	23 (52.3)	20 (45.5)	.52	29 (61.7)	40 (85.1)	<.05
CNMs can bill directly.	36 (81.8)	40 (90.9)	.22	37 (78.7)	42 (89.4)	.17
CNMs can teach medical students how to manage a normal birth.	42 (95.0)	36 (81.8)	<.05	47 (100.0)	47 (100.0)	.99
CNMs care for women with private insurance.	41 (93.2)	41 (93.2)	.99	44 (93.6)	44 (93.6)	.99
CNMs prescribe labor analgesia.	25 (56.8)	27 (61.4)	.67	26 (55.3)	47 (100.0)	<.001
CNMs care only for "low-risk" women.	15 (34.1)	23 (52.3)	.09	16 (34.0)	25 (53.2)	.07
CNMs augment labor with oxytocin.	15 (34.1)	18 (45.5)	.51	19 (40.4)	43 (91.5)	<.001
CNMs use only the modified lithotomy position.	2 (4.5)	5 (11.4)	.24	5 (10.6)	4 (8.5)	.73
Most CNMs have a master's degree.	35 (79.5)	37 (84.1)	.58	43 (91.5)	45 (95.7)	.41
Desire to work with CNMs in the future.	39 (98%)	32 (80%)	.06	42 (91%)	42 (91%)	.99

DISCUSSION

These results suggest that direct involvement with CNMs during the obstetric rotation enhanced medical student knowledge of the roles and skills that CNMs provide. The most dramatic findings were in the areas of CNM prescriptive authority. Medical students in the experimental group gained knowledge of CNMs' ability to prescribe labor analgesia, anesthesia, and oxytocin, whereas the control group did not.

This finding suggests that the medical students gained awareness of the interventions performed or ordered by CNMs in 1 hospital setting. A variety of researchers have found that CNMs use medical interventions less frequently for intrapartum management than other groups of providers, such as physicians.²⁵⁻²⁷ Although CNMs have prescriptive authority in the state where this study took place and prescribe agents such as analgesia, anesthesia, and oxytocics, these are considered interventions that CNMs reserve for situations where indications exist.

Questions related to episiotomy and the second stage of labor were included because these were emphasized in the didactic content that the CNM lecturers presented to the medical students in the experimental groups. The 2 groups of medical students differed in responses to only 1 question on the

pretest concerning use and repair of episiotomy in CNM practice. Significantly more of the students in the experimental group learned about CNMs' role in episiotomy and repair than those in the control group, despite the fact that the episiotomy rate in the practice at the time of the study was 6.6%.

Unfortunately, more students in both groups ended their obstetrician/gynecologist rotations believing that forceful pushing efforts were beneficial; however, the percentage was larger in the control group who lacked exposure to CNMs. In addition, the medical students in the experimental group appeared not to have been influenced by CNM didactic and clinical education in second-stage management. This finding occurred despite an intrapartum lecture on physiologic management principles and clinical experiences that modeled evidence-based approaches to the management of second-stage labor, such as the use of open-glottis, bearing down efforts. The medical students' view on second-stage management may reflect an approach to care they observed that was based on long-standing traditional views among faculty physicians and nursing staff who were highly influential on medical students' learning outcomes. Research is needed to further characterize the process of how evidence-based practice becomes the standard of care.

An additional benefit of exposure to midwives during medical students' rotations was made clear when the change in knowledge within each group was analyzed. Significantly more of the experimental group students indicated on the posttest that CNMs can teach medical students, whereas fewer students in the control group reported that this was true following their rotations. This finding supports the hypothesis that exposure to midwives benefits medical students' knowledge of midwifery practice and the CNM role as interdisciplinary educators.

Both the experimental and control groups expressed a desire to work with CNMs at the pretest (91% vs 98%, respectively). Students in both groups maintained a high level of interest in working with CNMs following their obstetrician/gynecologist rotations. However, a comparison of the posttest scores of the experimental and control groups revealed that the scores for the experimental remained the same (91%), whereas the control groups' score declined (98% to 91%). This finding supports the notion that exposure to CNMs is beneficial to the development of future collaborative relations. The students in the experimental group also exhibited an improved understanding of collaborative practice relationships between CNMs and physicians and knowledge of CNMs' academic preparation. These findings warrant further investigation and suggest that both professions could benefit from participation in interdisciplinary education.

This study was limited by the use of a small number of medical students from a single medical school and reflects the care practices in these 2 institutions only. Therefore, the findings may not be generalizable to other populations and settings. More investigations on the outcomes of collaborative education using an expanded instrument administered to larger groups of diverse medical students are indicated. A tool that contains items based on expected outcome criteria for collaborative education would be especially useful in future studies. Further investigation is necessary to explain the finding that medical students seemed to have learned most about CNMs' use of pharmacotherapeutics. If used in the future, the instrument would be improved by the inclusion of alternative and complementary approaches used in midwifery practice. In addition, validity testing of the instrument would strengthen future investigations. Items that highlight the unique family-centered philosophy of midwifery practice would also improve the instrument. For example, a 20-item survey that addressed physician-nurse interactions, including authority, autonomy, responsibility, collaborative decision making, and role

expectations was administered to 208 first-year medical students and 86 nursing students in a baccalaureate program.²⁸ The construct validity and reliability of the instrument were demonstrated statistically. This instrument measuring physician and nurse attitudes toward collaboration may be useful when developing tools for future investigations concerning collaborative education.

Additional studies that include quantifications of 1) exposure to CNMs; 2) unique details (i.e., rotations, curricula, campus organization, and the development of faculty and clinical preceptors); and 3) the attitudes of medical students toward nonphysician educators would add to the body of knowledge in this area. Exploration of the unique short-term and long-term learning outcomes that medical students achieve from interdisciplinary education will help support the future of collaborative practices that include midwives.

The Network of CNM Educators of Medical Students and Residents was formed in 1992 and meets at each American College of Nurse-Midwives (ACNM) annual meeting. ACNM members may join the medical student and resident instructor list server through eMidwife, a group e-mail discussion that allows members to exchange information in a peer-to-peer forum. Access is available on the ACNM web site.²⁹ In addition, a resource guide for midwives interested in collaborative practice has been published.³⁰

The findings of this study highlight the need to focus medical students' attention to the process of care rather than only the technical skills required to manage low-risk labor and birth. Students' exposure to the midwifery process of care, where trust in normal labor and birth is protected and valued, will hopefully enhance their care to women and families during their education and future practices. On the basis of this study and other sources, physicians who work with midwives during medical school and residency are more likely to seek professional collaborative practice teams that include midwives following graduation.^{18, 22} The involvement of midwives in the education of future physicians may assist in the growth of midwifery practices and opportunities.

Balancing the needs of midwifery students with medical students is an ongoing challenge that educators in academic settings face. Creative efforts, in which educators structure settings so that midwifery and medical students experience interdisciplinary clinical education together, have promise as potential solutions and are methods to meet the CGME goals³ for collaborative education. Ultimately, the impact of midwives' involvement in medical education will benefit the women and families who will be served by better-prepared collaborative practitioners.

This study was funded by a research grant from the UW Area Health Education Center (AHEC).

References

- ¹ Pellegrino E. Educating for the health team. Washington (DC): National Academy of Sciences Report, 1972.
- ² O'Neil EH. Pew Health Professions Commission. Recreating health professional practice for a new century. San Francisco (CA): Pew Health Professions Commission, 1998.

- ³ Council on Graduate Medical Education. COCME physician workforce policies: Recent developments and remaining challenges in meeting national goals. Washington (DC): U.S. Department of Health and Human Services Administration, 1999.
- ⁴ Fitzpatrick JJ. Building community: Developing skills for intraprofessional health professions education and relationship-centered care. *J Nurse Midwifery* 1998;43:61–5.
- ⁵ Greiner AC, Knebel E. Health professions education: A bridge to quality. Washington (DC): Institute of Medicine, 2003.
- ⁶ Keleher KC. Collaborative practice: Characteristics, barriers, benefits, and implications for midwifery. *J Nurse Midwifery* 1998; 43:8–11.
- ⁷ Taylor JS. Collaborative practice within the intensive care unit: A demonstration. *Intensive Crit Care Nurs* 1996;12:64–70.
- ⁸ Coluccio M, Maguire P. Collaborative practice: Becoming a reality through primary nursing. *Nurs Adm Q* 1983;7:59–63.
- ⁹ King T, Shah MA. Integrated midwife-physician practice: Obstetric Darwinism? *J Nurse Midwifery* 1998;43:55–60.
- ¹⁰ Baldwin DC. Some historical notes on interdisciplinary and interprofessional education and practice in health care in the U.S.A. *J Interprof Care* 1996;10:173–87.
- ¹¹ Collings K, Goodman B. The influence of multidisciplinary faculty on interprofessional learning. *J Interprof Care* 2003;17: 305–6.
- ¹² Shapiro J, Rucker L. Can poetry make better doctors? Teaching the humanities and arts to medical students and residents at the University of California, Irvine, College of Medicine. *Acad Med* 2003;78:953–7.
- ¹³ Norris TE, House P, Schaad D, Mas J, Kelday JM. Student providers aspiring to rural and underserved experiences at the University of Washington: Promoting team practice among the health care professions. *Acad Med* 2003;78:1211–6.
- ¹⁴ Lock E. A workshop for medical students on deafness and hearing impairments. *Acad Med* 2003;78:1229–34.
- ¹⁵ Mattick K, Bligh J. Interprofessional learning involving medical students or doctors. *Med Educ* 2003;37:1008–11.
- ¹⁶ Barret G, Greenwood R, Ross K. Integrating interprofessional education into 10 health and social care programmes. *J Interprof Care* 2003;17:293–301.

- ¹⁷ Howard FM, Leppert PC. Reaction of residents to a teaching collaborative practice. *J Nurse Midwifery* 1998;43:38–45.
- ¹⁸ VandeVusse L, Hanson L. Nurse-midwife and physician collaboration: Improving opportunities to work towards a healthier Wisconsin. *Wis Med J* 1997;96:25–9.
- ¹⁹ Afriat C. Nurse-midwives as faculty preceptors in medical student education. *J Nurse Midwifery* 1993;38:349–52.
- ²⁰ Sedler K, Lyndon-Rochelle M, Castillo YM, Craig EC, Clark N, Alber L. Nurse-midwifery service model in an academic environment. *J Nurse Midwifery* 1993;38:241–5.
- ²¹ Angelini DJ, Afriat CI, Hodgman DE, Closson SP, Rhodes JR, Holdredge A. Nurse-midwifery prototypes. Development of an academic nurse-midwifery service program: A partnership model between medicine and midwifery. *J Nurse Midwifery* 1996;41:236–42.
- ²² Harman PJ, Summers L, King T, Harman TF. Interdisciplinary teaching: A survey of CNM participation in medical education in the United States. *J Nurse Midwifery* 1998;43:27–37.
- ²³ Stapleton SR. Team building: Making collaborative practice work. *J Nurse Midwifery* 1998;43:12–8.
- ²⁴ Quinlivan JA, Black KI, Peterson RW, Kornman LH. Differences in learning objectives during labour ward clinical attachment between medical students and their midwifery preceptors. *Med Educ* 2003;37:913–20.
- ²⁵ Oakley D, Murray ME, Murtland T, Hayashi R, Andersen HF, Mayes F, Rooks J. Comparisons of outcomes of maternity care by obstetricians and certified nurse-midwives. *Obstet Gynecol* 1996;88: 823–9.
- ²⁶ Rooks JP. Evidenced-based practice and its application to childbirth care for low-risk women. *J Nurse Midwifery* 1999;44:355–69.
- ²⁷ Gabay M, Wolfe SM. Delivering better childbirth experiences: A consumer's guide to nurse-midwifery. Washington (DC): Public Citizen Research Group, 1995.
- ²⁸ Hojat M, Fields SK, Veloski JJ, Griffiths M, Cohen MJM, Plumb JD. Psychometric properties of an attitude scale measuring physician-nurse collaboration. *Eval Health Prof* 1999;22:208–20.
- ²⁹ American College of Nurse-Midwives. eMidwife discussion list of nurse-midwifery faculty involved in education. [cited September 15, 2003]. Available from: <http://www.midwife.org/membership/midwife.cfm>.
- ³⁰ Miller S, King T. Collaborative practice: A resource guide for midwives. *J Nurse Midwifery* 1998;44:66–73.

APPENDIX. The Medical Student Knowledge of CNMs Instrument

Identification # _____

1. I have had _____ lectures given by certified nurse-midwives (CNMs).

2. I have worked with CNMs _____ times in a clinical setting.

Please answer the following True/False Questions. Circle your response.

3. Physicians must be present for the births that CNMs attend. T/F

4. Physicians are ultimately responsible for the care that CNMs provide. T/F

5. Birth is a normal process. T/F

6. The second stage of labor is best if it is shortened with strong pushing efforts. T/F

7. Episiotomy preserves the woman's perineum. T/F

8. CNMs write prescriptions. T/F

9. CNMs provide prenatal care to adolescents. T/F

10. CNMs conduct cesarean sections themselves. T/F

11. CNMs cut and repair episiotomies. T/F

12. CNMs work in collaboration with obstetricians and/or family practice physicians. T/F

13. CNMs most often conduct home birth. T/F

14. CNMs prescribe epidural anesthesia in labor. T/F

15. CNMs provide all contraceptive methods and services. T/F

16. CNMs can bill directly for their services. T/F

17. CNMs can teach medical students how to manage a normal birth. T/F

18. CNMs care for women with private insurance. T/F

19. CNMs prescribe analgesia in labor. T/F

20. CNMs care only for "low-risk" women. T/F

21. CNMs augment labor with oxytocin. T/F

22. CNMs only conduct birth in the modified lithotomy position. T/F

23. Most CNMs are educated at the master's level. T/F

24. The word midwife means _____.

25. I would consider working with a CNM in the future. T/F