

The Knowledge-Attitude Dissociation in Geriatric Education: Can It be Overcome?

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Abstract

Introduction: A knowledge-attitude dissociation often exists in geriatrics where knowledge but not attitudes towards elderly patients improve with education. This study aims to determine whether a holistic education programme incorporating multiple educational strategies such as early exposure, ageing simulation and small group teaching results in improving geriatrics knowledge and attitudes among medical students. **Materials and Methods:** We administered the 18-item University of California Los Angeles (UCLA) Geriatric Knowledge Test (GKT) and the Singapore-modified 16-item UCLA Geriatric Attitudes Test (GAT) to 2nd year students of the old curriculum in 2009 (baseline reference cohort, $n = 254$), and before and after the new module to students of the new curriculum in 2010 (intervention cohort, $n = 261$), both at the same time of the year. **Results:** At baseline, between the baseline reference and intervention cohort, there was no difference in knowledge (UCLA-GKT Score: 31.6 vs 33.5, $P = 0.207$) but attitudes of the intervention group were worse than the baseline reference group (UCLA-GAT Score: 3.53 vs 3.43, $P = 0.003$). The new module improved both the geriatric knowledge (UCLA-GKT Score: 34.0 vs 46.0, $P < 0.001$) and attitudes (UCLA-GAT Score: 3.43 vs 3.50, $P < 0.001$) of the intervention cohort. **Conclusion:** A geriatric education module incorporating sound educational strategies improved both geriatric knowledge and attitudes among medical students.

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Key words: Asian medical school, Geriatrics attitudes, Geriatrics knowledge, Under-graduate medical student

Introduction

Consistent with the worldwide trend of increasing life expectancy, the elderly population is projected to increase exponentially in both developed and developing countries. As outlined by the Report of the Second World Assembly on Ageing, the education and training of healthcare professionals who are competent and comfortable to care for older adults have been identified as one of the priority directions for governments.¹ This is especially pertinent to Asian populations which currently have some of the fastest growing aged populations in the world.² For instance, in Singapore, the proportion of persons over 65 years will increase from 8.4% in 2005 to 18.7% in 2030.³ This demographic transition will further accentuate the epidemiological transition towards chronic diseases and neurodegenerative conditions like dementia.⁴

As future physicians will spend an increasing proportion

of their time caring for older patients, there is a compelling argument for improving the quality of geriatrics education in medical schools. However, the medical curriculum in many Asian medical schools does not adequately prepare students to meet the complex, specialised and rapidly changing needs of older adults.^{4,6} For instance, Matsuse et al⁷ previously reported that undergraduate geriatric medicine education in Japan focuses on the theoretical aspects of the ageing process and diseases in the elderly but lacks attention to the practical aspects of care. Obstacles to the development of proper geriatrics-specific teaching in the undergraduate curriculum include the lack of awareness and negative stereotyping of health-related issues of older adults, the absence of a coherent national strategy for geriatric medicine teaching and training, the shortage of trained faculty, lack of governmental support, and insufficient evidence supporting the inclusion of the geriatric curriculum

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in medical schools.^{4,5} Moreover, unlike other disciplines where it may be possible to adopt a “model” curriculum from elsewhere with relative ease, the geriatrics curriculum needs to be country-specific and should incorporate each country’s unique demographic, economic, and sociocultural context. A range of geriatrics-specific medical education curricula guidelines exists, including those from the British Geriatrics Society,⁸ American Geriatrics Society,⁹ and European Union.¹⁰ However, there are considerable variations between medical schools in terms of the timing (early vs later exposure), duration (ranging from hours to 3 years), teaching strategies (didactic vs experiential), setting (focused module vs clerkship; community vs hospital environment), and assessment methods employed.^{4,11,12}

The results from studies evaluating the impact of geriatric education in improving knowledge and attitude have been inconsistent.⁵ Notably, some studies reported a curious knowledge-attitude dissociation, whereby an undergraduate geriatrics education intervention improved knowledge without a corresponding amelioration in negative attitudes.^{13,14} Furthermore, there is a poor correlation between greater geriatrics knowledge and improvement in attitudes towards elderly patients.¹³ Uncertainties also exist about whether an experiential approach is superior to a didactic approach in improving knowledge and attitudes towards geriatric patients.¹⁴ Encouragingly, in recent years, there has been mounting evidence to suggest that educational strategies can improve student attitudes towards geriatric patients. These include earlier exposure to geriatric medicine in the undergraduate curriculum,⁵ longer duration (months or years rather than hours or days),¹⁵ ageing simulation,^{16,17} and exposure to healthy older adult mentors as opposed to ill elderly patients in a clinical environment.¹⁸ The objective of this study is to determine whether a holistic education programme incorporating multiple educational strategies results in improving both geriatrics knowledge and attitudes among medical students.

Materials and Methods

Context

The Yong Loo Lin School of Medicine at the National University of Singapore admits about 260 students yearly after high school education. Medical students undergo a uniform education for the first 2 years before rotating to different clinical sites within Singapore from the 3rd year onwards. Recently, the curriculum underwent a major revision and the new curriculum was implemented in 2008. The revised undergraduate curriculum is characterised by population orientation, early patient contact, and increased emphasis on ethical and professional behaviour and sociological aspects of medicine.

In the old curriculum, geriatric medicine was taught only in final (5th) year of the undergraduate curriculum where students were rotated to geriatric medicine. During the recent curriculum revision, a 2-week Foundations in Geriatric Medicine module was developed as part of the Geriatric Medicine blueprint which aims to integrate the learning of geriatrics throughout the entire undergraduate curriculum. After completion of this foundation module, students subsequently receive a bedside tutorial in performing a comprehensive geriatrics assessment on elderly inpatients under the supervision of geriatricians prior to the commencement of formal ward rotations in the 3rd year. Students’ learning in the foundation module is summatively assessed at the end of the second year.

Description of the Module

The module aims to provide the foundation for competent and compassionate care of older adults through didactic and experiential components. This was developed by a multidisciplinary team comprising geriatricians, a community rehabilitation physician, a pharmacologist with special interest in elderly care, a public health physician, a pathologist, an ethicist, an educationist, a dentist with special interest in elderly care, and a dietician. We reviewed existing geriatric-specific medical education curricula guidelines including those from United Kingdom,⁸ United States,⁹ and European Union.¹⁰ We defined our own learning outcomes after taking into consideration the needs of our local population (Table 1). We decided to use multiple educational strategies including large group teaching, small group interactive workshops/tutorials, and small group discussion.¹⁶⁻¹⁸ Table 2 details the topics covered.

A highlight of the module is the use of ageing simulation workshops to enhance experiential learning of key topics in geriatric medicine. The workshops aimed at sensitising students to the process of ageing. For instance, students are asked to wear translucent glasses (simulating cataracts) and apply masking tapes at the tip of the fingers (simulating peripheral neuropathy) before topping up pill boxes with 12 different colored mints (simulating 12 different medications with different dosing frequencies) and prepare micro-syringes of water (simulating insulin). Thereafter, students were asked to share their experiences with one another in their small group. In addition, students also had the opportunity to elicit a cognitive history and perform locally validated assessment tools such as the Abbreviated Mental Test and Geriatric Depression Score on their colleagues and appreciate the challenges and limitations of their administration. Students also learned the common problems associated with ageing such as dementia, depression and delirium through interactive case discussion. Ambulatory aids and appliances are provided for each small group for

Table 1. Learning Outcomes and Core Competencies in the New Foundations in Geriatric Medicine Module

• Acquire knowledge of the demography and epidemiology of ageing, including the growth in numbers of older people and heterogeneity the older population;
• Recognise the scientific basis of geriatric medicine and the differences in medical care of older patients;
• Develop foundational competencies in performing important aspects of a geriatric assessment including assessments of cognition, function, and gait;
• Assess and manage a geriatric patient from a multidisciplinary and multidimensional point of view;
• Recognise and appreciate physiologic diversity and its clinical significance in elderly patients;
• Establish the interactions between medical diagnoses, functional impairment, and medications;
• Interact with patients and their caregivers using a bio-psycho-social approach;
• Develop a clear understanding of important basic ethical principles governing care of elderly patient;
• Become an advocate of successful ageing;
• Explore healthcare services for the elderly and healthcare financing for the elderly with specific reference to Singapore.

hands-on experiential learning and their use was discussed in the context of specific diseases.

Descriptions of Instruments

We used the University of California Los Angeles (UCLA) Geriatric Knowledge Test (GKT) to assess knowledge and the Singapore-modified 14-item UCLA Geriatric Attitudes test (GAT) to assess attitudes.

The UCLA-GKT is a knowledge assessment instrument that determines the level of core knowledge and understanding of important geriatric concepts and conditions.^{21,22} The UCLA-GKT has 2 sections: the first section has 8 statements and respondents are required to choose ‘True, False, or Don’t Know’; the second section contains 10 single-best answer, scenario-based multiple choice questions. For the first section, 1 mark was awarded for the correct answer, zero marks for ‘Don’t Know’ and minus 1 mark for the incorrect answer. For the second section, 1 mark was awarded for the correct answer and zero marks for incorrect answers. The maximum score is 18 and scores are usually reported as a percentage. The psychometric properties of UCLA-GKT have been described in prior studies with reported Cronbach alpha values of 0.71 to 0.80.^{21,22} As an expert panel, we determined 3 questions in the original UCLA-GKT were unsuitable for our local situation. These questions were amended as follows: Question 3: ‘18%’ and ‘Singapore’ instead of ‘20%’ and ‘US’ respectively (answer remains False); Question 5: ‘Most Singaporeans have sufficient funds in

Table 2. List of Teaching Methodologies and Topics in the New Foundations in Geriatric Medicine Module

Large Group Teaching
• Ageing and society
• Approach to the older person
• Principles of geriatric medicine
• Theories of ageing and human longevity
• Macro and microscopic organ changes
• Physiology of ageing and functional impairment
• Cognitive and behavioral issues in ageing
• Prevention, rehabilitation and care
• Principles of geriatric pharmacology
• Prescribing in older persons
• Mental capacity and ageing
• Health promotion and disease prevention in older persons
• Nutritional needs & dental/oral hygiene
• Healthy ageing
• Resource allocation and intergenerational justice
• Health care services for the elderly
Small Group Interactive Workshops/Tutorials
• Clinical skills in geriatrics: history taking and physical examination
• Functional assessment and cognitive assessment
• Activity limitation and participation restriction
Small Group Discussion
• Ethical issues in geriatric care

their Central Provident Fund for retirement upon eligible age for withdrawal (currently 55 years)’ instead of ‘Social Security benefits automatically increase with inflation’ which changes the correct answer from ‘True’ to ‘False’; Question 10: answer options ‘Basic Activities of Daily Living Scale’ instead of simply ‘Activities of Daily Living Scale’ (to distinguish from the Instrumental Activities of Daily Living Scale) and ‘Geriatric Depression Scale’ instead of the ‘Zung Self-Rating Depression Scale’ (as the latter is not validated for use in Singapore and hence hardly used) without changes in the right answer. For Question 11, ‘3-kg’ was used instead of ‘7-lb’ as we use International System units in Singapore. Our study was the first to use the UCLA-GKT locally and hence no prior validation data on the Singapore-modified UCLA-GKT was available.

The original UCLA-GAT is a 14-item survey instrument that elucidates respondents’ attitudes towards geriatric patients. Responses are captured using a 5-point Likert Scale (1 = strongly disagree, 2 = somewhat agree, 3 = neutral, 4 = somewhat agree, 5 = strongly agree). A typical example of a statement is ‘If I have the choice, I would rather see younger patients than elderly ones.’ To ensure uni-directionality of item, the scores were adjusted such that a higher score reflects more positive geriatric attitudes

to geriatric patients. The psychometric properties of UCLA-GAT including its validity have been established in prior studies with reported Cronbach alpha values of 0.70 to 0.76.^{21,23} The study by Kishimoto et al²¹ included 2 additional items ('I feel comfortable working with elderly adults' and 'Most elders feel uncomfortable discussing the issue of death and dying with their physician'). As 2 items in the original UCLA-GAT were not relevant to the local setting, there were modified as described and validated in a prior study from Singapore on geriatric attitudes among 1st year medical students by Chua et al:²⁴ Question 2: 'federal government' to 'government' and 'Medicare' to 'care of the elderly'; Question 8: Adding 'I believe' to the start of Question 8 as students did not have prior clinical experience. Chua et al²⁴ reported a Cronbach alpha of 0.73 on 244 first year medical students using the Singapore-modified UCLA-GAT.

Study Population and Design

We administered the Singapore-modified UCLA-GAT and UCLA-GKT to old curriculum students at the end of their 2nd year in March 2009 which constituted the (historical) baseline reference group. Second year students from the new curriculum constituted intervention group and there were 2 data collection points for this group: on the first day of Foundations in Geriatric Medicine module in March 2010 before any teaching started and 2 weeks after the end of the module. Only the total scores of students who completed all questions in the UCLA-GKT and UCLA-GAT were included in statistical analysis. We compared baseline reference and pre-intervention UCLA-GKT and UCLA-GAT scores using unpaired t-test; and the UCLA-GKT and UCLA-GAT scores before and after the new module using paired (McNemar) t-test. To determine the Cronbach alpha for the UCLA-GKT, the first section was dichotomised into either correct or incorrect/don't know answers. We used Statistical Package for Social Sciences (SPSS) Version 17 (IBM Corp., Somers, NY) for data analysis.

Ethical Approval and Considerations

The National University of Singapore's Institutional Review Board approved the study (Approval Number NUS-179). All data were kept confidential, written informed consent was obtained and no personal identifiable information was collected. Scores obtained from UCLA-GAT and UCLA-GKT did not affect students' marks or performance in the examination. No harm was foreseen from students participating in the study.

Results

One hundred and ninety-five of the 254 students from the

baseline reference cohort participated in the study (76.8%). Of this group, all 195 students completed all questions in the UCLA-GAT but only 189 students completed all questions in the UCLA-GKT. For the intervention cohort, 204 of the 261 students participated in the survey before the module (78.1%) but only 198 students of the 204 students participated in the survey after the module (198/261 = 75.9%). Only 169 (64.8%) and 198 (75.8%) out of 261 students in the intervention cohort completed all items in the UCLA-GKT and UCLA-GAT respectively to allow comparison of scores before and after the new module. The mean age of students in both cohorts at the time of study was 20 years. For both cohorts, the gender ratio was approximately equal and 90% of respondents were of Chinese ethnicity, in line with the demographics of student population at our medical school. There were no significant differences in gender or ethnicity between cohorts, and no significant associations between gender or ethnicity with UCLA-GKT scores for both cohorts. There were also no significant associations between ethnicity and UCLA-GAT scores for both cohorts. However, males in the baseline reference cohort had more positive attitudes towards geriatric patients than females [mean GAT: 3.00 (standard deviation, SD = 0.27) vs 2.89 (SD = 0.28), $P = 0.001$]; but there was no gender difference in UCLA-GAT scores in the intervention cohort.

The Cronbach alpha for all 18 items of the Singapore-modified UCLA-GKT was 0.47 for baseline reference group, and 0.35 and 0.43 before and after the new module respectively for the intervention group. There was no statistical difference UCLA-GKT scores between the baseline reference and intervention cohorts before the new module [mean: 31.6% (SD = 15.7%) vs 33.5% (SD = 14.2%), $P = 0.207$] (Table 3). UCLA-GKT scores significantly improved by 12% in the intervention cohort after the new module [mean: (before) 34.0% (SD = 14.3%) vs (after) 46.0% (SD = 16.2%), $P < 0.001$].

The Cronbach alpha for all 14 items of the Singapore-modified UCLA-GAT was 0.61 for baseline reference group, and 0.67 and 0.69 before and after the new module respectively for the intervention group. The attitudes towards geriatric patients of the intervention cohort before the new module was less positive than the baseline reference cohort [mean GAT: (intervention) 3.46 (SD = 0.36) vs (baseline reference) 3.56 (SD = 0.32), $P = 0.015$] (Table 3). The attitudes of the intervention cohort became more positive after the new module [mean GAT: (before) 3.46 (SD = 0.36) vs (after) 3.53 (SD = 0.36), $P = 0.001$].

Discussion

The key finding of our study is that the 2-week Foundations in Geriatric Medicine module improved both geriatrics

Table 3. Geriatric Knowledge (GKT) and Attitude (GAT) Test Scores in Baseline Reference Group, and Before and after the New Foundations in Geriatric Medicine Module in the Intervention Group

Instrument*	Baseline Reference Group (2009)	Intervention Group (2010) (before)	P Value†	Intervention Group (2010)		P Value‡
				Before	After	
Mean UCLA	(n = 189)	(n = 193) [§]		(n = 169) [§]		
Geriatric Knowledge Test (GKT) Score (%) (SD)	31.6 (15.7)	33.5 (14.2)	0.207	34.0 (14.3)	46.0 (16.2)	<0.001
Mean UCLA	(n = 195)	(n = 204) [§]		(n = 198) [§]		
Geriatric Attitudes Test* (GAT) Score (SD)	3.56 (0.32)	3.46 (0.36)	0.015	3.46 (0.36)	3.53 (0.36)	0.001

UCLA: University of California Los Angeles

*Singapore-modified version

†Chi-square test

‡McNemar's test

§The number and mean UCLA-GKT and UCLA-GAT scores of students for the before-and-after module comparison were different from the inter-cohort comparison because only students who completed all items in the UCLA-GKT and UCLA-GAT, both before and after the module, were analysed.

knowledge and attitudes of 2nd year medical students. This occurred despite the less positive attitudes at baseline among the students in the new curriculum compared with the old curriculum.

The decline in medical students' empathy and attitudes during the medical school years has recently been on the spotlight. Of note, 2 longitudinal cohort studies among the medical students documented the decline in empathy and attitudes towards patients over time even as the students continue to acquire their knowledge.^{24,25} The decline seems to be particularly pronounced during third year of medical school or the first clinical year when the students start their clinical rotation. Of particular concern, the decline in empathy is more pronounced towards vulnerable and marginal patient populations such as elderly, medical indigent or those with chronic disability.²⁶ The reasons for decline are multifactorial: idealistic attitudes among the new students, lack of positive role modeling, a predominantly biomedical clinical experience, and presence of "null curriculum" where important materials are deliberately left out.^{25,26} Interventions that reverse the decline or at least maintain the empathy include experiential learning, role modeling, longer exposure to target patient population, and a clearer signal that maintaining a healthy attitudes towards elderly and other vulnerable groups is imperative.^{26,27} Our module incorporates many of these educational strategies which may explain why the module did not demonstrate a knowledge-attitude gap in the intervention cohort.

While the strategies we employed in our new Foundations in Geriatric Medicine module (e.g. ageing simulation workshops) were no more innovative than those used in US, Europe and elsewhere, our study is the first from Asia to use validated geriatric knowledge and attitude instruments to test and measure the effectiveness of a new geriatric education intervention using a before and

after intervention study design with a baseline reference cohort. This is supported by a recent systematic review of 30 studies on teaching interventions to improve geriatrics knowledge or attitudes in medical students, of which none was from Asia.⁵ Comparing with other published studies which have used a similar study design and the UCLA-GAT, our finding that a short geriatrics course improved attitudes was similar to Eskildsen and Flacker's study in the USA.²⁸ However, it should be noted that another similar study from the UK by Hughes et al³¹ using the UCLA-GAT found no significant change in attitudes. Comparing all the 3 studies, the geriatric course in Eskildsen and Flacker's study was similar to ours as both involved introducing the foundations of geriatric medicine to medical students in the early years of medical school (1st year students for Eskildsen and Flacker and 2nd year students for ours) while Hughes et al's geriatric course was a clinical training programme for 4th year medical students. Hence, it may be possible that the attitudes of medical students towards geriatric care are more amenable to change during the early years of medical school than the later years. The poorer geriatric attitude in the intervention cohort before the module compared to the baseline reference cohort could possibly have been due to natural inter-cohort variation or the effects of the major revision of the medical curriculum. Nevertheless, the new Foundations in Geriatric Medicine module was fortunately able to improve geriatric attitudes in the intervention cohort. With respect to geriatrics knowledge improvement, we are unable to compare our study with other published studies because the only 2 studies that used a similar study design and the UCLA-GKT involved interventions lasting 3 to 4 years, as opposed to our 2-week geriatrics course.^{29,30} Nevertheless, these 2 studies, both from the USA, reported conflicting results: Nagoshi et al³² found that students at the end of the new 4-year geriatrics curriculum had poorer

knowledge than those from the old curriculum while Supiano et al³³ found that a new geriatrics curriculum delivered longitudinally over 3 to 4 years improved relevant knowledge in the intervention cohort.

Like with most studies on teaching interventions to improve knowledge and attitudes of medical students,⁵ we are unable to determine exactly which aspect of the new module was the most effective. Nevertheless, we propose that the interdisciplinary, international guideline-based and experiential nature of the module all contributed to improvement of both knowledge and attitudes of medical students within a short duration of 2 weeks. In particular, we feel that the ageing simulation workshops where students experienced the common challenges faced by older people such as visual impairment, peripheral neuropathy and polypharmacy were instrumental in improving the attitudes of empathy and compassion towards the elderly in medical students.

The strengths of the study are use of validated instruments, pre- and post-intervention assessment of impact using a baseline reference group, prospective design of the study, good response rates (>75% for all stages of study) and the assessment of both geriatric knowledge and attitudes. However, it also has its own limitations. Firstly, this is a single institution study so we caution against over-generalisation. Secondly, the relatively low Cronbach alpha values for the Singapore-modified UCLA-GKT reduced the criterion validity of the knowledge test in our study. Sensitivity analysis to improve the Cronbach alpha of the Singapore-modified UCLA-GKT by omitting a question did not raise the value above 0.55. There could be 3 possible reasons for this observation: the modifications to the original UCLA-GKT to suit our local context may have reduced the test's internal validity; the original UCLA-GKT was developed and validated in graduate medical schools (as opposed to our undergraduate medical school and hence, younger students); and contextual differences between the education and healthcare system in the USA and Asia. Thus, our study also supports the recommendation that tools validated in Western settings may not be blindly applied without re-checking its validity when used in Asian settings. Finally, our study did not address the long-term retention of knowledge and change in attitudes. We intend to re-assess the geriatric knowledge and attitudes of both baseline reference and intervention group in their final year and compare the long-term effect of the augmented geriatric medicine training in the new curriculum, controlling for differences in geriatrics knowledge and attitudes at baseline.

Conclusion

Many medical schools are responding to the surge of geriatric population by strengthening geriatric medicine

curriculum during medical schools years. As awareness of geriatric education gains momentum, there is a need for outcome studies on geriatric curriculum and assessment.⁵ Priority research topics may include identifying the ideal curriculum models in geriatrics that provide support to the students' learning and developing and validating instruments to measure effectiveness of curricular innovations. As educational outcome studies are sparse, prospective well designed studies would add significant value to our understanding of how we can create a meaningful learning opportunity for our students in geriatric medicine. We hope our study contributes to this body of knowledge.

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