Original Contribution/Clinical Investigation

Knowledge, Attitudes and Perception of Medical Students about Elderly Patients before and after Implementation of a New Geriatrics Curriculum

Firdous Jahan *(1)*
Shaikh M Naeem *(2)*
Muhammad A Siddiqui *(3)*
Muhammad Moazzam Khan *(4)*

(1) Firdous Jahan, Department of Family Medicine
Oman Medical College, Sohar, Oman
(2) Shaikh M Naeem, Department of Family Medicine
Oman Medical College, Sohar, Oman
(3) Muhammad A Siddiqui, School of Health Sciences
Queen Margaret University, Edinburgh, UK
(4) Muhammad Moazzam Khan, Department of Family Medicine
Oman Medical College, Sohar, Oman

Correspondence:
Firdous Jahan
Department of Family Medicine
Oman Medical College
Sohar, Oman
Email: *firdous@omc.edu.om*

ABSTRACT

Objectives: The aim of this study was to evaluate the attitudes, knowledge and perception of medical students about elderly patients before and after implementation of a new geriatrics curriculum and to assess perceived attainment of objectives in geriatric module.

Methods: This was a pre-post cohort study of seventy 6th year (first clinical year) medical students. Questionnaires were provided prior and post geriatric assessment. Utilization of common geriatric tools was taught in a tutorial and then reinforced in small group (case based) discussions. Questionnaire was mainly comprised of pre and post questions, perception of students regarding geriatric care and students' perceived attainment of objectives from geriatric module. Statistical analysis was performed using SPSS 20.v. Data were expressed in frequencies, mean and percentages. Paired t test was used to evaluate the significant difference between pre and post responses.

Results: A total of 70 students participated in the study. 14.3% were male and 85.7% were female students with mean age of 22.84 ± 1.03. The mean scale score for students' basic understanding of geriatrics was significantly higher after completion of education program compared with scores prior to training ($p < 0.001$, 95% CI: 3.01-4.87) with an increase of 3.943 in the mean scale score. In the same way the mean scale score of students' knowledge of geriatrics was statistically higher after completion of education program compared with scores prior to training ($p < 0.001$, 95% CI: 3.13-4.5) with an increase of 3.829 in the mean scale score. Overall students' feedback about geriatric module at the end of rotation was good as more than two third clumped from achieved to outstandingly achieved.

Conclusion: Medical students who received education during their module showed improvement in levels of knowledge about geriatrics.

Key words: Geriatrics, Curriculum, Feedback, Education, medical students

Background

Geriatrics refers to the clinical aspects of aging and the comprehensive health care of older persons. Evidence from several studies and national surveys indicates that families are the major care providers for impaired older adults. As fertility rates decline, the proportion of persons aged 60 and over is expected to double between 2007 and 2050. A survey of US medical schools showed that 71% percent of schools either had geriatrics as a medical student clerkship or as part of a required clinical rotation [1-2]. Ageing is characterized by progressive and heterogeneous decline in physiological reserve of all organ systems. There are an estimated 101,145 60-plus people in Oman, representing 5.2 per cent of its population. Five per cent of these are bed-ridden [3-4].

Every elderly person has unique and specific needs. Ministry of Health (MOH) Oman runs a comprehensive assessment program to determine the immediate needs of an individual. This defines whether the person needs health or social intervention or both. Globally the number of elderly is expected to increase three-fold by 2050 [5]. This rise of the aging population has had an impact on the practice of medicine, as the unique needs of the elderly require the presence of a multidisciplinary and comprehensive medical approach [6]. The need for geriatric education has been repeatedly cited in the United States where, according to one study, every third patient seen by a medical student is elderly [7]. Teaching geriatrics in medical schools leads to improvement in geriatric knowledge, skills and attitudes of undergraduate medical students [8].

Evaluation and treatment of elderly patients requires specific knowledge, attitudes, and skills that are acquired across the continuum of medical education. Development and implementation of new geriatrics experiences has been undertaken throughout the medical school and residency curriculum [9]. Geriatric/Palliative care education in the undergraduate medical curriculum found considerable evidence that current training is inadequate in dealing with end of life issues, most strikingly in the clinical years. Reforming existing health care curriculum to incorporate palliative care education is often faced by many challenges on a number of levels [10]. There is a strong need to incorporate geriatric palliative care education into primary health care education such that there is an overlap between primary health care and palliative care. The attitudes and competencies required to provide high-quality care overlap substantially with those required to provide excellent primary care [11-12].

To strengthen and make it more effective in terms of teaching and experiential learning of geriatric /palliative care in family medicine few steps are already being done. Thus, a process of needs assessment, identifying gaps in knowledge, consultations with the curricula reformers and strategic planning is thought to be an effective catalyst for curricular change [13-14]. Geriatric care is an integral part of teaching and learning in family medicine. Caring for patients with a chronic or terminal illness is an opportunity to use knowledge and skills as part of a team and to give patients the time and the opportunity to discuss some of their deepest fears and anxieties. Cure may not always be a possibility but empathy and care will always be required, and the doctors of the future need to be aware of this.

Goals of family medicine program are to have a competent clinician in respect of diagnosis and providing evidence-based cost-effective management of conditions commonly met at the primary health care level. The purpose of this study was to evaluate the attitudes, knowledge and perception of medical students about elderly patients before and after implementation of a new geriatrics curriculum and to assess perceived attainment of objectives in geriatric module.

Methods

A favorable ethical opinion was obtained from the Oman Medical College ethics committee at the beginning of study.

Curricular Design

A detailed study of curriculum design and planning was then undertaken. The student-centered, problem-based, integrated model seemed most applicable in our setting and was adopted. Key topics were identified through an overview of American Association of Medical Colleges' list of common geriatric competencies. We integrated a geriatric course into an existing curriculum and described the necessary steps required to implement it. The overall aim was to introduce a geriatrics education program within the existing curriculum [13-15].

The course content was reviewed by experts, course coordinators and academic vice dean. Exit level and specific enabling objectives of the geriatric program were made. Teaching/learning strategies were devised and consisted of small group tutorial sessions, case based scenarios, role play, simulated history taking and a few large class format sessions.

Curricular Implementation

Teaching/learning strategies were devised and consisted of small group sessions. The new module was incorporated in the existing eight week family medicine rotation in year 6 which is the first clinical year. In all, five groups of students rotate through family medicine for eight weeks through the year, with this class having a total of 70 students. The geriatric course objectives for this year were to familiarize students with history taking and physical examination and use of common geriatric assessment tools in elderly patients. In addition basic knowledge of aging physiology and pharmacology were also incorporated in this rotation.

Prior to the introduction of geriatrics in the family medicine rotation, faculty development initiative was taken. Family medicine faculty underwent a basic two hour training session on teaching a problem based geriatric history and physical examination method. Besides this reading materials were provided as additional learning resources.

For students, two tutorial sessions were conducted to cover the basics of aging physiology and pharmacology and small group sessions in which problem based scenarios were used to practice history-taking in the context of aging physiology and pharmacology. Geriatric assessment and use of common geriatric tools was taught in a tutorial and then reinforced in small group case based discussions. Each student rotates to geriatric clinic in a government primary care clinic and had opportunity to assess patients. Opportunistic learning in terms of history taking and

geriatric assessment was also provided to students in their clinical sessions during encounters with elderly patients throughout their eight week rotation.

Learning Outcomes and Core Competencies in Geriatric Module

- o Acquire knowledge of the demography and epidemiology of ageing;
- o Recognize the scientific basis of geriatric medicine and the differences in medical care of older patients;
- o Develop foundational competencies in performing important aspects of a geriatric assessment;
- o Recognize and appreciate physiologic diversity and its clinical significance in elderly patients;
- o Establish the interactions between medical diagnoses, functional impairment, and medications;
- o Interact with patients and their caregivers using a bio-psychosocial approach;
- o Develop a clear understanding of important basic ethical principles governing care of elderly patient;
- o Explore healthcare services for the elderly and healthcare financing for the elderly with specific reference to Oman.

List of Teaching Methodologies and Topics in Geriatric Module

Small Group Interactive Workshops/Tutorials

- o Approach to the older person and Principles of geriatric medicine
- o Physiology of ageing and functional impairment
- o Cognitive and behavioral issues in ageing
- o Common medical problems in old age/ Prevention, rehabilitation and care
- o Principles of geriatric pharmacology / Prescribing in older persons
- o Health promotion and disease prevention in older persons
- o Nutritional needs & dental/oral hygiene
- o Health care services for the elderly in Oman

Once in 8 week rotation: visit to Elderly care center

- o Clinical skills in geriatrics: history taking and physical examination

Once in a week clinical rotation at Geriatric clinic

- o Clinical skills in geriatrics: history taking and physical examination
- o Approach to geriatric patients' problems in primary care

Curriculum Evaluation

Student's feedback on this curriculum was taken to further refine the curricular content and strategies as necessary. Two study instruments were used to assess the course. Student knowledge was assessed via a single best option test which was given to all students as a pre-test prior to the introduction to geriatrics. The UCLA geriatric knowledge test, a validated questionnaire used in previous studies, was reviewed for pre-test development. Keeping in line with the overall objectives of history taking and assessment skills for students, a modified pretest was designed. The questionnaire consisted of questions on aging demographics, aging physiology (cardiovascular and central nervous system), aging pharmacology, history taking, nutritional, functional, and gait assessment. The same questions were given (in a different order) to the students at the end of the geriatric sessions as a post test. Scores were reported as the total number of correct responses.

Attitudes toward geriatrics were measured using a geriatric attitude questionnaire adapted from the 14-item UCLA Geriatrics Attitudes Scale [16]. The scale was designed to assess general impressions about older people, perceived value of older people, distributive justice of societal resources toward older people, attitudes toward caring for older patients, perceived potential benefits of treating older patients, and personal economic concerns about caring for older patients. The additional two questions were used to assess attitudes toward working with elders and to evaluate attitudes regarding elders' perceived level of trust in discussing sensitive issues with medical providers. A self-administered evaluation form was also distributed at the end of the rotation to all students. The overall quality of teaching was included in the feedback form and a global rating for the overall module was also assessed. At the end of the rotation all students were asked to fill in the feedback form. This form consisted of nine questions related to the course objectives rated on a forced choice format (a variant of the Likert scale) questionnaire with five choices ranging from 1 ('not achieved') to 5 ('outstandingly achieved'). Space was also provided at the end of the form for additional comments. Student name on the course evaluation form was optional. No extra resources or funds were used.

Statistical Analysis

Statistical analysis was performed using SPSS (IBM SPSS Statistics 20.0). Data were expressed in frequencies, mean and percentages. Each participant's individual score was calculated for pre and post question by assigning 1 for correct and 0 for the wrong response. Mean scale scores for the pre and post questionnaire of each scale were evaluated for significance difference using the paired t-test for hypothesis testing.

Results

A total of 70 students participated in the study. Age ranged from 21 to 25 years with mean of 22.84 ± 1.03. 14.3% were male and 85.7% were female students. Table 1 shows student's pre and post-test geriatric teaching correct responses. Significant difference was found regarding geriatric teaching between student's pre and post correct responses ($p < 0.001$, 95% CI: 5.228-13.24). Similarly, significant difference was observed between pre and post-test knowledge MCQ correct response ($p < 0.001$, 95% CI: 12.39-23.39). The mean scale score for students basic understanding of geriatrics was significantly higher after completion of education program compared with scores prior to training ($p < 0.001$, 95% CI: 3.01-4.87) with an increase of 3.943 in the mean scale score. In the same way the mean scale score of students' knowledge of geriatrics was statistically higher after completion of education program compared with scores prior to training ($p < 0.001$, 95% CI: 3.13-4.5) with an increase of 3.829 in the mean scale score. Similarly, significant difference was found between pre and post responses among both male and female students. All students were also satisfied with the quality of teaching with 90% rating it as good or higher. Most students (89%) rated that the overall objectives were clear and achieved. Table 3 shows the students' perceived attainment of objectives from geriatric module at the end of rotation.

Table 1: Student's Pre and Post-Test Geriatric Teaching Correct Responses among 70 Students - n (%)

	Questions	Pre	Post	P Value
1	The majority of elders 65 years plus are senile	39 (55.7)	40 (57.1)	0.87
2	The majority of old people have no interest in, nor capacity of sexual relationship.	30 (42.9)	42 (60)	0.06
3	The five senses (sight, hearing, taste, touch, smell) tend to be weak in old age	18 (25.7)	45 (64.3)	<0.001
4	Lung vital capacity tends to decline with old age	55 (78.6)	59 (84.3)	0.42
5	The majority of old people feel miserable most of the time.	33 (47.1)	41 (58.6)	0.21
6	At least 1/10th of the elders are living in nursing homes, mental hospitals and care homes	50 (71.4)	45(64.3)	0.39
7	Physical strength tends to decline with age.	17 (24.3)	43 (61.4)	<0.001
8	Drivers under age of 65 years have lesser accident rate	30 (42.9)	43 (61.4)	0.03
9	Old workers usually cannot work as effectively as younger workers	16 (22.9)	38 (54.3)	<0.001
10	More than 3/4 of the elders are healthy enough to do their normal activities without help.	47 (67.1)	53 (75.7)	0.18
11	The majority of elder population are unable to adapt to change	25 (35.7)	38 (54.3)	0.03
12	Elders usually take longer time to learn new things	46 (65.7)	54 (77.1)	0.12
13	Elders tend to react slower than younger people	15 (21.4)	48 (68.6)	<0.001
14	Depression is more frequent among the elders than younger people	34 (48.6)	55 (78.6)	<0.001
15	In general, old people tend to be pretty much alike	38 (54.3)	43 (61.4)	0.39
16	The majority of elder population say they are seldom bored	34 (48.6)	49 (70)	0.008
17	The majority of elder population are socially isolated.	46 (65.7)	46 (65.7)	1
18	Old workers have lesser accident rate than young workers	37 (52.9)	47 (67.1)	0.08
19	More than 20 % of the total population is now 65 and older	34 (48.6)	38 (54.3)	0.54
20	Majority of elders are working or would like to have some activities, say housework and volunteer work	51 (72.9)	56 (80)	0.34
21	Majority of elders have income below the poverty line defined by the U.S. federal government	33 (47.1)	43 (61.4)	0.07
22	Majority of medical practitioners give low priority to the elders	28 (40)	51 (72.8)	<0.001
23	The majority of elders say they are seldom irritated or angry	45 (64.3)	47 (67.1)	0.74
24	Elders tend to become more religious with progression of age	59 (84.3)	60 (85.7)	0.82
25	Health and economic status of elders will be same or worse in 2020 as compared to youngers	38 (54.3)	50 (71.4)	0.06
26	Total population of elderly people in Oman is 3.8%	44 (62.9)	44 (62.9)	1
27	MCI means mentally compromised individuals	25 (35.7)	20 (28.6)	0.37
28	Life expectancy in Oman has increased from 50 to 74.22 years between 1970 and 2011	54 (77.1)	61 (87.1)	0.11
29	Recent improvement in standard of living in Oman led to an increase in infectious diseases	53 (75.7)	36 (51.4)	0.002
30	Care at home for elders is better than hospitals and elderly care centers	40 (57.1)	56 (80)	0.53

Figure 1. Students Geriatric Teaching Correct Pre and Post-Test Responses with significant difference

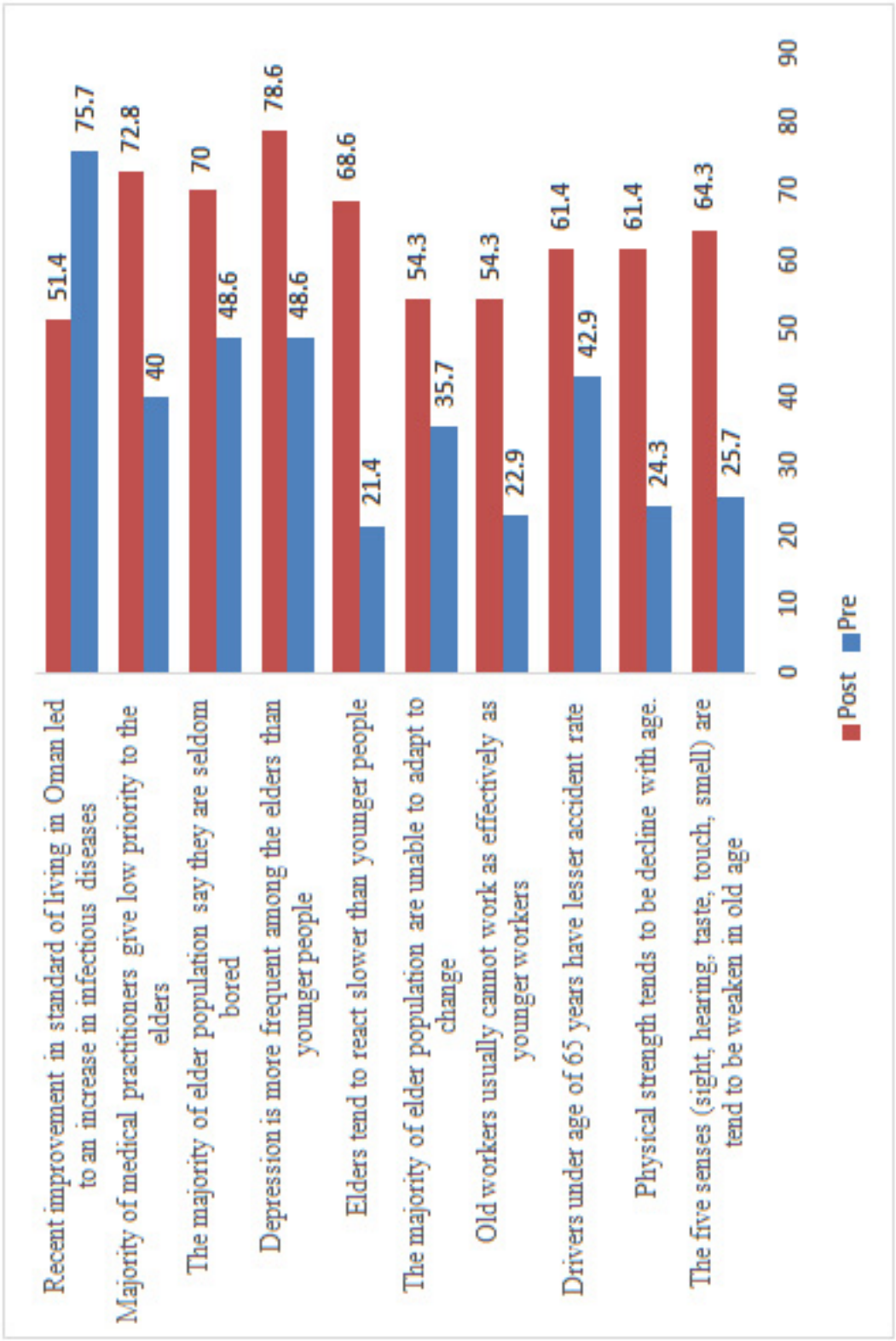

Table 2: Pre and Post-Test Knowledge MCQ Correct Response among 70 Students - n (%)

	Questions	Pre	Post	P Value
1	Memory loss is a common complaint among elder population	50 (71.4)	54 (77.1)	0.37
2	A person's height tends to decline in old age	38 (54.3)	51 (72.9)	0.018
3	People above 65 years are 20 percent of the current U.S. population (13% 2010 Census)	28 (40)	45 (64.3)	0.003
4	Majority of elder population are residing in nursing homes	57 (81.4)	57 (81.4)	1
5	Social Security benefits automatically increase with inflation	29 (41.4)	49 (70)	0.001
6	Majority of elders are quite capable of safe motor driving	32 (45.7)	42 (60)	0.105
7	Most elders consider their health to be good	32 (45.7)	55 (78.6)	<0.001
8	Older females exhibit better health care practices than older males	30 (42.9)	52 (74.3)	<0.001
9	Patient's capacity to make decision regarding their health care is 78-years	32 (45.7)	42 (60)	0.53
10	Instruments are the best to assess the physical functional abilities of 75-year-old nursing home resident?	13 (18.6)	49 (70)	<0.001
11	Most appropriate management in an 82-year-old nursing home resident who often clamps her teeth and refuses to eat.	7 (10)	50 (71.4)	<0.001
12	Environmental modifications is best option for 85-year old women with a history of frequent falls	23 (32.9)	46 (65.7)	<0.001
13	Community-acquired infection is the most common cause of hospitalization among elders	45 (64.3)	61 (87.1)	0.003
14	Most likely diagnosis among older female with involuntary leakage of urine due to coughs, sneezes, or does low-impact aerobics	59 (84.3)	63 (90)	0.32
15	Recommended vaccination for a 70-year old male with diabetes and emphysema who visited physician 10 years earlier but has received a tetanus shot 4 years earlier in ER because of a laceration.	14 (20)	44 (62.9)	<0.001
16	Most likely cause of right hip pain with walking restriction without support after 3 days of a fall in a 76-year old woman? Plain radiographs of the pelvis show no abnormalities.	18 (25.7)	30 (42.9)	0.48
17	A frail 70-year-old with early Alzheimer's disease and mild dementia complains of chronic pain. Radiologist suggests that the x-ray findings are minimal and may not account for the pain. Who can provide accurate evidence of the existence of pain?	20 (28.6)	39 (55.7)	0.001
18	Non pharmacological treatment of chronic intermittent low back pain in a 68-year old retired male carpenter. Radiological studies showed minimal degenerative changes of the spine, MRI and electromyogram show no evidence of spinal stenosis or nerve root impingement	26 (37.1)	46 (65.7)	0.002

Figure 2: Students' Knowledge MCQ Correct Pre and Post-Test Responses with significant difference

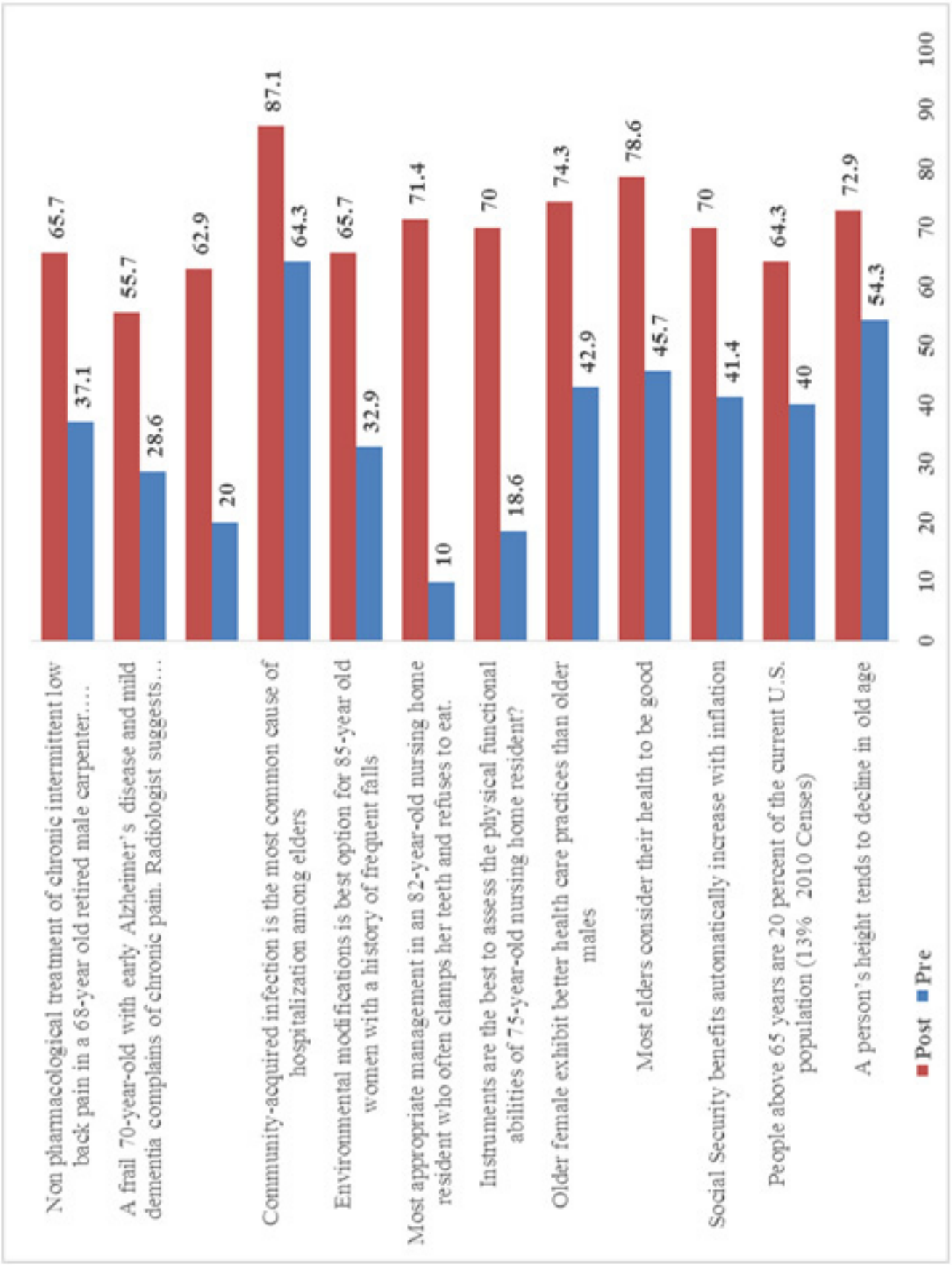

Table 3: Students' Perceived attainment of objectives from geriatric module at the end of rotation - n (%)

	Attainment of objectives	Not achieved	Partially achieved	Achieved	Better achieved	Outstandingly achieved
1.	Over all Objectives of this module were clear and achieved	1 (1.4)	6 (8.6)	5 (7.1)	39 (55.7)	19 (27.1)
2.	This module increased the level of confidence/ competence in geriatrics	0 (0)	8 (11.4)	16 (22.9)	33 (47.1)	13 (18.6)
3.	Clinical history taking and examination competency	4 (5.7)	2 (2.9)	23 (32.9)	30 (42.9)	11 (15.7)
4.	Aging physiology pharmacology learning	2 (2.9)	17 (24.3)	28 (40)	14 (20)	9 (12.9)
5.	Student's ability to generate a problem list	1 (1.4)	9 (12.9)	27 (38.6)	24 (34.3)	9 (12.9)
6.	Student empathize with a geriatric patient	2 (2.9)	2 (2.9)	14 (20)	21 (30)	31 (44.3)
7.	Psychosocial assessment	2 (2.9)	3 (4.3)	15 (21.4)	29 (41.4)	21 (30)
8.	Use of Common geriatric assessment tools	1 (1.4)	9 (12.9)	27 (38.6)	24 (34.3)	9 (12.9)
9.	Teaching and facilitation was appropriate	1 (1.4)	2 (2.9)	17 (24.3)	22 (31.4)	28 (40)

Discussion

There has been a rise in the elderly population throughout the world including Oman because of good living standards. The unique needs of the elderly require a multidisciplinary and comprehensive medical approach for medical care and health promotion. This is imperative to have structured undergraduate and postgraduate medical curriculum to train our future doctors how to handle these population [16]. The knowledge scores improved considerably in students who attended the geriatrics course in their first clinical year. This change was similar to improvement in student scores reported in other schools where geriatrics was introduced [17]. Effective teaching and learning methods for geriatric competencies are mandatory to enhance knowledge in geriatric medicine [18-19].(Table I, Figure I) Different areas of knowledge also showed improvement; the same finding is also reported in literature that students were successful in fulfilling objective, which was to bring about an improvement in students' knowledge and attitudes in geriatrics [20].

Using pre and post rotation testing, we were able to demonstrate significant knowledge acquisition on a variety of topics pertaining to geriatric medicine and care of the older patient. Various research studies have shown the same result [21-23](Table II, Figure II). This study'sresults have shown overall level of confidence and competency in students and better empathic response towards geriatric population [24-25].

Student's perception regarding geriatric care was improved after they finished the rotation. The overall course was well-received by students, and teaching strategies were considered good or better by a strong majority of students. There were a small number of students who rated the course unsatisfactory in terms of achievement of objectives. This was also reflected in the course evaluation scores where students rated achievement of objectives in teaching and learning physiology and pharmacology slightly lower than the other areas. As reported in literature students may have some negative attitudes towards geriatric medicine that need to be addressed appropriately [26-27].(Table III).

One of the important points in students' feedback was their report of difficulty in students' ability to generate a problem list in geriatric patients as well as using a tool for geriatric assessment. Basic understanding and exposure to geriatrics can develop a good and effective curriculum for undergraduate medical students. Teaching and learning focused on geriatric issues as well as assessment after module will further improve the outcome [28-29]. Increase in geriatric population in Oman needs a focused and structured undergraduate as well as postgraduate curriculum to train our future doctors [30].

Future research should address the issue of translating acquired knowledge in geriatric medicine into demonstrated clinical skills, when caring for the elder population. Future research may involve identification of the ideal curriculum models in geriatrics that provide support to the students' learning and developing and validating instruments to measure effectiveness of curricular innovations.

Conclusion

Medical students who received education during their module showed improvement in levels of knowledge about geriatrics. This study has demonstrated that a combined didactic and clinical program successfully increased students' knowledge in Geriatric Medicine. Adding a student-based approach and strengthening assessment are future steps towards improving this curriculum. Changing population demographics mandate not only the need for more specialists in geriatric medicine, but also primary care physicians should have an adequate knowledge of the principles of caring for older patients. This must be accomplished with a mandatory rotation in medical schools.

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