Effects of a Geriatric Clinical Skills Training on Attitudes of Medical Students

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Abstract

**Background:** Physicians’ attitudes, knowledge and skills are important determinants of quality of care for older patients. Previous studies showed that it is difficult to improve attitudes by educational interventions. So far, no study assessed the effect of a skills-oriented educational intervention on attitudes towards elderly patients.

**Methods:** This study evaluated the effect of a geriatric clinical skills training (CST) on attitudes of medical students in their first year of clinical training at the University of Bern. The geriatric CST consisted of four 2.5-hour teaching sessions covering important domains of geriatric assessment (e.g., cognition, mobility) and self-preparation with a textbook. Students’ attitudes were the primary outcome and assessed in a quasi-randomized manner either before or after the geriatric CST using the 14-item University of California at Los Angeles Geriatrics Attitudes Scale (UCLA-GAS).

**Results:** Overall, 154 medical students participated. The median UCLA-GAS overall scale was 49 (interquartile range 44–53) in students evaluated before and 51 (interquartile range 47–54) in students evaluated after the geriatric CST (median difference 2, 95% confidence interval 0–4, P=0.062). Of the four validated UCLA-GAS subscales, the resource distribution subscale was significantly higher in students evaluated after the geriatric CST (median difference 1, 95% confidence interval 0–2, P=0.005).

**Conclusions:** This study shows that teaching aimed at skills has the potential to improve medical students’ attitudes towards elderly patients. Future studies should investigate whether the implementation of attitude building elements might enhance the positive effect of skill-oriented educational interventions on medical students’ attitudes.
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Key Words

Aged; education; students, medical; attitude.
Background

Suboptimal care for older patients can result from negative physicians’ attitudes towards elderly persons [1, 2]. Therefore, it is important to improve physicians’ attitudes in this regard. A wide variety of studies examined the effect of attitude and knowledge building educational interventions on medical students’ attitudes towards older adults [3-18]. These studies provided evidence that attitude and knowledge building educational interventions may improve medical students’ attitudes, but positive effects were inconsistently found and effect sizes were small. As educational interventions may not only be targeted at improving attitudes or knowledge, but also at training skills, the question arises whether a skills-oriented educational intervention has better effects on attitudes.

A recent study systematically reviewed educational interventions to improve attitude, knowledge, and skills of medical students in geriatric medicine [19]. This systematic review concluded that skills-oriented interventions have been poorly investigated and further research is necessary to confirm the efficacy of skills-specific teaching strategies in geriatrics. Some previous studies used skills as an outcome measure of their investigation, but not as main target for intervention [10, 11, 20]. To the best of the authors’ knowledge, no previous study assessed the effect of a geriatric skills-oriented educational intervention with real patients on attitudes of medical students. We therefore examined whether a geriatric clinical skills training (CST) has a favorable effect on attitudes of medical students.
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Methods

Setting and participants

The University of Bern is one of six medical schools in Switzerland providing clinical teaching. Medical school lasts 6 years (2 years preclinical and 4 years clinical training). There are between 150 and 200 medical students per class (i.e., per year) at the University of Bern. CST in different specialties is an integral component of medical students’ first year of clinical training. All medical students in their first-year clinical training of the academic year 2011 – 2012 at the University of Bern were eligible for participation in this study. This study was performed in accordance with the Declaration of Helsinki and has been approved by the local ethics committee.

Intervention

The intervention was a geriatric CST which consisted of four 2.5-hour teaching sessions and self-preparation with a textbook which was distributed before the first teaching session. Each teaching session started with a 45-minute interactive introduction to the session topic. After this, the medical students continued the teaching in small groups of four to five students with real patients at the patients’ bedside and under supervision of a clinician experienced in geriatric medicine. The four teaching sessions covered the following topics: activities of daily living and cognition during the first session; mobility and social situation during the second session; nutrition, medication, urinary and fecal continence, and screening of hearing and vision during the third session; and, a complete geriatric assessment as repetition and consolidation during the fourth session. Only validated instruments were used (e.g., Mini...
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Mental State Examination [MMSE] or Basic Activities of Daily Living [BADL]) [21-24]. The textbook contained detailed instructions on how to perform and how to interpret these instruments.

Assessment of attitude and knowledge

Attitude and knowledge were assessed with the use of a questionnaire. For the assessment of attitude, the questionnaire contained a German translation of the University of California at Los Angeles Geriatrics Attitudes Scale (UCLA-GAS) [25]. The English version was translated into German and re-translated in English for validation. Only one item („The federal government should reallocate money from Medicare to research on AIDS or pediatric diseases.“) was slightly adapted to the cultural situation in Switzerland. For the assessment of knowledge, the questionnaire contained four questions elaborated by a didactic expert group. Each question had to meet the following prerequisites: 1) the question was related to a domain covered in the CST training; and, 2) the question was answerable after reading the textbook provided to medical students before the first teaching session. The following three multiple-choice questions were selected. First, the medical students had to rate a given numerical sequence according to the instructions for the calculation task of the MMSE [21]. Second, they had to rate a pentagon drawing according to the instructions for the corresponding task of the MMSE [21]. Third, they had to select among five suggested activities which one did not belong to the BADL [22]. In a fourth question, the medical students had to estimate how much time is required to perform a MMSE and a clock drawing test in clinical routine. In addition to attitude and knowledge, the questionnaire also assessed medical students’ age and sex.
The students were informed that by completing the questionnaire they consented to participation in this study including an anonymized analysis of their answers. Depending on the geriatric CST round, the questionnaire was alternatingly administered at the beginning of the first session or at the beginning of the last session. Thus, each individual medical student answered the questionnaire only once, either at the beginning of the first session or at the beginning of the last session. As the medical students were allocated to the CST rounds in alphabetical order based on their family names, they completed the questionnaires before or after geriatric CST in a quasi-randomized manner.

**Assessment of skills**

Geriatric skills were assessed using an objective structured clinical examination (OSCE) at the end of the academic year. The OSCE involved standardized patient actors as well as standardized evaluation forms. The OSCE was mandatory for all medical students who wanted to proceed to the next year of medical education. The OSCE comprised a circuit of 12 stations to test different medical specialty areas of which one was geriatrics. This study only reports the results from the geriatrics station. OSCE results were analyzed by an independent academic institution at the University of Bern. For setting the pass mark, the borderline regression method was used [26].

**Outcomes**

The primary outcome of this study was the UCLA-GAS overall scale as well as its four validated subscales (i.e., compassion subscale, resource distribution subscale, medical care subscale, and social value subscale) in students evaluated after geriatric CST as compared to
students evaluated before geriatric CST [25]. As secondary outcomes, knowledge and skills before and after geriatric CST were evaluated.

**Data Analysis**

Firstly, we analyzed the frequency of missing values among participating medical students. Data were complete, except for five single items of the UCLA-GAS. According to the low missing frequency, missing variables were imputed by its highest frequency value [27].

Secondly, we descriptively analyzed the results of the questionnaire and the OSCE. Descriptive analyses included counts and percentages for categorical variables and median values with their interquartile range (IQR) for continuous variables. For the UCLA-GAS, the summary scores for the overall scale and its four subscales were calculated [8, 25]. Based on the summary score for the overall scale, medical students were dichotomized in two groups: students with positive attitude (score ≥42) vs. students with negative attitude (score <42) [7].

Answers to the three knowledge-oriented multiple-choice questions were rated as correct or incorrect (i.e., rating of the numerical sequence and the pentagon drawing of the MMSE as well as determination of the activity not belonging to BADL). A knowledge score was calculated as sum of correct answers to the three knowledge-oriented multiple-choice questions (range 0 to 3). Based on the knowledge score, medical students were dichotomized in two groups: students with good knowledge (score ≥2) vs. students with little knowledge (<2). Finally, characteristics between groups were compared by Pearson’s chi-squared test for binary variables and by the Wilcoxon ranksum test for scores. Tests were two-sided. Differences and confidence intervals (CI) in scores from the Wilcoxon test were derived from Hodges-Lehmann estimates [28]. The Hodges-Lehmann estimate is defined as the median of all possible score differences between two independent groups. Differences were calculated
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Data were analyzed with Stata 12.1 (StataCorp LP, College Station, TX, USA).

Results

Participants

A flow chart is shown in Figure 1. There were totally 154 medical students attending the first-year clinical training during the academic year 2011 – 2012. Of these, seven students (4.8%) did not complete the questionnaire, resulting in 147 students (95.2%) who participated in the study. Of these, 71 students (48.3%) were evaluated before and 76 students (51.7%) after the geriatric CST.

The mean age of evaluated students was 22.9 ± 2.1 years (maximum range 20 to 36 years). There were 90 women (61.6%). There were no significant differences in age or sex between students evaluated before and students evaluated after the geriatric CST.

Attitude

The median difference of the UCLA-GAS overall scale was 2 points (95% CI 0 – 4, P = 0.062), indicating a higher score in students evaluated after the geriatric CST (Table 1). The nearly significant increase in the overall scale was the consequence of a significant improvement in the resource distribution subscale (Table 1).
Knowledge

The median difference in the knowledge score was 2 points (95% CI 0 – 2, P < 0.001), indicating a significantly higher score after the geriatric CST (Table 1). After the geriatric CST, more students correctly rated the pentagon drawing of the MMSE (28.2% before and 65.8% after the geriatric CST, P < 0.001) and correctly identified the activity not being part of BADL (56.3% before and 86.8% after the geriatric CST, P < 0.001). The proportion of students correctly rating the numerical sequence of the MMSE calculation task was already high before the geriatric CST (76.1%) and was not significantly different from the proportion of students after the geriatric CST (67.1%). Students evaluated after the geriatric CST estimated the time needed for an MMSE and clock drawing test significantly lower than students evaluated before the geriatric CST (difference in time estimation -5 minutes, 95% CI -10 – 0 minutes, P < 0.001) (Table 1).

Skills

One student was unable to participate in the OSCE, resulting in a total of 153 medical students (99.4%) who underwent the OSCE. Of all participating students, 131 students (85.6%) successfully passed the geriatrics station of the OSCE.
Discussion

This study shows that a brief skills-oriented educational intervention has the potential to improve medical students’ attitudes towards elderly patients. Presumably, the implemented training with real patients at the patients’ bedside contributes to a change of negative and reinforcement of positive attitudes. This study also shows that the observed effect size on students’ attitudes is small and that it is easier to improve knowledge or skills. The authors believe that this is the first study which assessed the effect of such an educational intervention on attitudes of medical students and that this study therefore contributes to current evidence.

The observed increase in the UCLA-GAS overall scale of two points is small. The question arises whether this increase is relevant. Several previous studies used the UCLA-GAS for the evaluation of attitude change by a teaching intervention in medical students and reported an improvement [5, 8, 15]. In these studies the improvement in the overall scale ranged between 1.12 and 2.52 points, and, thus, was similar to our study. According to these studies’ findings and conclusions, we believe that the change observed in our study is relevant. This is further supported by the following observations. First, some participating medical students already had favorable attitudes before the geriatric CST [8, 25]. Because of the ceiling effect, it is difficult to achieve an improvement in these students by any intervention. Therefore, in a mixed population of students with positive and negative attitudes, even a small change of the UCLA-GAS is of importance. The small change indicates that the proportion of students with negative attitudes decreases, something we also observed in our study. Second, the improvement in the overall scale was attributable to a highly significant improvement in the resource distribution subscale. Therefore, in the case of statistically significant improvements only in part of the UCLA-GAS subscales, even a statistically non-significant improvement of
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The UCLA-GAS overall scale may be of great relevance. We find interesting that some subscales improved and others not. We believe that the modifiability of the different UCLA-GAS subscales by a teaching intervention should be evaluated in future studies.

The effects of the geriatric CST on knowledge and skills were evident. The knowledge score significantly improved by the teaching intervention along with a pronounced decrease of students with little knowledge. Furthermore, a vast majority of students succeeded in the OSCE. As none of the students had any experience in geriatric clinical skills before the geriatric CST, the OSCE result documents that the teaching intervention successfully imparted clinical skills. We believe that this secondary outcome adds to current literature [19, 29-33].

This study has limitations. First, our study was performed at one academic institution and several teachers with their own attitudes were involved. This limits generalizability of our findings. Second, the two groups might not be fully comparable because we used alternation and alphabetical order of family name (quasi-randomization) for assignment to evaluation before or after the geriatric CST. However, for age and sex no difference between the two groups was found.

Conclusions

This study shows that a geriatric skills-oriented educational intervention at the patients’ bedside has the potential to positively affect medical students’ attitudes towards elderly patients. However, in comparison to the impressive improvements of medical students’
knowledge and skills, the observed improvement of attitudes was small. Therefore the question arises whether the implementation of attitude building elements might enhance the effect of the geriatric CST on medical students’ attitudes in the future.
Competing interests

All authors declare that they have no competing interests.

Authors’ contributions

AOG, AES and AWS designed the study, acquired data, elaborated the analysis plan, and drafted the manuscript. AS and YDS acquired data. AM performed the statistical analysis. All authors discussed the results and critically revised the drafted manuscript. All authors read and approved the final manuscript.

Acknowledgment

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References


Figure legends

Figure 1. Flow Chart. CST, clinical skills training.
### Table 1. Attitude and Knowledge of Medical Students Before and After the Geriatric Clinical Skills Training (CST).

<table>
<thead>
<tr>
<th></th>
<th>Students evaluated before geriatric CST&lt;sup&gt;a&lt;/sup&gt; (N = 71)</th>
<th>Students evaluated after geriatric CST&lt;sup&gt;a&lt;/sup&gt; (N = 76)</th>
<th>Difference (95% CI)&lt;sup&gt;b&lt;/sup&gt;</th>
<th>P-Value&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
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<tbody>
<tr>
<td><strong>Attitude</strong></td>
<td></td>
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<tr>
<td><strong>UCLA-GAS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Overall scale</td>
<td>49 (44 – 53)</td>
<td>51 (47 – 54)</td>
<td>2 (0 – 4)</td>
<td>0.062</td>
</tr>
<tr>
<td>- Compassion subscale</td>
<td>14 (13 – 15)</td>
<td>14 (12 – 16)</td>
<td>0 (-1 – 1)</td>
<td>0.963</td>
</tr>
<tr>
<td>- Resource distribution subscale</td>
<td>16 (14 – 17)</td>
<td>17 (15 – 18)</td>
<td>1 (0 – 2)</td>
<td>0.005</td>
</tr>
<tr>
<td>- Medical care subscale</td>
<td>11 (10 – 14)</td>
<td>12 (10 – 13)</td>
<td>0 (0 – 1)</td>
<td>0.390</td>
</tr>
<tr>
<td>- Social value subscale</td>
<td>7 (6 – 9)</td>
<td>8 (7 – 9)</td>
<td>0 (0 – 1)</td>
<td>0.405</td>
</tr>
<tr>
<td>Students with negative attitude</td>
<td>12 (16.9%)</td>
<td>6 (7.9%)</td>
<td>NA</td>
<td>0.096</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge score</td>
<td>1 (-1 – 1)</td>
<td>1 (1 – 3)</td>
<td>2 (0 – 2)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<sup>a</sup> Students evaluated before and after the geriatric clinical skills training.

<sup>b</sup> Difference in scores (95% confidence interval).

<sup>c</sup> P-value for the difference in scores.

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<table>
<thead>
<tr>
<th>Students with little knowledge</th>
<th>32 (45.1%)</th>
<th>15 (19.7%)</th>
<th>NA</th>
<th>0.001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated time needed to perform a MMSE and a clock drawing test in minutes</td>
<td>30 (20 – 30)</td>
<td>20 (15 – 30)</td>
<td>-5 (-10 – 0)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; CST, clinical skills training; MMSE, Mini Mental State Examination; UCLA-GAS, University of California at Los Angeles Geriatrics Attitudes Scale.

a Values are medians with interquartile ranges or numbers with percentages.

b Difference with 95% confidence interval (CI) based on Hodges-Lehmann estimate.\(^3\)

c P-Value from two-sided Wilcoxon ranksum test.

NA = not available.
154 medical students in their first-year clinical training attended the geriatric CST during the academic year 2011/2012 at University of Bern

154 were quasi-randomized to questionnaire completion before or after geriatric CST

76 were assigned to evaluation before geriatric CST

- 5 did not complete the questionnaire

71 were evaluated with questionnaire before geriatric CST

78 were assigned to evaluation after geriatric CST

- 2 did not complete the questionnaire

76 were evaluated with questionnaire after geriatric CST