Effect of a long-term-care rotation on the University of Toledo physician assistant students' knowledge of geriatrics and attitudes toward the elderly

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Effect of a Long-Term-Care Rotation on The University of Toledo Physician Assistant Students’ knowledge of Geriatrics and Attitudes Toward the Elderly

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Dedication:

**Eliane Simpson:**

No amount of words can express the depth of my heartfelt gratitude to you. I will be forever indebted to you for your unending sacrifice, for giving up your job to care for Selom and Sedem so I could have peace of mind to concentrate on school work. You are a gift from above.

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Introduction

The size of the elderly population is growing gradually with an increase in life expectancy. In 1900, 4.1% of the U.S population was over the age of 65; in 2010, that number increased to 13%, and is projected to reach 20.2% by the year 2050. (Administration on Aging, 2010) This means that by the year 2050, one in five Americans will be over the age of 65. As a result, learning to provide medical care for the elderly is paramount and should be an integral part of physician assistant (PA) education and training. The PA profession emerged in the mid-1960s to alleviate a problem of primary care physician shortage (American Academy of Physician Assistants [AAPA], 2011). Physician assistants are health care professionals who practice medicine as part of a team with physicians; they are licensed, certified or registered to practice medicine. They deliver a broad range of medical and surgical services, including conduct physical exams, diagnose and treat illnesses, order and interpret tests, counsel on preventive health care, assist in surgery, and prescribe medications (AAPA). Our changing demographics highlight the need for practitioners in geriatrics, as the elderly population is currently underserved. Thus, PA educators and programs should lay additional emphasis on geriatrics training to keep in line with the reason for which the profession was established. As stated earlier, that reason is to alleviate a problem of physician shortage and provide healthcare to underserved populations.

Secondly, in addition to the increasing numbers of the elderly, care for the elderly is generally more costly. The elderly use a disproportionately large amount of medical services because most of their health problems are chronic, requiring continuous care
over a lifetime. Because of this, there is a pressing need to increase geriatric education in PA programs as well as in other programs for physician extenders if healthcare costs are to be contained. For example, it costs less for HMOs to employ the services of a PA compared to their physician counterparts. The recent (2009/2010) efforts to health reform has sought to contain the rising healthcare costs among other things. This will be impossible without strengthening the healthcare foundation, which in my opinion is primary care. In addition, because one in every five Americans will be 65 years and older by 2050, more emphasis should be put on the geriatrics aspect of primary care than has been in the past.

There is a desperate need for more geriatricians in the United States. Population growth and aging are estimated to increase the workload of adult primary care practitioners by 29% from 2005 to 2025, but the number of adult primary care practitioners is estimated to grow by only 2 to 7 percent, projections expected to lead to estimated shortages of 35,000 to 44,000 adult primary care practitioners (Bodenheimer & Pham, 2010). The situation gets grimmer when we consider the geriatrics sub-specialty because only a small percentage of practitioners want to focus on geriatric medicine. An anticipated 36,000 geriatricians will be needed by 2030, whereas the absolute number of geriatricians actually decreased from 9,256 in 1998 to 6,435 in 2005.(Hirth, Eleazer, & Dever-Bumba, 2008) Despite the change in the population’s need, geriatric medicine education has been cited to have the largest education gap by the Centers for Disease Control and Prevention (Varkey, Chutka, & Lesnick, 2006). In their article ‘A brief intensive, clinically focused geriatrics course during the third year of medical school,’ the authors state “The numbers of young physicians seeking
specialized training in geriatrics is inadequate to meet the coming demand or maintain the current workforce. Additionally, there is a coming decline in the numbers of practicing primary care physicians, who are the current providers of most geriatric care. Consequently, future care of older patients will increasingly shift to specialists and subspecialists who did not initially plan for careers in geriatrics (Fisher et al., 2009). Because PAs are going to be seeing a growing number of elderly patients, it is imperative that they have adequate knowledge of geriatrics, and how to care for the elderly, as well as positive attitudes towards their elderly patients. Providing medical care to the elderly requires multidisciplinary teams because most elderly patients have several comorbidities and physician assistants work well in such teams. Interestingly, although 36% of PAs self-report practicing in primary care, only 0.6% report practicing geriatric medicine (AAPA). As noted earlier future care of older patients will increasingly shift to providers who did not initially plan for careers in geriatrics; hence, it will be beneficial for PAs and other care providers to obtain adequate training in geriatrics that will allow them to properly care for elderly patients. The goal of the study is to determine the difference in knowledge of and attitudes towards the elderly among a group of PA students before and after a required four-week geriatric rotation.

Hypothesis

It is hypothesized that a long-term-care rotation will improve PA students’ knowledge of and attitudes toward elderly patients. It should be noted that long-term-care (LTC) rotation is synonymous with geriatric rotation. The University of Toledo Physician Assistant Program refers to its geriatric rotation as LTC rotation.
Null Hypothesis (H₀): There will be no difference in PA students’ knowledge of geriatrics or attitudes towards the elderly after a LTC rotation (α = 0.05).

Alternate Hypothesis (Hₐ): There will be an improvement in PA students’ knowledge of geriatrics and attitudes towards the elderly after a LTC rotation.

If a rotation in geriatrics results in a significant improvement of PA students’ knowledge of geriatrics and attitudes towards the elderly, then perhaps one could make the argument that introducing geriatrics rotations in PA programs would produce PAs who are better prepared to care for the elderly.
Literature Review

A review of the literature revealed few studies on PA’s knowledge of and/or attitudes towards the elderly, however, several studies on this topic conducted with medical students provided relevant content for this review.

In a pilot study to provide an initial assessment of PA students’ interest in geriatric medicine and to analyze how this interest relates to knowledge of aging, attitudes toward the elderly and experience with older adults, (Dacey, Vail, & Tataronis, 2007) surveyed 85 PA students from two separate MPA programs at the conclusion of their professional studies; the two programs had different geriatric exposure and curricula. The survey instruments used included the Palmore Facts on Aging Quiz (FAQ1), Maxwell-Sullivan Attitude Scale-Revised (MSAS), and additional questions to assess experience with older adults and level of interest in geriatrics medicine. They found that knowledge of aging was low among PA students (FAQ1 = 45.8% ± 11.5%), yet commensurate with a level achieved by other health care professional students on the FAQ1. The PA students’ responses on the MSAS showed very positive attitudes toward elderly patients overall, with a mean score of 1.75 ± 0.55 on the 5-point Likert scale. Interest in geriatric medicine was found to be significantly associated with higher knowledge of aging ($r = .23$; $p = .04$), but not with positive attitudes toward aging or prior experience with the elderly. The authors called for PA programs to make an effort to increase knowledge, cultivate student interest and foster alliances that increase the likelihood of PA presence in geriatrics.

(Woolsey, 2007) conducted a survey research of 233 participants to evaluate the attitudes of physician assistant students and practicing PAs toward geriatric patients
and their expressed intents toward practicing geriatric medicine. All study participants were volunteers and were either students currently enrolled in the physician assistant program or alumni. The researchers used a 14-item modified version of the Kogan Old People Scale developed by Reuben and colleagues; four additional questions were added to assess likelihood to practice in geriatric medicine. The author found no difference in attitudes toward the elderly based on age or gender, but found that older PA students and PAs were more likely to practice in geriatric medicine. Because age is not a variable that can be controlled for in the selection of PA students, Woolsey called for PA programs to implement other educational strategies to improve the attitudes and likelihood that their students will choose a career in geriatric medicine.

In another study (Steer, 2010) investigated the attitudes of first-year PA students at Western Michigan University regarding older adults using a modified version of Polizzi’s 2003 Aging Semantic Differential (ASD) in addition to a custom-made Likert-type survey regarding relationships and contacts with older adults; Minimum ASD scores reflects most positive attitude while maximum ASD scores reflects most negative attitude. Thirty-five of the 36 first-year PA students invited to participate in the study completed the ASD and the survey regarding their contact with older adults. The class mean ASD score 2.53 ± 0.46 reflected positive attitudes toward the elderly. Regression analysis using student sex, age, and responses to the questionnaire as independent variables revealed only two significant associations. Students reporting more frequent (weekly) socialization with older adults had more positive attitudes ($\beta=-.330$, $p=0.43$) than those reporting less frequent (yearly) socialization ($\beta=.319$, $p=.050$).
“PA educators could positively impact the health of seniors by augmenting current geriatric knowledge and skills in their training programs (Olson, Stoehr, Shukla, & Moreau, 2003).” The authors conducted a needs assessment of geriatric curriculum in physician assistant education. A Likert scale-based written survey was mailed to 128 PA program directors nationwide, and to 300 practicing PAs and 94 board-certified geriatricians in Arizona. Participants were asked to rate PA program educational needs in 26 geriatric topics and to rate their agreement with statements about methods of delivery of geriatric education for PAs. All groups identified a high need for further PA geriatric education in the topics of polypharmacy, depression, dementia and cognitive assessment. Most participants favored an increase in elective course offerings in geriatrics as the educational modality. PA program directors favored more CME and geriatricians favored the addition of a required clinical rotation in geriatrics.

In her article “Geriatric Medicine and the Future of the Physician Assistant Profession,” (Woolsey, 2005) discusses various topics pertaining to the PA profession such as historical perspectives, health care shortage, barriers to geriatric education, physician assistants and geriatrics, and geriatric training in PA programs. She asserts that care provided by PAs is indistinguishable from the care provided by their physician counterparts and maintains that since PAs often spend more time with individuals than their physician counterparts, they are an asset in geriatric medicine because the elderly frequently require additional time for counseling, explanations, and close follow-up care to ensure compliance with prescriptions and treatment of chronic diseases. The author states that significant effort must be expended to improve the geriatric curriculum offered at PA programs because the healthcare shortage affecting the elderly will only
increase with time; she states “The current growth trends in the elderly population are not being met with an equal growth in the field of health care. This void will only become more noticeable over the next few decades unless action is taken to increase the training of health care providers in the field of geriatrics. PA programs need to implement early positive experiences with the elderly and increasingly incorporate topics on aging across their curricular.” The first five studies reviewed in the literature focused on PA students/PAs as subjects. The subsequent studies are relevant studies using medical students as subjects.

(Kishimoto, Nagoshi, Williams, Masaki, & Blanchette, 2005) conducted a study to evaluate the attitudes and knowledge of medical students, internal medicine residents, and geriatric medicine fellows (GMF) about elderly patients before implementing a new geriatrics curriculum. The study used a revised version of the UCLA geriatrics survey, which included a 16-item Geriatrics Attitude Scale and a 23-item knowledge Scale. The study found that attitudes toward elderly patients were generally positive in all groups. First year medical students scored higher on the attitude scale reflecting their greater enthusiasm upon entering medical school. GMFs achieved the highest attitudes score, probably reflecting the selection bias inherent in being accepted to a geriatric medicine fellowship program. The knowledge test scores on the other hand correlated positively and significantly with level of training; this result was observed despite the lack of an intensive geriatric curriculum and was probably a result of existing patient care experiences and the acquisition of medical knowledge in general. GMFs showed significantly higher knowledge test scores than all the other
groups which is likely a reflection of their higher medical training and keen interest in caring for geriatric patients.

In assessing the effect of a re-designed medical school problem-based learning (PBL) curriculum, (Nagoshi et al., 2008) compared an intervention group consisting of the entire class of 59 medical students entering medical school in 2002 who participated in newly developed educational experiences in geriatrics spanning all of the four years of medical school to a control group consisting of two classes of students who graduated just prior to the intervention group. Outcomes were measured using a threefold approach. First, the efficacy of the curricular changes was evaluated using results of the Association of American medical Colleges (AAMC) Medical School Graduation Questionnaire. Secondly, the UCLA Geriatrics Knowledge Test and Attitudes Scale were used to assess geriatric-specific knowledge and attitudes; the instrument was administered to the intervention cohort ($n=59$) on their first day of medical school and after completion of the forth-year geriatrics rotation. Lastly, a four-station standardized patient examination at the conclusion of the fourth year rotation was used to measure geriatrics clinical skills. Results of the AAMC Medical School Questionnaire used to measure students’ confidence in caring for elderly patients’ showed an increase since implementation of the curriculum. The total score on the knowledge test significantly improved from an average of 5.8 on their first day of medical school to 11.4 at the end of their fourth-year required geriatrics rotation ($p=0.0001$). However, the average knowledge test score for the intervention group (11.4) was significantly lower than for the historical control group (13.9, $p=0.0001$). The average attitude scale scores did not show a significant change; it went from 3.93 on
the first day of medical school to 3.87 at the end of the geriatrics rotation ($p=0.317$), but was significantly higher than for the historical control group (3.72, $p=0.03$). The authors therefore demonstrated an increase in students’ geriatrics knowledge with implementation of the curriculum but not an increase in positive attitudes toward elderly persons. In addition, students’ geriatrics clinical skills as measured by performance on examinations appeared to be higher for the intervention group than historical controls on three of the four clinical scenarios.

In the article “Advancing Geriatrics Education: Evaluation of a New Curricular Initiative,” (Roscoe, Schonwetter, & Wallach, 2005) describe the development of a required one-week curricular program in geriatric medicine for third-year medical students at the University of South Florida and present three years of evaluation data. The curriculum comprised of 28 contact hours over five consecutive days. In addition to didactic sessions, the week-long program featured small group conferences and problem-solving sessions, and an opportunity to experience simulated sensory impairments. Community-dwelling seniors were invited to campus to have lunch with the students and to participate in a panel discussion that covered several topics on aging.

To assess knowledge, a pre- and posttest of knowledge of geriatric medicine concepts were administered; the pretest consisted of 11 short vignettes with four answer choices, while the posttest consisted of a 38-item examination – the 11 pretest items plus 27 other questions – given at the end of the program. In addition because attitudes toward older patients can impact the care provided, students completed pre- and post-attitude assessment scales. Attitude items were adapted from a draft attitude survey developed by colleagues in the Florida Consortium for Geriatric Medical Education based on the
ASD and MSAS. Mean pretest and posttest scores of geriatric knowledge were compared using paired $t$ tests for students enrolled in the program in 2004, while mean pretest and posttest scores on each of the attitude survey items were compared using independent $t$ tests. Paired $t$ tests for the 85 students who completed both the pretest and exam posttest revealed statistically significant improvement in scores. The mean pretest score was $6.48 \pm 1.48$ and the mean posttest score was $9.75 \pm 1.22$. Attitude measures were repeated for two student cohorts one and two years after completion of the program. Independent $t$ tests comparing mean pretest and posttest scores revealed significant improvement in students’ attitudes. The authors concluded that attitudes of medical students and their beliefs about older patients can be significantly improved through a well-designed one-week required geriatrics curriculum.

(Denton et al., 2009) conducted a study to determine the influence of a geriatrics home visit program on medical students’ knowledge, skills, and attitudes towards the care of the elderly. They compared a volunteer control group of 17 students at two different sites to an intervention group of 16 students also at two different sites all within the same third-year internal medicine clerkship at the Uniformed Services University. Volunteer and control group students were each given internet and CDROM-based geriatric self-study materials. In addition, the intervention group students identified a geriatric patient from their clinical experience and performed one ‘home-visit’ to practice geriatrics assessment skills. They also wrote a reflective paper and presented their findings in small group settings. All students including volunteer and intervention groups took a pretest and a posttest to measure any changes in their geriatrics knowledge and attitudes. The researchers concluded that a single geriatrics ‘home-visit’ with reflective
writing improved student attitudes towards the elderly and provided an opportunity to practice geriatric assessment skills. They however acknowledged that all participants including volunteer and intervention groups gained geriatrics knowledge during their internal medicine clerkship.

In another study conducted at the University of Oklahoma, (Struck, Bernard, Teasdale, & Oklahoma University Geriatric Education, 2005) sought to examine the influence of a mandatory geriatric clerkship on third-year medical students. The four-week clerkship included a weekly didactic component, patient encounters and a paper. The impact of the clerkship on students was assessed in three areas: knowledge, skills, and attitude using pre- and post-knowledge tests, student satisfaction surveys and written comments. Knowledge was evaluated using a 33-question pretest and posttest developed by faculty. Faculty evaluation during patient encounters and self-assessment on Likert-like scale regarding improvement in physical examination skills and patient assessment skills were the methods for assessment of student skills. A paired $t$ test on the pre- and post-knowledge test scores showed a significant improvement with the clerkship experience. The overall pretest mean was 21 and posttest mean was 27 out of a possible 33 correct responses. Fifty percent of students agreed or strongly agreed that the clerkship experience assisted them in improving their physical examination skills on self-report. Sixty-six percent of students agreed or strongly agreed that the clerkship enhanced their clinical evaluation and patient assessment skills. In regards to attitudes, 73% of respondents thought that their experience on the clerkship was positive and 63% reported that the clerkship was important to their education as physicians. According to the authors the real success of the clerkship was the positive
attitudes of medical students toward geriatrics when they were not enthusiastic about taking the new clerkship. Even though only 14% of the students indicated an interest in geriatrics as a career choice, almost two-thirds perceived such a course as being important to the educational preparation of a physician.

(Alford, Miles, Palmer, & Espino, 2001) conducted a study to measure the attitudinal impact of a new curriculum that brought first year medical students in sustained contact with healthy older people. The curriculum was the Geriatrics Continuity of Care Track (Geri Track), which consisted of six sessions each with three components: a one-hour didactic presentation by a geriatrician, a visit to an assigned older volunteer, and a response to reflection questions posted on a course website. A locally developed survey instrument that included multiple questions on attitudes and beliefs about providing medical care for older people, knowledge and beliefs about aging, interest in pursuing clinical geriatrics and interest in pursuing aging research, was administered to an intervention group of 204 first-year medical students before and after they participated in the Geri Track. The same survey was also administered to a non-intervention group, the preceding first-year class of 200 students who did not participate in the Geri Track. Four factors were consistently formed in the factor analysis process: attitudes and beliefs about providing medical care for older people, knowledge and beliefs about aging, interest in pursuing clinical geriatrics and interest in pursuing aging research; the last 2 factors are irrelevant to the current study. Paired sample t tests were used to compare variables. Pre- and posttest comparisons showed that beliefs about the tendency of older people to change physically (factor 1) was significantly different from time one (mean = 4.14 ± 0.77) to time two (mean = 4.34 ± 0.76); In
addition, positive responses to items about experiences and comfort with older people (factor 2) also increased significantly from time one (mean = 4.87 ± 0.86) to time two (mean = 5.05 ± 0.73). Comparison of intervention and non-intervention groups also showed significant differences between the two groups on the same two factors; The intervention group agreed significantly more on items in factor 1 (mean = 4.34 ± 0.75) versus (mean = 4.11 ± 0.67) and factor 2 (mean = 5.05 ± 0.73) versus (mean = 4.78 ± 0.87). The authors concluded that the program resulted in an increase in awareness of geriatrics and comfort with older people.

In their study “Improving Medical Students’ Attitudes Toward and Skills with the Elderly,” (Intieri, Kelly, Brown, & Castilla, 1993) evaluated the effect of a six-week experimental gerontology training program. Study participants were third-year medical students at the University of Mississippi Medical Center who rotated through a required six-week block in psychiatry over the course of one academic year. The academic year consisted of two semesters, each with three blocks in psychiatry; each block consisted of twelve to eighteen students. Rotation blocks 1, 3, and 5 received the training program while blocks 2, 4, and 6 were controls in which students completed measures but received no geriatrics instruction. The six-week session consisted of a pre-assessment session in week 1 in which students completed a set of questionnaires followed by four weekly 90-minute group sessions and a posttest session. The posttest included a re-administration of all questionnaires and a behavioral assessment interview with a simulated patient. The Aging Semantic Differential (ASD) was used to measure stereotypes of participants toward older adults; summary scores range from 32 to 224 with lower scores indicating a more positive view of older adults. A 15-minute
videotaped interview of an older adult was used to assess social skills. The authors reported a significant improvement of attitudes for the experimental group – pretest ASD mean was 128.88 ± 25.07 and posttest ASD mean was 118.08 ± 21.32 versus the control group for which pretest ASD mean was 123.90 ± 18.64 and posttest ASD mean was 124.07 ± 18. They also noted that program participants were significantly more skillful in 2 behavioral domains, use of clarifying statements and encouragement of the patient to talk. The authors however reported a lack of significant differences between groups on the FAQ-R.

(Fields, Jutagir, Adelman, Tideiksaar, & Olson, 1992) evaluated the efficacy of a mandatory clinical rotation for fourth-year medical students at the Mount Sinai School of Medicine of the City University of New York. They used a one-group pre- and post-study design with the intervention being the mandatory four-week-long clinical geriatrics clerkship and with students being assigned to one of three clinical sites. The pretest occurred on day one of the rotation and posttest at the conclusion of the rotation. The pre-rotation test of knowledge consisted of a 31-item factual test, while the post-rotation test of knowledge consisted of 85 multiple choice, true-false, and matching questions. For the purposes of comparison the percent score on 31 items in the posttest which were taken from the pretest comprised the post-rotation knowledge score. The ASD scale and a modified version of the Maxwell-Sullivan questionnaire were used to assess attitudes. The pre and post rotation differences in knowledge and attitude scores were first examined by paired t tests and differences in ratings among sites were compared using chi square techniques. Pre-rotation mean scores on the knowledge test was 53.8% ± 10.4, while post-rotation mean score was 72.5 ± 8.9. On the portion of the final
exam which constituted the pretest, paired $t = 17.65$ ($df=113$, $p<0.001$). Because a total score could not be obtained for the Maxwell-Sullivan questionnaire due to how the analysis was performed, only pre-post differences on individual items were studied. Most views did not vary over the clerkship; only two of the seven items used varied significantly pre- and posttest. The mean pre-rotation ASD score was 130.5 ± 19.2 and the mean post-rotation ASD score was 126.6 ± 18.7; Paired $t=1.45$ ($df=110$, and $p$=non-significant). The authors therefore concluded that the rotation resulted in a dramatic increase in students' knowledge of geriatric medicine, but an insignificant change in attitudes toward the elderly.

What does this all mean? As shown in the review of the literature, a well-designed intervention in geriatric medicine can improve students' knowledge of geriatric medicine and attitudes toward the elderly, although there is still some debate as to what constitutes the best intervention program. For example in one of the articles reviewed, while PA program directors favored more CME, geriatricians favored the addition of a required clinical rotation in geriatrics. There is plenty of evidence to suggest that there is a desperate need of geriatricians in the United States and there is a general consensus that the growth trends in the elderly population are not being met with an equal growth in the field of healthcare. As a result several authors have called for PA programs to implement strategies that will improve their students' knowledge about geriatrics medicine and their ability to provide care to the elderly, as well as to foster more positive attitudes towards geriatric patients.
Methods

Study Site & Participants

The Department of Physician Assistant Studies under the College of Medicine at the University of Toledo Health Science Campus was the primary site of this study. The survey was administered to the class of 2011 of the University of Toledo Physician Assistant Studies Program after approval by the Institutional Review Board of the University of Toledo. The class size was 32 including the co-investigator, hence, a total of thirty-one surveys were administered. Twenty-five of the 32 students (78%) were female, while the remaining seven students (22%) were male. All 31 students who agreed to complete the pretest signed consent forms prior to completing the survey. Participants were informed that taking part in the study was voluntary and that refusal to participate or discontinue participation was without penalty and would not affect future relations with the principal or co-investigators, or with The University of Toledo. Of the 31 students who completed the test, one did not complete the Geriatrics Attitude Scale section of the pretest and therefore responses from this participant will be excluded in the data analysis.

Data collection instruments

The survey instrument consists of two parts; a Geriatric Knowledge Questionnaire and a Geriatrics Attitude Scale.

Knowledge about geriatrics was assessed using a 20-item questionnaire developed by the principal investigator. One of the questions had 9 sections requiring
participants to match one word to another. Thus, the analysis was performed on 28 questions in total. The questionnaire was designed to assess participants’ knowledge of disease processes of the elderly and clinical assessment tools used in the elderly; it was developed using material from the SLU GEMS (St. Louis University Geriatric Evaluation Mnemonics and Screening Tools) hand book. The questionnaire was later tested among a small group of PA students by the physician mentoring the geriatric clinical rotation for the PA Department and most of them answered similarly.

Students’ attitude towards the elderly was assessed using the UCLA Geriatrics Attitudes Scale for Primary Care Residents (Reuben et al., 1998). Permission was obtained from the authors to use the survey instrument. The instrument is a 14-item Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument development used cross-sectional and longitudinal studies at an academic medical center. The 14 items were selected from a pool of 37 items administered to the 121 participants in the study: 96 residents of the UCLA internal medicine (n=72) and family medicine (n=24) programs, 14 geriatrics fellows, and 11 geriatrics faculty members. The instrument demonstrated high reliability (Cronbach’s alpha = .76) and known-groups and construct validity. The instrument was then cross-validated with 96 subjects of a different year group, none of whom participated in the initial study. The subjects included 62 internal medicine residents, 16 family medicine residents and 18 first-year geriatrics fellows. Cross validation results supported the reliability and validity of the instrument and longitudinal data showed significantly different trends of attitude changes among groups of residents and fellows over a 2-year period. Nine of the 14 items were worded in a negative direction with the remaining 5 items worded in a
positive direction. The negatively-worded items were reversed before they were used in the calculation.

**Study Intervention**

The intervention was the required four-week LTC rotation. This rotation was integrated into the curriculum for PA students in the Fall of 2010. The participants in the study were the first students required to complete this rotation. In previous years, students in the PA program have been required to shadow a care provider (e.g. physician, nurse practitioner, PA, nurse aide) at a nursing home for two weeks during their didactic year and submit a typed complete history and physical examination on a patient of their choice as an assignment to the program. Now in addition to that, students are to complete the required four-week LTC rotation.

The goal of this rotational experience is to teach the physician assistant student how to gather information on geriatric patients in different settings - assisted living facility, nursing home and geriatric outpatient clinic – and to learn to manage the common disorders and diseases in older adults. The objectives of this clinical rotation are summarized as follows:

- Outline evidence-based preventive care recommendations for the elderly.
- Describe effective components of home visitation.
- Recognize when a patient is ready for referral to a nursing home.
- Describe effective components of nursing home visits.
- Counsel patients on advance health care directives.
- Demonstrate how to screen for depression, delirium, dementia and malnutrition.
• Outline management of common conditions, such as dementia, delirium, polypharmacy, urinary incontinence, hypertension, congestive heart failure, osteoarthritis, osteoporosis, malnutrition, depression, hearing and vision defects, pressure ulcers, falls, sleep disorders, chronic benign pain and constipation.

During the rotation, students participate in independent and team visits with the patients. The rotation is coordinated by the geriatrician (who is also the principal investigator), and other members of the health provider team including a nurse practitioner, residents, and fellows. Hence all of the aforementioned people served as clinical preceptors throughout the rotation. During independent visits, the student is required to complete clinical decision making inclusive of assessments, diagnoses, and potential management plan. A discussion with the appropriate team member(s) follows. The student together with the preceptor then goes back to see the patient to ensure that the preceptor agrees with the student’s findings. When students saw patients with the preceptor, the preceptor allowed the student to perform part of the physical exam and/or history taking. Clinical experiences occurred at 3 different nursing homes/assisted living facilities in addition to the geriatrics clinic where the geriatrician saw patients.

Each student was also provided with the SLU GEMS (St. Louis University Geriatric Evaluation Mnemonics and Screening Tools) hand book and other reading materials on the first day of the clinical rotation and encouraged to read them. The handbook contains several tools used to assess different conditions in the elderly.
Study design & data collection

The study design used was that of a one-group pre-test – post-test design. Uncontrolled threats to validity in this design include, but are not limited to maturation and testing. The more clinical rotations a student has had, the broader his/her knowledge base is expected to be. Thus, students who had LTC as their last rotation would have improved their knowledge base from other rotations by the time they did their LTC rotation. Secondly, it is possible for students to commit specific questions on the pretest to memory and look up the answers in hopes of answering those questions correctly on the posttest.

The two-part survey questionnaire was administered to each student on the first day of their four-week LTC rotation, and again on the last day of the rotation. Students were placed in groups of four for all clinical rotations; hence, each four-week LTC rotation consisted of four students. The faculty investigator, who was also the preceptor, administered the pretest survey questionnaire to students after the voluntary nature of the study was explained and a signed consent form was obtained. Time was provided during the first clinical experience for completion of the questionnaire before any teaching was done. This was to ensure that responses on the questionnaire reflected students’ knowledge prior to the LTC rotation. Students were given thirty minutes to complete the questionnaire and all students were able to complete it within the allotted time. The questionnaire was administered as a paper and pencil questionnaire. To ensure participant confidentiality, all questionnaires were coded and the key to the codes was stored in a locked computer in the faculty investigator’s office. The faculty investigator also administered the posttest survey questionnaire on the last day of the
rotation; however, due to work load, his administrative assistant was asked to administer the posttest questionnaire to the last two groups consisting of eight students on their last day of clinical rotation respectively.
Results

Data were analyzed to address the following hypothesis:

Null Hypothesis (H₀): There will be no difference in PA students’ knowledge of geriatrics or attitudes towards the elderly after a LTC rotation (α = 0.05)

Alternate Hypothesis (Hₐ): There will be an improvement in PA students’ knowledge of geriatrics and attitudes towards the elderly after a LTC rotation.

Data for the pretest and posttest scores for the knowledge test and attitudes scale for 30 students were complete. This represents 94% of the student class that served as the population for this study. Data for one student was eliminated due to non-completion of the pre-rotation attitude questionnaire. The author is a member of this class and did not complete the posttest questionnaires. Data were analyzed using SPSS. A total score for the pre- and post-knowledge test was computed and percentage correct answers calculated. For the attitudes questionnaire the scores on negatively worded items were reversed and an average score was calculated. Descriptive statistics was computed and t-tests were calculated to address the hypothesis.

Knowledge

All the 30 students who were included in the analysis saw an improvement in knowledge after the LTC rotation. The overall pretest mean was 14.07 ± 3.24 (50.24%) and the overall posttest mean was 21.53 ± 3.16 (76.90%) out of a possible 28 (100%) points. Refer to Table 1 for the distribution of the pre- and post-knowledge percent
scores for the subjects. Paired \( t \)-tests for the scores of the 30 students who completed both the pretest and posttest showed a statistically significant improvement in knowledge scores. The mean change in knowledge percent score after completing the LTC rotation was 26.67 (\( p < 0.05 \)). Refer to Table 2 for the results of the paired \( t \)-test.

**Attitude**

The overall pretest mean was 3.71 ± 0.37 and the overall posttest mean was 3.75 ± 0.42. Refer to Table 3 for the distribution of the pre- and post-attitude mean scores for the subjects. Of the 30 students who were included in the analysis, 17 had more favorable attitude towards the elderly, 2 saw no change in attitude, while the remaining 11 had less favorable attitude towards the elderly after completing the LTC rotation. Paired \( t \)-tests showed no statistically significant improvement in favorable attitudes toward the elderly after the LTC rotation. The mean change in attitude score after completing the rotation was 0.04 (\( p = 0.46 \)). Refer to Table 4 for the results of the paired \( t \)-test.

This study supported the hypothesis that there would be an improvement in PA students’ knowledge of geriatrics after a four-week rotation in LTC. The study however did not support the hypothesis that there would be an improvement of PA students’ attitude toward the elderly after a four-week rotation in LTC.
Discussion

Knowledge gains

A four-week rotation in geriatrics resulted in a dramatic increase in PA students’ knowledge of the elderly. Knowledge of PA students about the elderly was initially low, with an average of 50.23% on the Geriatrics Knowledge Questionnaire answered correctly. This is comparable to scores achieved by PA students in a pilot study conducted by (Dacey, et al., 2007) to provide an initial assessment of PA students’ interest in geriatric medicine and to analyze how this interest relates to knowledge of aging. In that study, PA students’ knowledge of the elderly was low with an average of 45.8% of questions answered correctly. It is worth noting however that the Palmore FAQ was used in that study and that reported percentage scores allows for a reasonable comparison of the two studies to be made.

Based on previous studies conducted with PA students and medical students, it was hypothesized that PA students’ knowledge of and attitude toward the elderly would improve after a rotation in LTC. Kishimoto (2005) in a study showed that knowledge test scores using the UCLA Geriatrics Knowledge Test correlated positively and significantly with level of training, and thus Geriatrics Medicine Fellows showed significantly higher knowledge test scores reflecting their higher training in geriatrics compared to all other groups studied. Roscoe (2005) showed a significant acquisition of knowledge about geriatric medicine after a one-week curricular program in geriatric medicine for third-year medical students using a paired $t$ test; knowledge scores improved from 6.48 ± 1.48 to 9.75 ± 1.22 out of a possible 11 points. In the study conducted by (Struck, et al.,
2005), a mandatory geriatric clerkship for 3rd-year medical students resulted in a significant gain in knowledge of geriatric medicine based on performance on a pre- and posttest. Test scores increased from 21 before the clerkship to 27 after the clerkship out of a possible 33 points. Similarly, there was an 18.7% increase in mean geriatric knowledge (p < 0.001) after a mandatory 4th-year geriatrics clerkship (Fields, et al., 1992).

Data from the current study strongly suggests that a 4-week rotation in geriatrics can improve PA student’s knowledge about medical care for the elderly; knowledge scores increased from 50.23% before the LTC rotation to 76.90% after the rotation (α = 0.05, p = 0.001).

**Attitude changes**

The current study did not support the hypothesis that a rotation in LTC will improve PA students’ attitudes towards elderly patients; the mean change in attitude test score after completing the rotation was 0.04 (p = 0.46). Attitude scores can range from 1 (more negative attitude) to 5 (more positive attitude). Attitudes toward the elderly among study participants were generally high with a mean score of 3.71 ± 0.37 before the LTC rotation. Similar findings of positive attitudes of PA students toward the elderly were shown in studies conducted by Dacey (2007) and by Steer (2010). Although there was no significant change in attitudes, one could argue that students started the rotation with a positive attitude toward the elderly and hence there was no apparent bias toward the elderly to overcome. In fact when looking at the raw data, of the 30 subjects
included in the analysis, 17 saw some improvement in attitudes, 2 saw no change and the remaining 11 had less favorable attitudes towards the elderly.

**Limitations**

There are certain limitations in this study. First, the study design was that of a one-group pre-test- post-test design with poor generalizability. Secondly, the study population was small with only 32 participants; thus, the small sample size and study participants being from a single PA program means the results may not necessarily be representative of all PA students. In addition, it is possible for students to memorize specific questions on the pretest with the intention of finding the answers to those questions; in this case, knowledge gains cannot be attributed to the study intervention. Lastly, the validity of the study instrument is questionable. The instrument used to assess students’ knowledge was developed by the principal investigator using material from the St. Louis University Geriatric Evaluation Mnemonics and Screening Tools handbook and tested in only a small number of PA students. It would be interesting to see if a similar study using a more validated instrument such as the Geriatrics Knowledge Test for Medical Students developed by (Lee, Wilkerson, Reuben, & Ferrell, 2004) would produce different results.
Conclusion

The results presented in this study demonstrate that PA students’ knowledge of geriatrics can be significantly improved through a well-designed four-week LTC rotation. As stated earlier, the size of the elderly population is growing gradually with an increase in life expectancy and by the year 2050, one in five Americans will be over the age of 65. Since the demand for geriatricians far outweighs supply, care for the elderly will have to be provided by other specialists and practitioners who did not intend to practice geriatric medicine in the first place. Hence, even if PA students were not considering geriatric practice, it would be beneficial for them to receive the appropriate training that better prepares them to care for the elderly. PAs have the potential to be more involved in providing care to the elderly and to help meet the increasing demands of the elderly population. Based on this study, it is recommended that PA programs incorporate a rotation in geriatrics/long-term-care to help increase PA students’ geriatrics-specific knowledge and to better prepare them to provide care to their elderly patients.
References


### Table 1. Frequency statistics for Geriatrics Knowledge Test – percent score pre- and post-rotation

<table>
<thead>
<tr>
<th></th>
<th>Pre rotation %</th>
<th>Post rotation %</th>
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</thead>
<tbody>
<tr>
<td>Number of subjects</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Mean</td>
<td>50.24</td>
<td>76.90</td>
</tr>
<tr>
<td>Median</td>
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<td>78.57</td>
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<tr>
<td>Mode</td>
<td>53.57</td>
<td>78.57</td>
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<tr>
<td>Standard deviation</td>
<td>11.56</td>
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<tr>
<td>Minimum score</td>
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<td>Maximum Score</td>
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### Table 2. Paired samples test of knowledge

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<th>Pair</th>
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<td></td>
<td>Lower</td>
</tr>
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<td>Pair 1</td>
<td>Pre knowledge %</td>
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</table>

*significant, p < 0.05
Table 3. Frequency statistics for Geriatrics Attitude Scale – pre- and post-rotation

<table>
<thead>
<tr>
<th></th>
<th>Pre rotation</th>
<th>Post rotation</th>
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<tbody>
<tr>
<td>Number of subjects</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Mean</td>
<td>3.71</td>
<td>3.75</td>
</tr>
<tr>
<td>Median</td>
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<tr>
<td>Mode</td>
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<tr>
<td>Standard deviation</td>
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<tr>
<td>Minimum score (reflects most negative attitude)</td>
<td>2.79</td>
<td>2.71</td>
</tr>
<tr>
<td>Maximum Score (reflects most positive attitude)</td>
<td>4.29</td>
<td>4.36</td>
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</table>

Table 4. Paired samples test of attitude

<table>
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<tr>
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<td>Mean</td>
<td>95% Confidence Interval</td>
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<tr>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Pair 2</td>
<td>Pre attitude mean</td>
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<td></td>
<td>Post attitude mean</td>
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Abstract

Objective: The purpose of this study was to evaluate the effect of a four-week geriatrics rotation on PA students’ knowledge of geriatrics and attitude toward the elderly.

Methods: Final year PA students from the University of Toledo participated in a study that involved completing questionnaires before and after the rotation. The questionnaires included a 20-question geriatrics knowledge test and a 14-question UCLA Geriatrics Attitudes Test. Results: PA students’ knowledge of geriatrics increased significantly after the rotation. Paired t-tests showed a mean change in knowledge percent score of 26.67 (p < .05). Although attitudes toward the elderly remained unchanged after the rotation, it should be noted that students had favorable attitudes prior to the rotation. The mean change in attitude score was 0.04 (p = .46).

Conclusion: A four-week geriatrics rotation will significantly improve PA students’ knowledge of geriatric medicine thus; PA programs should consider incorporating such a rotation in their curriculum.