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Editorial

Dr Abdul Abyad
Chief Editor

In this issue a number of papers from the region discussed important aspect of ageing in the area.

In a paper from Bahrain the author discussed the Ageing And Pattern of Population Changes in The Developing Countries. He stressed the fact that ageing is not a disease. It is a natural phenomenon that all species go through. Although, it continues to be not very well understood it is the process that transforms a salubrious person to a frail one, with decline in the efficiency of most of the body organs. The number of old people worldwide is on the rise and according to WHO, "between 2000 and 2050, the proportion of the world's population over 60 years will double from about 11% to 22%, reaching an absolute number to over 3 billion in the same period". However, such increase will be seen more and faster in the developing than the developed countries despite the less dollars and the cost implications on the health and social services to be provided is high. The author highlighted and discussed in particular to the elderly percentage of the total population and the forecast. It discussed issues related health deterioration and disabilities as people tend to age and the health needs of this sector of the population with its cost implications.

A paper from Jordan looked at team assessment and planning of care in vascular dementia. The aim is to bring awareness to the members of the public around the globe about the dangers of dementia disease, importance of caring and team work to help the affected people in the locality. The paper includes a brief outline of the disease, its types, symptoms, causes, effects, diagnosis treatment and the affected people ratio in the globe. It also provides advice on the risk factors of affected individuals, to help deal with the disease. A case study on the disease, diagnosis and effects are provided to help understand the disease.

A paper from Egypt examined the relationship between vitamin D status and basic functional mobility in ambulatory elderly. The author follow a cross sectional study was conducted on 100 elderly patients aged > 60 years. Participants were recruited from Geriatric primary health care clinic at Ain Shams University hospital, Cairo, Egypt. All participants underwent comprehensive geriatric assessment , physical performance assessment using timed up and go (TUG) test and Gait speed test at four meters, also had Serum levels of vitamin D (25OHD) measured by Enzyme- Linked Immunosorbent Assay method . Of 100 subjects, 52% showed vitamin D insufficiency, 16% were vitamin D deficient and 32% had normal vitamin D levels. Regarding physical performance 64% of subjects had elevated TUG test (as defined by the cut off value 14 seconds), 56% of subjects scored a gait speed < 0.6 m/s. Physical performance was significantly related to vitamin D deficiency when measured by gait speed test but not TUG test. The authors concluded that vitamin D insufficiency is prevalent among ambulatory elderly and vitamin D status is strongly associated with basic functional mobility when measured by gait speed test.

A pre-post cohort study of seventy 6th year(first clinical year) medical students from Sultanate Oman evaluated 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. Questionnaire 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. A total of 70 students were participated in the study. 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. The authors concluded that medical students who received education during their module showed improvement in levels of knowledge about geriatrics.

Original Contribution/Clinical Investigation

Study of the relationship between vitamin D status and basic functional mobility in ambulatory elderly

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ABSTRACT

Background : Associations between physical performance and vitamin D status have been contradicted among studies. Vitamin D deficiency is very common among geriatric patients and is an established risk factor for osteoporosis, falls and fractures.

Aim: to analyse the relation between Vitamin D and basic functional mobility in a sample of ambulatory Egyptian elderly.

Methods: A cross sectional study was conducted on 100 elderly patients aged ≥60 years. Participants were recruited from Geriatric primary health care clinic at Ain Shams University hospital, Cairo, Egypt. All participants underwent comprehensive geriatric assessment, physical performance assessment using timed up and go (TUG) test and Gait speed test at four meters; they also had Serum levels of vitamin D (25OHD) measured by Enzyme- Linked Immunosorbent Assay method.

Results: Of 100 subjects, 52% showed vitamin D insufficiency, 16% were vitamin D deficient and 32% had normal vitamin D levels. Regarding physical performance 64% of subjects had elevated TUG test (as defined by the cut off value 14 seconds), 56% of subjects scored a gait speed < 0.6 m/s. Physical performance was significantly related to vitamin D deficiency when measured by gait speed test but not TUG test.

Conclusion: Vitamin D insufficiency is prevalent among ambulatory elderly and vitamin D status is strongly associated with basic functional mobility when measured by gait speed test.

Key words: Vitamin D; Functional mobility ; Elderly;

Introduction

Functional mobility is the ability to move from one position to another and is extremely important in performing independently daily activities (1). Recent studies have documented the relationship between vitamin D supplementation and functional mobility, muscle strength, sway and the decreased incidence of falls and fractures (2,3).

Vitamin D (calcitriol) is a hormone that consists of vitamin D2 (ergocalcipherol) and vitamin D3 (cholecalcipherol). The main sources of vitamin D are endogenous production of dermal synthesis due to solar or synthetic ultraviolet (UV) B light exposure and also could be obtained through food and supplementation (4,5).
Elderly are prone to develop vitamin D deficiency because of various risk factors including decreased dietary intake, diminished sunlight exposure, reduced skin thickness, impaired intestinal absorption and impaired hydroxylation in the liver and kidneys.(6,7)

Vitamin D deficiency is very common among institutionalized elderly, geriatric patients and patients with hip fractures and it is an established risk factor for osteoporosis, falls and fractures(8). In an international study conducted on women with osteoporosis, the highest proportion of hypovitaminosis D was reported in the Middle East (9).

The Timed Up & Go Test (TUG) is a test of balance that is commonly used to examine functional mobility in community-dwelling, frail older adults (10).

Gait speed is highly recommended as the "sixth vital sign" because of its ability to predict future health status, its ease of administration, ease of grading and interpretation and minimal cost involved (11). Studenski et al reported that gait speed of less than 0.6 m/sec is predictive for future risk of hospitalization and decline in health and function(12).

With a growing elder population, there is an increasing need to identify potentially modifiable risk factors for disability. This study aimed to determine the relation between serum vitamin D concentration and functional mobility in a sample of community dwelling Egyptian elderly.

Subjects and Methods

A cross sectional study was conducted on one hundred elderly; subjects were recruited from Geriatric primary health care clinic at Ain Shams University hospital in Cairo city, Egypt, during the period from (April 2014till November 2014).

Sample size justification: based on previous published literature in Egyptian subjects of 20% prevalence of vitamin D deficiency and a postulated 35% prevalence in the elderly group with a power of study 90% and alpha error 5%, the required sample size is 65 subjects. The program of sample size calculation is STATA 10.

All participants underwent comprehensive geriatric assessment, cognitive assessment, physical performance assessment using (TUG) test and Gait speed test at four meters and had laboratorial measurement of serum vitamin D (25OHD).

Subjects with dementia, clinical cardiopulmonary, neurological and musculoskeletal problems that prevent them from following physical performance test instructions were excluded.

TUG test was used to assess the basic functional mobility by measuring the time required to do subsequent activities: standing up from a 46 centimeter-high chair with back and arm support, walking for 3 meters, turn back to the chair, and sit back. Thus, if a subject scored 14 seconds or longer he or she was classified as high-risk for falling. (13)

Gait speed test at 4 meters was performed. Participants were asked to walk at their usual pace. Walking speed was defined as the best performance of two 4 meter walks at usual pace along a corridor. Time of shortest walk was scored and Gait speed was calculated for each participant using distance in meters and time in seconds. (14)

As regards vitamin D (25OHD), blood samples were collected, centrifuged and stored at -80°C. Serum levels of vitamin D (25OHD) were measured using Enzyme-Linked Immunosorbent Assay (ELISA) method. Vitamin D deficiency was defined as values below 30 nmol/ L and insufficiency values ranged from 30 to75 nmol/ L.

Covariates
Covariates included body mass index (BMI; computed as weight in kg/height in meters squared and classified according to WHO classification, 1997) (15).

Statistical methods:
The collected data were coded, tabulated, revised and statistically analyzed using SPSS program (version 15). The statistical tests used in this study were student t test and ANOVA test for quantitative data and chi-square test for qualitative data. The level of significance was taken at P value < 0.05.

Results

Analysis of baseline socio-demographic characters of subjects showed that mean age of subjects was 72.8 5.1 years, males represented 57% and females represented 43% of sample.

Regarding body mass index, 53% of studied elderly were Overweight (BMI=25-29.9) and obese (BMI $\geq$30).

Table 1 shows that 52% of subjects had vitamin D insufficiency, 16% had vitamin D deficiency and 32% had normal vitamin D levels.

Table 1: Distribution of vitamin D in whole sample

Vit D (nmol/L)	Whole sample	
	no	%
Normal(>75)	32	32.0
Insufficient(30-75)	52	**52.0**
Deficient(<30)	16	**16.0**

Females showed higher rate of vitamin D deficiency compared to males (20.9% versus 12.3%), while males showed higher rate of vitamin D insufficiency compared to females (66.7% versus 32.6%) and that was statistically significant.

Diabetes and hypertension were the highest prevalent co-morbidities among studied subjects, 43% and 47% respectively as shown in Table 2.

Table 2: The Distribution of CO-morbidities among subjects

CO morbidities	Whole sample	
	no	%
Diabetes	43	**43.0**
Hypertension	47	**47.0**
ISHD	38	38.0
COPD	37	37.0
Old CVS	9	9.0
CLD	38	38.0

CLD = chronic liver disease
ISHD = ischemic heart disease
CVS = cerebrovascular stroke
COPD = chronic obstructive pulmonary disease

Sixty four percent of subjects scored TUG test >14 seconds as shown in Table 3.

Table 3: Distribution of Timed up and go (TUG) test score among subjects

	No.	%
< 14 seconds	36	36.0
≥14 seconds	64	**64.0**

As regards gait speed test, subjects were divided into 2 groups; 56% scored a gait speed < 0.6 m/s and 44% scored a speed ≥0.6 m/s.

Table 4 shows higher percentage of elevated TUG among subjects deficient in vitamin D compared to other groups but the difference was not statistically significant.

Table 4: Relation between vitamin D status and TUG test

Vitamin D	TUG< 14sec No. %	TUG ≥14sec No. %	X2	P
Normal N=32	14 43.8	18 56.3		
Insufficient N=52	17 32.7	35 67.3	1.2	0.5
Deficient N=16	5 31.3	11 **68.8**		

Table 5 shows that mean Gait speed test was elevated among vitamin D deficient subjects 5.4 2.4 compared to those with normal vitamin D and the difference was statistically significant.

Table 5: Relation between vitamin D status and mean gait speed

Vitamin D	Mean	SD	F	P
Normal N=32	2.8	1.1		
Insufficient N=52	2.7	1.9	0.9	0.01
Deficient N=16	**5.4**	2.4		

Table 6 shows higher percentage of Vitamin D deficiency (60%) among very obese subjects (BMI >40) compared to other groups and higher percentage of vitamin D insufficiency (65.2%) among obese subjects (BMI >30).

Table 6: Relation between BMI and vitamin D status among participants

BMI	VITAMIN D			X2	P
	Normal N %	Insufficient N %	Deficient N %		
Underweight (<18.5)	2 66.7	1 33.3	0		
Normal(18.5-24.9)	12 27.3	26 59.1	6 13.6		
Overweight(25-29.9)	8 40.0	8 40.0	4 **20.0**	22.8	0.004
Obese (≥30)	8 34.8	15 **65.2**	0		
Very obese(≥40)	2 20.0	2 20.0	6 **60.0**		

BMI (body mass index)

Discussion

The relation between vitamin D status and basic functional mobility has been investigated in this cross sectional study. The mean age of subjects was 72.8 (±5.1) years. TUG test and gait speed test were used as measures for functional mobility among subjects.

In the present study 52% of subjects showed vitamin D insufficiency, 16% showed vitamin D deficiency and 32% had normal vitamin D levels. Vitamin D deficiency was more common among females compared to males while insufficiency was more among males.

Reviewing literature, Aly et al reported that vitamin D insufficiency represented 26% and was more common among males in a study conducted on elderly in Dakhlia governorate in Egypt (16). In the InCHIANTI study Houston et al reported that vitamin D deficiency among females represented 28.8% versus 13.6% among males (17) and in Jakarta, a study conducted on elderly women reported 23.3% vitamin D deficiency rate (18).

Associations between physical performance and vitamin D status have been contradicted among studies. In the current study vitamin D (25- OH) deficiency was inversely associated with gait speed which agreed with results of Houston et al who reported that vitamin D (25- OH) status was inversely associated with poor physical performance. (17) On the contrary, Belfrail population-based study showed no association between gait speed and serum levels of (25-OHD) in elders.(19)

Possible explanation of this contradiction among studies is that researchers have not yet identified the circulating 25-OHD concentrations needed to ensure optimal muscle functioning in elderly people and use a wide range of cut-off levels to define 25-OHD deficiency.

The present study showed that (TUG) test was elevated in 68% of subjects with vitamin D deficiency compared to 52% of subjects with normal vitamin D with no statistical significant difference. This finding comes in agreement with Gschwind et al who didn't find significant difference between cases with the higher quartile of vitamin D and cases with the lowest quartile in performance of TUG test (20). Also Dukas et al reported that TUG was not associated with serum 25-OHD levels in a study conducted on community-dwelling elders (21). This can be explained by presence of factors other than vitamin D which affect TUG test such as nervous system, spine and hip flexibility, range of motion of the joints, muscles, biomechanical relationship between body segments, diseases, medications, and behaviour(22,23).

Regarding BMI, vitamin D deficiency and insufficiency were higher among obese and very obese groups compared to non obese. This comes in agreement with Lagunova et al who reported a significant decrease in serum 25(OH) D3 levels with increasing body mass index in elderly(24). Also Linnebur et al reported that vitamin D deficiency remained present in obese elderly even after taking vitamin D supplementation (25). Obesity-associated low vitamin D levels are likely due to the decreased bioavailability from cutaneous and dietary sources because of its deposition in body fat compartments. (26)

Conclusion

Hypovitaminosis D is common among ambulatory Egyptian elderly and significantly affects gait speed. We recommend further studies with larger sample sizes; also we recommend that researchers should agree on ranges and cutoff values for vitamin D deficiency in elderly.

Ethical considerations

Informed consent was taken from every elder participating in this study; also an approval was taken from the head of Geriatrics and Gerontology Department. The study methodology was reviewed and approved by the Research Review Board of the Geriatrics and Gerontology Department, Faculty of medicine, Ain Shams University.

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Original Contribution/Clinical Investigation

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

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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

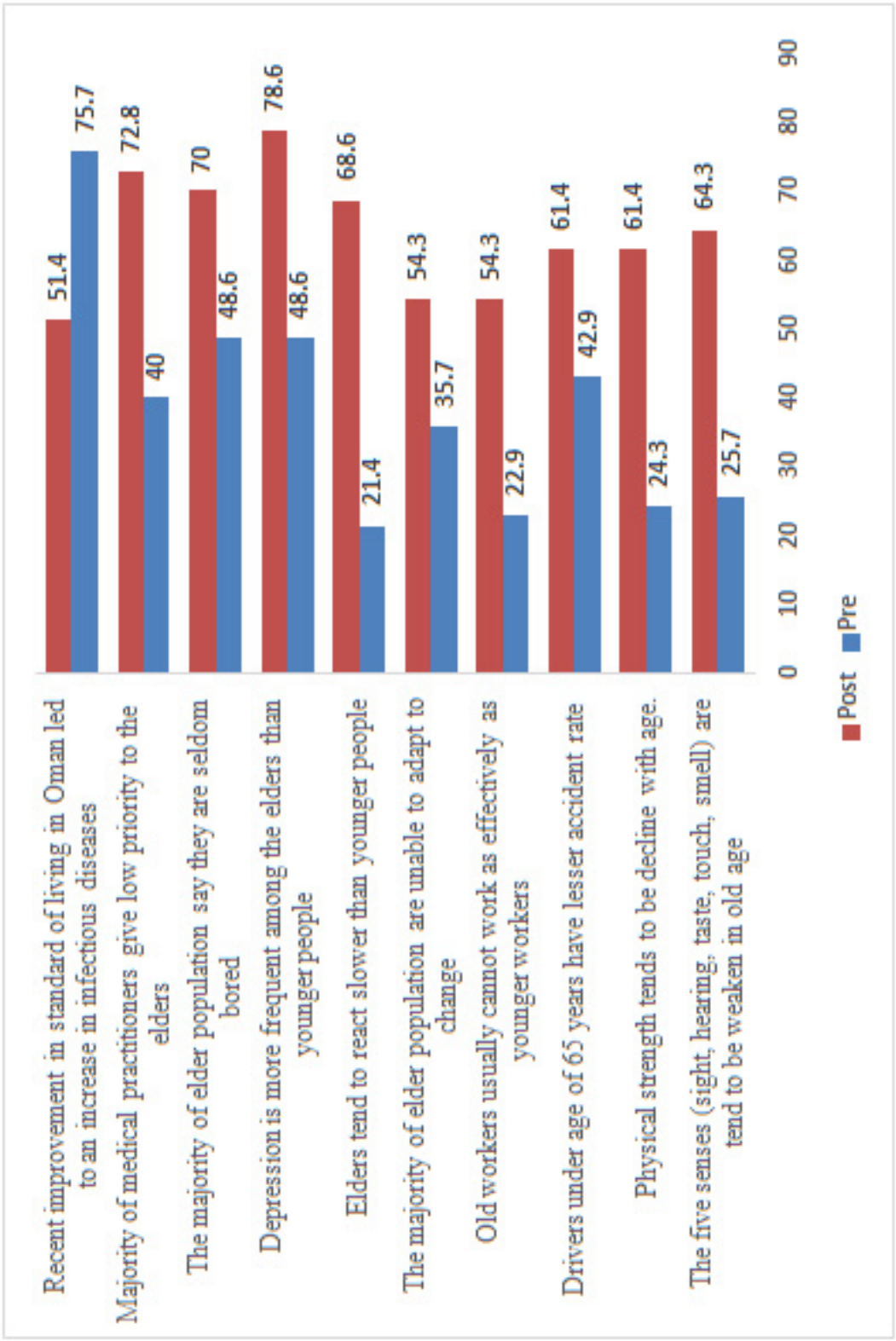

Table 2: Pre and Post-Test Knowledge MCQ Correct Response among 70 Students - n (%)

	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

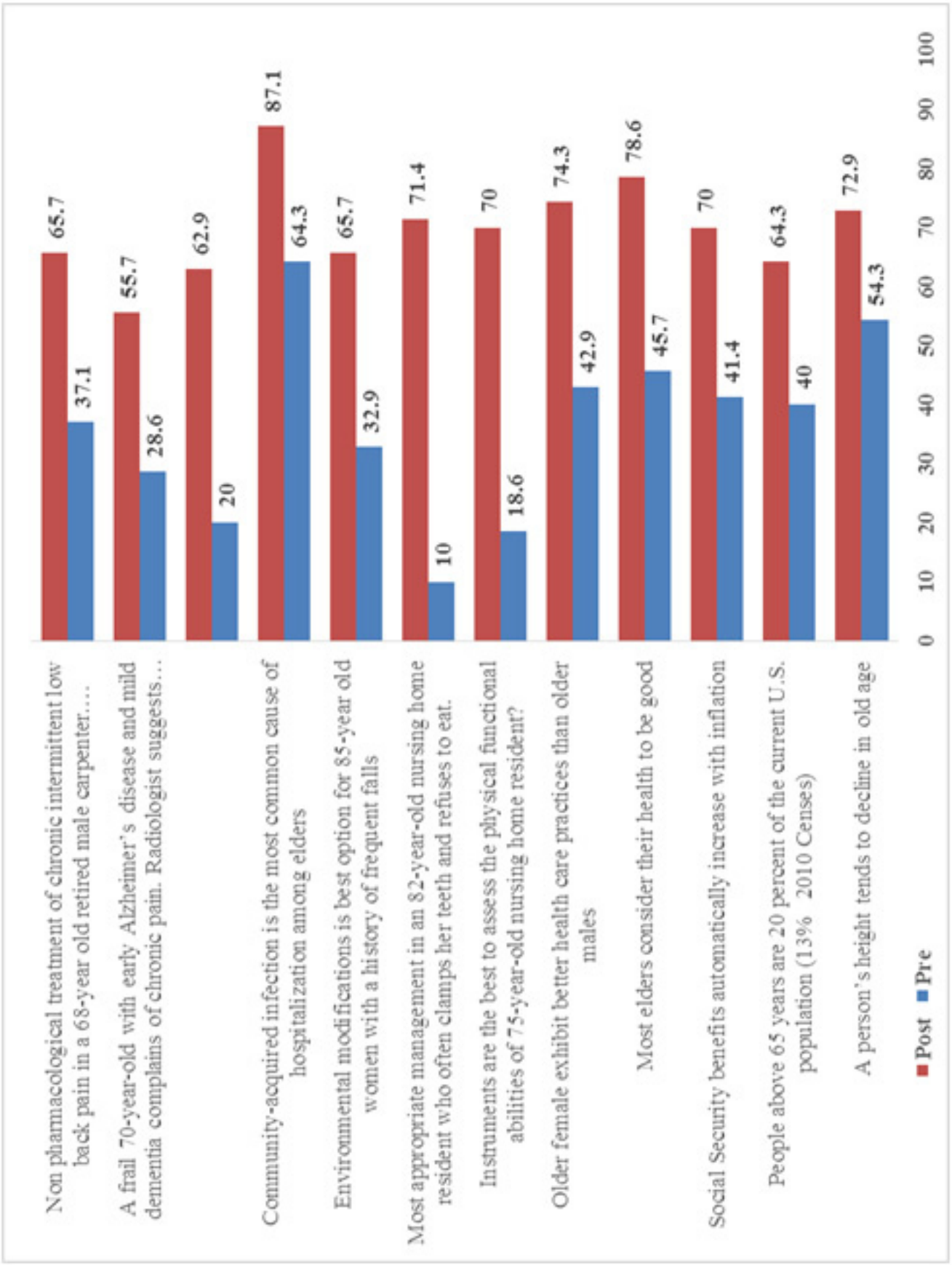

Table 3: Students' Perceived attainment of objectives from geriatric module at the end of rotation - n (%)

	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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Team Assessment and Planning of Care: Vascular Dementia

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ABSTRACT

This study is meant to bring awareness to the members of the public around the globe about the dangers of dementia disease, importance of caring and team work to help the affected people in the locality. Types of dementia forms are clearly outlined but Vascular Dementia form is the basic form that is discussed in this study. The study includes a brief outline of the disease, its types, symptoms, causes, effects, diagnosis treatment and the affected people ratio in the globe. It also provides advice on the risk factors of affected individuals, to help deal with the disease. A case study on the disease, diagnosis and effects are provided to help understand the disease.

Key words: Vascular Dementia, Management, Care

1. Introduction

1.1 Dementia

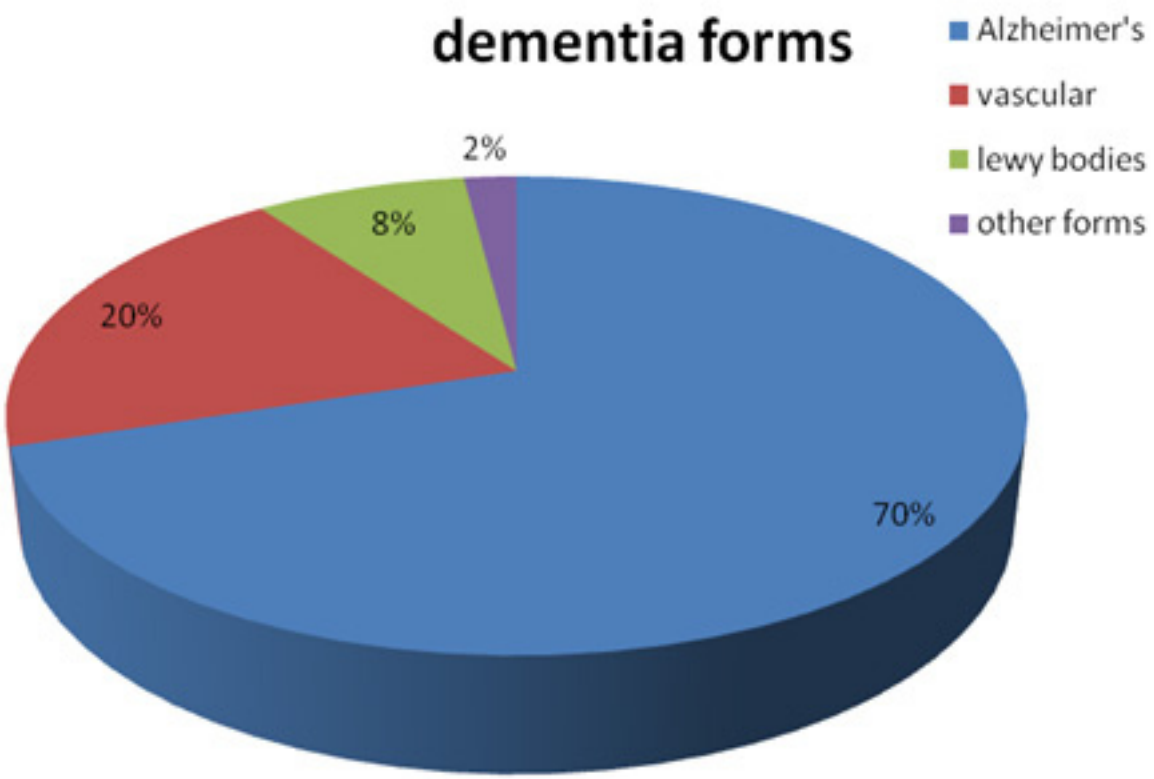
The term dementia refers to a set of symptoms that occur after the brain is damaged by a specific disease. This includes memory impairment, loss of communications skills and gradual deterioration in the person's ability to carry out daily tasks and activities(1). Frequent signs of ailment include troubles with verbal communication and enthusiasm. There are some small cases of the disease running in families. The view of ailment normally depends on the rigorousness and the history of individuals' health. It is anticipated that about 40 million populace of the planet are affected by the illness, that is, about 20% of the populace develop ailment at one point in their existence(1).

The disease is more common with age the group 66-75; 3% of this group are suffering from dementia. In the age group of 73-85, it is estimated that 19% of them have Dementia. It is also estimated that about half of the people aged 87 and above have Dementia. Dementia for this reason is the most common cause of disability among aged people in the world and it is suggested that it accumulates economic costs(2). Social stigma greatly impacts on affected people. Therefore, there is need to raise more awareness of the disease to avoid such impacts on patients and stigma.

1.2 Forms of Dementia

There are numerous forms of dementia. Some of the most prevalent forms are conferred in the following figure.

Figure 1: A pie chart to show the percentage spread of Dementia forms



1.3 Alzheimer's Disease
This is the most widespread form of Dementia. It affects about 80% of individuals in most Dementia cases. The part of the brain that is mostly affected by this disease is the hippocampus. Other parts that develop atrophy are the temporal and the parietal lobes as researched by Cipriani et al.(3)

1.4 Vascular Dementia
This sort of Dementia affects about 20% of Dementia sufferers. It is the second most widespread type and is caused by incompetent blood streams in the brain. Lack of oxygen and supplementary nutrient supplies to the brain lead to individuals collapsing. Some of the common symptoms include impaired judgments on decision making and organization(4). Brain imaging can be utilised to view the blood vessels affected by the disease.

1.5 Dementia with Lewy Bodies (DLB)
Referred also to as Lewy body disease, also has common symptoms. These symptoms include hallucinations, rigid muscles and a lack of concentration. This form is distinguished by irregular protein drops on brain stem nerve cells. This causes a disruption in the brain's regular functioning(4).

1.6 Parkinson's disease dementia (PDD)
Parkinson's disease is a progressive neurological disease. In its advanced stages, the disease can affect cognitive functioning(5). It is very important to note that not all individuals who have Parkinson's disease develop dementia but a significant number does. The most common symptoms of Parkinson's disease include tremors, muscle stiffness, slow and delayed comprehension and decision making.

1.7 Frontotemporal Dementia (FTD)
This form of dementia is exemplified by drastic personality changes and speech difficulties in the sufferer. There are three types of FTD, they include Behavioral Variant FTD (bv-FTD), Temporal Variant Dementia (TV-FTD) and Progressive Non Fluent Aphasia (PNFA)(10).

1.8 Creutzfeldt-Jacob Dementia (CJD)
The occurrence of this disease is very rare. It is caused by some viruses that affect the brain's normal functioning. This form of dementia has no treatment and advances rapidly over a period of few months. The common symptoms of the disease include, muscle stiffness, lack of coordination causing falls in geriatric individuals, and speech impairment(6).

1.9 Normal Pressure Hydrocephalus (NPH)
This sort of dementia engrosses the accretion of cerebrospinal fluid in the head cavities. This solution then leads to the upsurge of added force on the brain hindering the brain's ability to function normally(3). Symptoms that are associated with this disease include, problems in balance, bladder control, speech impairment and reduced problem solving abilities.

1.10 Huntington's Disease
This is an innate type of Dementia. It affects individuals' cognition, routine and relationships. The behavioral symptoms associated with this type of Dementia include memory problems, impaired judgments, mood swings and depression(5). Symptoms such as involuntary jerking movements of the face, body and sometimes hallucinations may also be observed in affected individuals.

1.11 Wernicke Korsakoff Syndrome

This type of Dementia is caused by a deficiency of vitamin B1 (Thiamine). When Thiamine ranks are condensed, brain cells are unable to regenerate sufficient vigor to help accurate functioning. Deficiency in B6, B12, vitamin E, Folate and Omega 3 are associated with increased Homocysteine level which lead or contribute to the occurrence of a stroke. This form of dementia is most common in alcoholics, but can also be caused by cancer, malnutrition, high levels of thyroid hormone and long term dialysis(3). The most widespread signs of the disease are lasting gaps of memory loss and affected short term memory.

1.12 Mild Cognitive Impairment (MCI)

As suggested by Rabins et al.(5) this type of Dementia may be caused by a medical illness, medications or environmental factors. Individuals with MCI are always aware and feel like they are in an unpleasant or dangerous state or situation. A number of the indications linked with this form of dementia include memory failure, prejudiced judgment and poor speech. Depression, anxiety, aggression and emotional apathy may also be experienced. This is mostly because of the patients' unawareness of the disease and its symptoms, causing frustration.

2. Vascular dementia

2.1 A brief summary of Vascular Dementia Disease

Vascular Dementia is a group of ailments that cause a decline in cognitive skills. The disease is characterised by condensed blood flow to the brain as a result of blockage problems with blood vessels supplying blood flow to the head(7). As a result, the brain eventually becomes damaged in a very short time and can even die due to lack of oxygen. Vascular dementia is a progressive disease that has significant effects on the life style of the affected person, friends and family members. There are many forms of Dementia. After Alzheimer's Disease, Vascular Dementia is the second most widespread Dementia disease.

The first discovery and diagnosis of Vascular Dementia was in 1899; it was named Senile Dementia. In 1969 Mayer Gross and his partners discovered that there are many different syndromes relating to different vascular mechanisms. They reported that hypertension contributes to the development of the disease in about 50% of patients(8). In this form of dementia, changes in thinking skills may sometimes occur very quickly due to cases of strokes, causing blockage in the main blood vessels leading to the brain. Thinking problems may either be mild or severe. Brain experts refer to this as Vascular Cognitive Impairments (VCI).

3. Varieties of Vascular dementia

There are many diverse forms of Vascular Dementia. They include; Mild Vascular Cognitive Impairment and Multi-Infarct Dementia, that are due to strategic single infarct. Vascular Dementia is also caused by hemorrhagic lesions, the Binswanger Disease, Sub Cortical Vascular Dementia and Mixed Dementia which is a combination of Alzheimer Dementia and Vascular Dementia diseases(7). Two main universal forms of Vascular Dementia Disease are the Multi-Infarct and the Binswanger's Disease.

3.1 Multi-Infarct Dementia

This is the most widespread type of Vascular Dementia Disease. It originates from numerous mini strokes or Transient Ischemic Attacks (TIA). The strokes source harm to the cortex of the brain in the area that is generally associated with erudition, reminiscence and verbal communication. A person suffering from this type of Vascular Dementia has better insight in its early stages than people suffering from Alzheimer's Disease because parts of their personality remain intact for a longer time. Signs of the disease include severe hopelessness, temper swings and Epilepsy(7).

3.2 Binswanger's Disease

In the past years, this disease has been assumed to be rare but the disease is relatively common. It is connected with stroke interrelated modification where the white matter deep in the brain is generally affected. As suggested by Etherton-Beer(7) it is caused by high blood pressure, solidification of the arteries and deficient blood flow. Common symptoms associated with the disease include sluggishness, complexity in walking, expressive ups and downs and lack of bladder management.

4. Signs of Vascular dementia

Vascular Dementia can from time to time have very equivalent forewarning signs to Alzheimer's Dementia. The signs are dissimilar depending on the part of the brain affected as suggested by Sharp et al.(9) The symptoms in most cases are always clear when occurring suddenly after a stroke. When changes in ones intellect and reasoning are clearly linked to a stroke, the condition is called Post Stroke Dementia. Additional distinctiveness of Vascular Dementia symptoms outline includes a sequence of mini strokes. The disease's warning signs can be divided into three categories; behavioural, mental and physical symptoms.

4.1 Behavioural Symptoms

These symptoms affect the way a person behaves naturally in their day to day activities. They include confusion, trouble paying attention, speech problems, reduced ability to organize thoughts, agitation and irritation, laughing or crying for no particular reasons and basically reduced ability to function in daily life activities. This includes experiencing difficulty doing things that used to come easily such as handling money or paying bills(10).

4.2 Mental Symptoms

These include indications linked with individuals' mental power skills. They consist of illusion and fantasy, confusions, slow judgment, common inattentiveness, personal alterations and odd mood swings, hallucinations, delusions and dizziness. People suffering from the disease also get lost frequently, even in familiar settings(10).

4.3 Physical Symptoms

These are indications that can be seen on the physical physique of the affected person. They include movement problems especially when it comes to balancing, hands and legs weakness, urinary and bowel incontinence, slowed movement tremors, moving with rapid and shuffling steps(10).

4.4 Co-existence of Symptoms

It should be considered that behavioral, mental and physical symptoms of Vascular Dementia can co-exist across the different categorised symptoms.

5. The Risk Factors of Vascular dementia disease

According to Stephan et al.(8), the risk aspects of Vascular Dementia Disease are identical to the risk aspects of heart disease and stroke. They include;

Figure 2: A diagram showing the risk factors of Vascular Dementia

5.1 Age Factor

As individuals become older, the danger of acquiring Vascular Dementia Disease amplifies. This is the reason most elderly people have the disease by the age of 85 and above(2).

5.2 A History of Heart Attack and Strokes

The chances of developing Vascular Dementia Disease are higher in individuals who have suffered a heart attack. This is because brain blood vessels develop complications which may increase the risk of developing dementia(8).

5.3 High Cholesterol

High levels of cholesterol are allied with the danger and intensification of Vascular Dementia. This is because cholesterol decreases the flow of blood that nurtures the brain(8).

5.4 High Blood Pressure

When blood strain is high there is excessive stress on the body and the brains' blood vessels. This intensifies the likelihood of having vascular complications in the head as proposed by Sharp et al.(9)

5.5 Diabetes

Increased glucose intensity can cause injury to blood vessels in the body including those in the head. This damage in blood vessels, particularly in the brain can pilot to contagion of Vascular Dementia and a stroke(8).

5.6 Obesity

Overweight individuals are at a higher risk of developing Vascular Dementia than average weight individuals. This is because of their increased Cholesterol, Diabetes, Atrial Sclerosis, Thrombosis and Embolism and Aneurysm(8).

5.7 Atrial Fibrillation

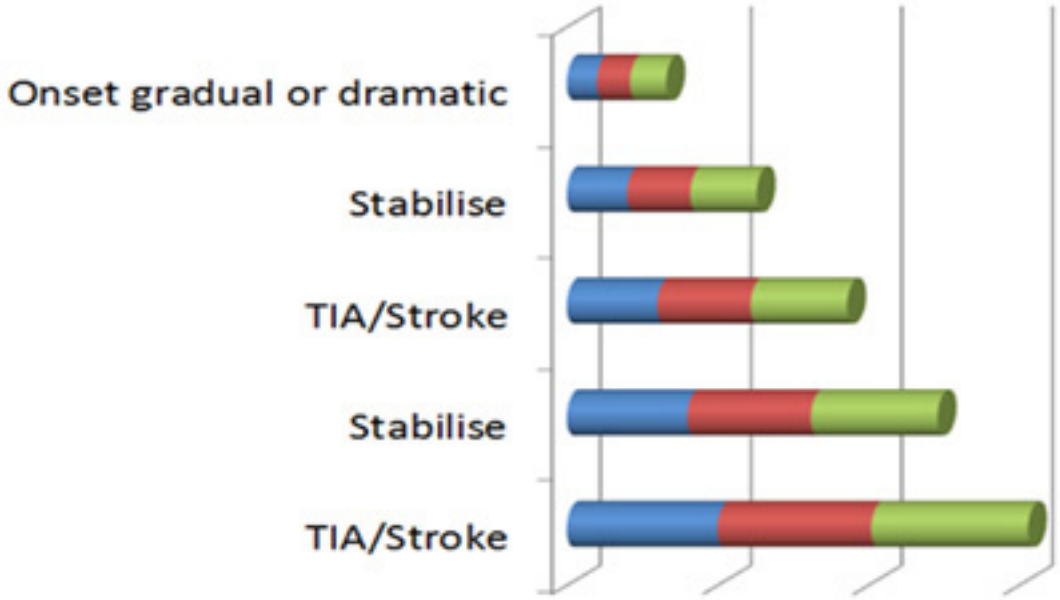
This is an irregular heart beat where the higher chambers of the heart begin to pound hastily and erratically out of harmonization with the upper cavity of the heart. The threatening of a stroke is caused by the poor blood current in the brain along with body components(8).

5.8 Smoking and Alcoholism

Martin-Ruiz et al. (11) assert that smoking and alcohol are common risk factors contributing to the development of Dementia. This is because smoking damages blood vessels, causing respiratory diseases including Vascular Dementia.

Considering the signs and symptoms of Vascular Dementia, individuals experience signs and symptoms as the disease progresses as shown in the below graph.

Figure 3: Progression of Vascular Dementia



6. Diagnosis of Vascular Dementia Disease

Vascular Dementia disease is normally diagnosed with the use of several techniques. These techniques include neurological examinations, brain scans which include the computerized tomography and magnetic resonance imaging (MRI) tests. The verdict of Vascular Dementia is pedestal on the presence of cognitive mutilation and cerebrovascular disease being the chief source of the signs(8). If ailment is assumed, numerous tests have to be executed to make sure accurate analysis takes place. Neuropsychological checks are carried out to evaluate the sub cortical brain utility. To assess and establish the location of brain damage, a brain examination is conducted using MRI and computerized tomography(1).

7. Managing Vascular Dementia Disease

There is no precise cure for ailment causing Vascular Dementia. The only available prescriptions are those that can assist in managing the intensification of the disease. Controlling the conditions affect the underlying health of the heart according to Stephan et al.(8) Pentoxifylline and ergolid mesylates (Hydergine) can be beneficial for increasing cerebral blood flow; significant improvement will be noticed in assessing intellectual and cognitive function and helpful in slowing down the rates at which Vascular Cognitive Impairment (VCI) progresses to further pathology. Medications to help control high blood pressure, high cholesterol, atrial fibrillation and diabetes can be prescribed(9). Aspirins or other anti-coagulant drugs can also be prescribed to reduce clotting in blood vessels in the appropriate timely manner. A healthy diet, exercise and avoidance of smoking and excessive alcohol intake play a great role in the reduction of strokes and Vascular Dementia disease(3).

Drugs can be approved to alleviate agitation or gloominess to help Dementia patients. A carotid endarterectomy surgery can be performed to treat obstruction in the carotid arteries, the main blood vessel leading to the brain(8). Recent studies indicated that some medications used by Alzheimer's patients can be used for patients suffering from Vascular Dementia Disease in some circumstances. The medications include cholinesterase inhibitor medications such as Donepezil and Galantamine.

Team assessment and planning of care for patients is crucial. This includes Physiotherapy to help in movement and balance. Speech Therapy is also necessary to assist patients' speech impairment. Educating family members can also play a big role in helping patients at home. They can develop strategies to help in memory enhancement by writing and placing notes and reminders. The purpose of the below diagram and above explanation is to remind the public and treating doctor to follow team assessment and planning of care. This should be encouraged as it is not effective if only one doctor treats a Vascular Dementia patient whose symptoms and treatments vary across various medical fields. Therefore, having team assessment and planning allows the achievement of a successful treatment plan. Constantly reminding the patients of common details about themselves would also be helpful as suggested by Stephan et al. (8)

Figure 4: Team assessment and planning of care

8. Lifestyle changes that can be used to manage and prevent Vascular Dementia

Diagnosis of the disease can be challenging, especially because there is no cure for the disease. But with the correct guidelines on how to live healthy, there are several things that can be planned to maintain a sufficient lifestyle and manage the disease.

Regular exercise is one of the most important things in managing the effects of ailment. It is very important to at least take a 20 minute walk every day to help slow the progression of Vascular Dementia and help control weight, boost overall happiness and also relieve stress(11).

Seeking help, encouragement from friends, family and health experts are also very important whilst managing the disease. This is because such people are a very important part of affected individuals' lives(11).

A healthy diet is another important way of controlling the effects of Vascular Dementia disease. It helps to manage the cholesterol levels which will, in turn improve and slow the progression of Vascular Dementia symptoms.

Boosting individuals' memory, learning how to relax and manage stress is also another strategy to help control ailment. Meditation and yoga can also help in relaxation and reduce stress(11). Challenging the brain can be applied in the management of ailment. Training the brain to retain and retrieve memories, setting up a special routine plan sometime in the evening to try and recall all the day's activities help build memory capacity such as an eating plan, exercise plan, remembering medication and emergency numbers. Other activities such as painting and learning to complete puzzles can also help in building brain capacity(8). Keeping a routine can also assist in managing the effects of Vascular Dementia. Certain routines of the day can help in the avoidance of forgetting important things.

9. Case study

A 77 year old female visiting her sister from overseas (Middle Eastern Country) to Australia attended the clinic with her younger sister who is 67 years old for an assessment for her reduced cognitive abilities. Her sister who is residing in Australia is concerned about the older visiting sister and her short term memory loss for the past 2 years as stated by the family overseas. The patient had a stroke 5 years ago. Following the stoke she started to ask the same questions repeatedly. The patient recently had another minor stroke which was misdiagnosed as hypoglycemia by a family member, not a medical practitioner 12 months prior to visiting Australia. She had an episode of dizziness within one month of her arrival. Her sister noticed further decline in her cognition; she recently noticed that she is becoming more suspicious of her nephews and has been holding onto things. She has also lost interest in her daily activities and forgets to include the right ingredients and components in her cooking. Whilst taking her daily medications, her sister needs to remind her of the correct medication and dosage. As well as this, her second eldest son and his wife in her home country are helping her manage her finances and living arrangements as she hallucinates of mice travelling in the florescent tubes in the ceiling.

The patient has Hypertension, Diabetes, Cholesterol, Osteoarthritis and Osteoporosis. On the Mini-Mental Status Examination (MMSE), the patient scored 21/30 with abnormal clock drawing. On the Geriatric Depression Scale (GDS), the patient scored 2/15. A CT scan of the head was performed in Sydney, Australia revealing multiple lacuna infarcts in the right basal ganglion and left cerebellar region.

The diagram below is used to establish the principles of the ongoing management of Vascular Dementia patients.

Figure 5: Management guide

Conclusion

Vascular Dementia Disease is an ailment that affects the brain and the ability to think properly. There are several types of the disease and there is great importance to establish a correct diagnosis of Vascular Dementia from the treating doctor. Family is very important to patients who are affected as they require a lot of support from their families and friends to avoid cases of stigma. Although the disease has no known cure, its symptoms can be controlled by use of some medication, surgery, Occupational Therapy, a Registered Nurse, Physiotherapy, Speech Therapy, a Geriatric Specialist, Carer and the General Practitioner / Family Doctor working as a team.

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Ageing and Pattern of Population Changes in the Developing Countries

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ABSTRACT

Ageing is not a disease. It is a natural phenomenon that all species go through. Although, it continues to be not very well understood it is the process that transforms a salubrious person to a frail one, with decline in the efficiency of most of the body organs. Ageing usually impacts human health in a way that is more destructive to the body than any other disease. During ageing there is a continuous deterioration in the function of cells as time passes, increased vulnerability to challenges and high prevalence of occurrence of age-associated diseases that ultimately lead to decreased ability to survive and death.

The number of old people worldwide is on the rise and according to WHO, "between 2000 and 2050, the proportion of the world's population over 60 years will double from about 11% to 22%, reaching an absolute number to over 3 billion in the same period". However, such increase will be seen more and faster in the developing than the developed countries despite the fewer dollars and the cost implications on the health and social services to be provided is high. The main reason for such rapid increase is the decrease in the mortality rate along with the increase in the average living age of people reflected directly on the total population size of such countries.

In this paper the issue of the elderly people is highlighted and discussed in particular to their percentage of the total population and the forecast. It will also discuss issues related to health deterioration and disabilities as people tend to age, and the health needs of this sector of the population with its cost implications.

Key words: Elderly, geriatric, pattern, disabilities, cost, health and social welfare.

Review

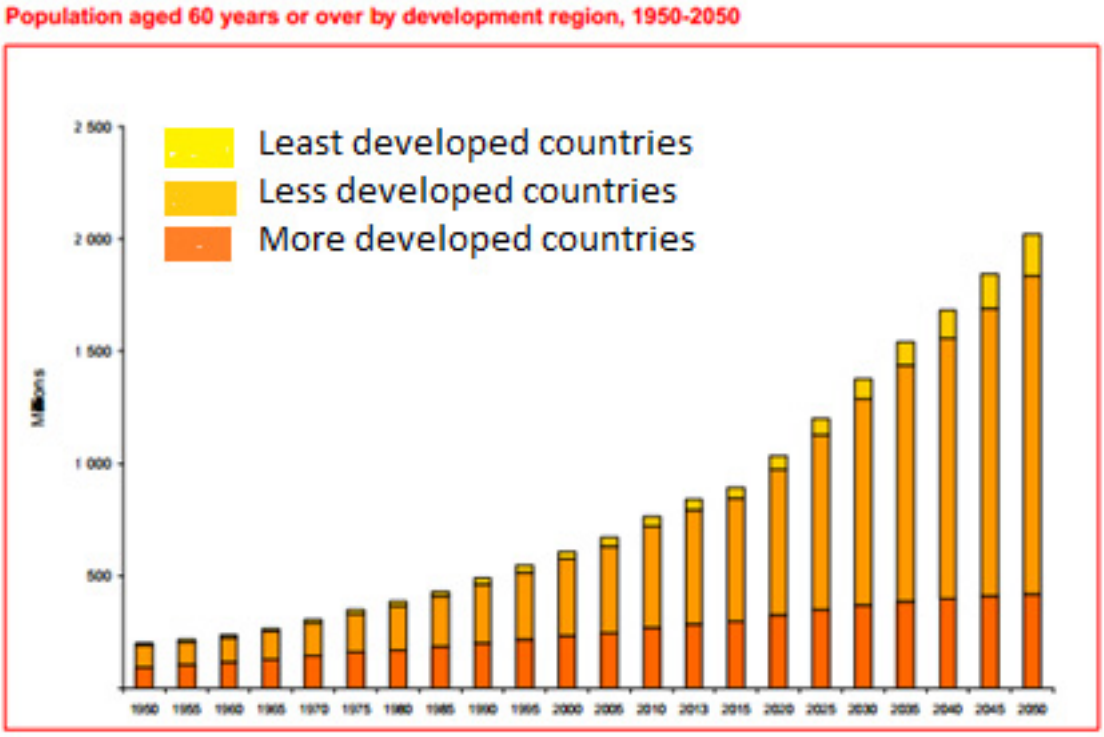
"We all form part of a life cycle, and every moment in this session, both at its beginning or near its end must be regarded as a treasure and be an occasion to celebrate" (World Health Organization).

To highlight the vast changes among the population trend in the world, the World Health Organization (WHO) adopted a slogan stating "The world is turning gray" that indicate the continuous rise in the number of elderly people and forecasting that the whole world is ageing without any marked heterogeneity between countries.(1) Although WHO defined old age as "the segment of the population, aged 60 and over", with many aged people leading an active life, the organization has later introduced three different categories of ages: 'young old' from 60 to 69 years old, 'middle age old' from 70 to 79 and 'old old' who are 80 and over.

Forecast

Due to the rapid decline in both fertility and mortality rates and more public health prosperity, there is an immense demographic change in the world (2) leading to improvement in the health of old people and ultimately increase in the average life span. (3) In the United Kingdom it is reported that the average life expectancy at birth for a man a few years ago was 68, but it is now 75 years with a rise at a rate of 2 months every year. The increase in the oldest old is even more dramatic reaching 100 years of age. (1)

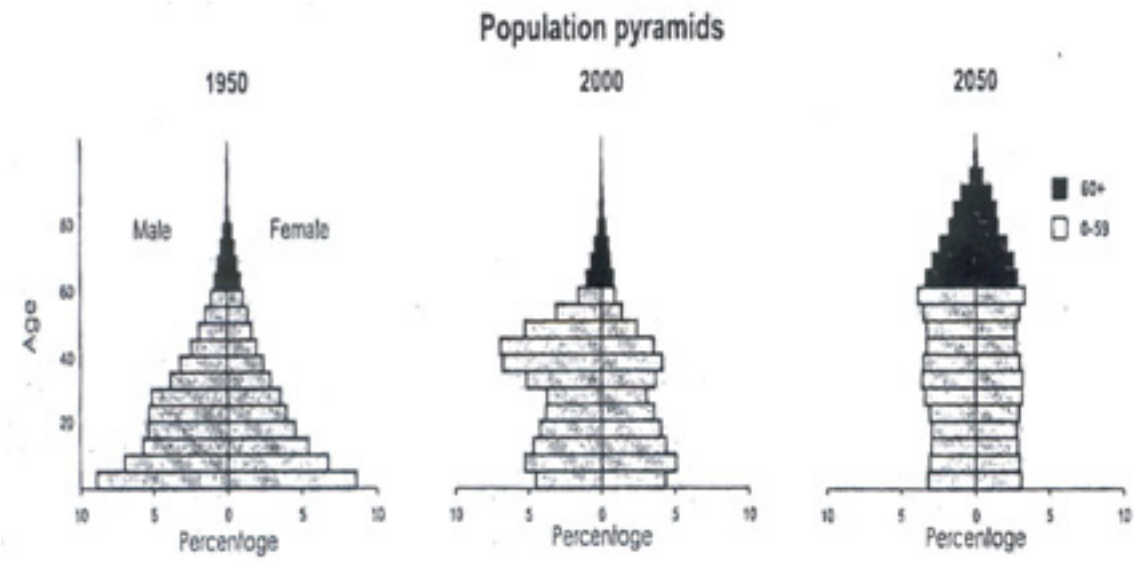
According to WHO, "between 2000 and 2050, the proportion of over 60 years old from the world's population will double from 11% to 22%, while their absolute number is expected to increase from 605 million to 3 billion over the same period of time" (Graph 1).



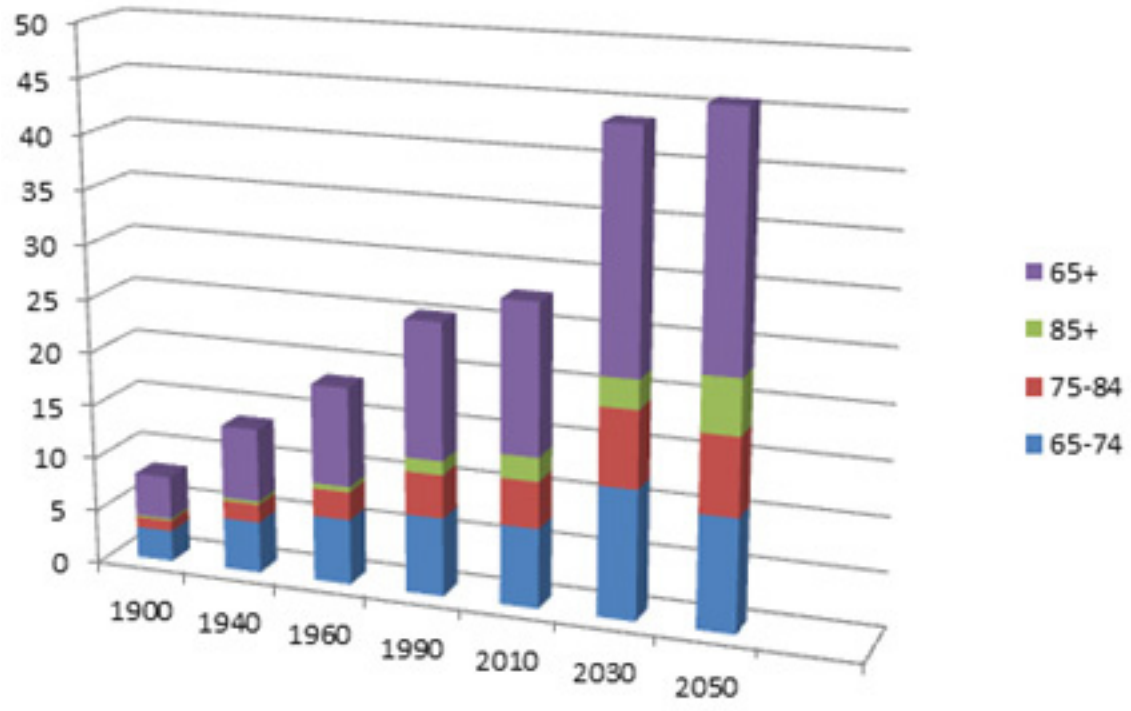
Graph 1: Projection of the number of population over 60 world- wide
Source: SIXTY-FIVE PLUS IN THE UNITED STATES. May 1995. Economics and Statistics Administration (4)

Gorman, in 2002, projected a monthly increase in the number of people aged 65 years till the year 2010 reaching to 1.1 million.(5) Although the current percentages (18% to 20%) of old people among the population in the developed world is higher than in the developing countries, it maintained its stability, while there is a steady and rapid increase in their number within the developing world. (6) It is alerting to know that 80% of such increment will be most prominent in low and middle-income countries. Reports indicate that in Africa alone during the coming few years the increase will reach 450 million (from an existing 213 million). (7) If the kingdom of Bahrain is taken as an example of the MENA (developing) countries, the percentage of old people reported in 1992 was 2.4%, that reached to 3.2% in 2000, then 5% in 2003 and is anticipated to be 10% and 25% in years 2025 and 2050 (Graph 2 - next page) respectively.(8)

Moreover, China will take around 34 years and Singapore around 20 years to double the proportion of its ageing population.(1) Meanwhile, the changes in the developed world have been gradual and homogeneous occurring over hundreds of years, before reaching its current ratios. In the United States of America, for example, the proportion of old people in 1990 was 4% and amounted to only 13.9% in 2010 (9) (Graphs 3,4). Also it took over 100 years for Belgium to double the proportion of its 60+ population from 9% to 18%. (1) Such a long period of gradual increase provided sufficient time for policy makers and scientists to conduct studies and regulate policies enabling the society to prepare and act in the best interests of this segment of the population, a luxury that the developing world would not have. (6)

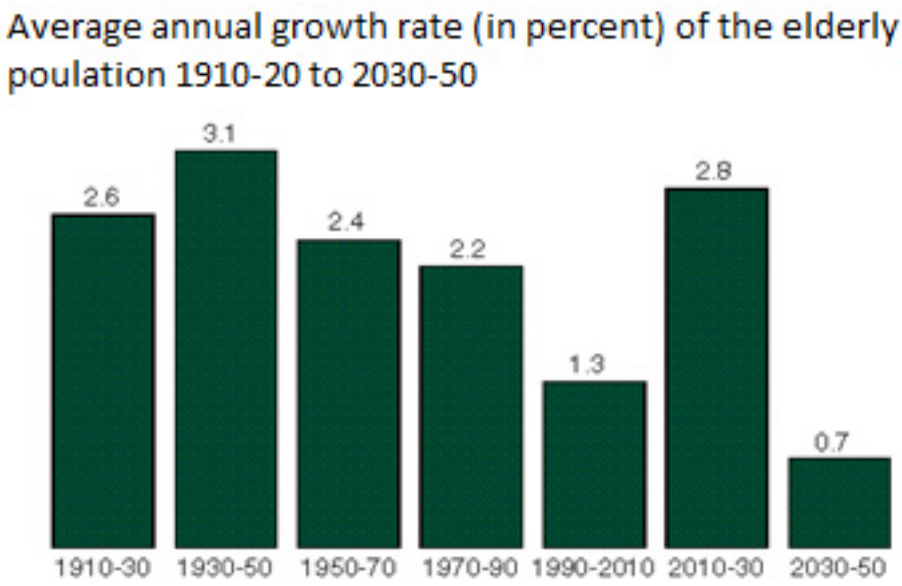


Graph 2: Forecast of population up to 2050 in Bahrain
Source: Central Statistics Organization, State of Bahrain 1995-1996.(8)

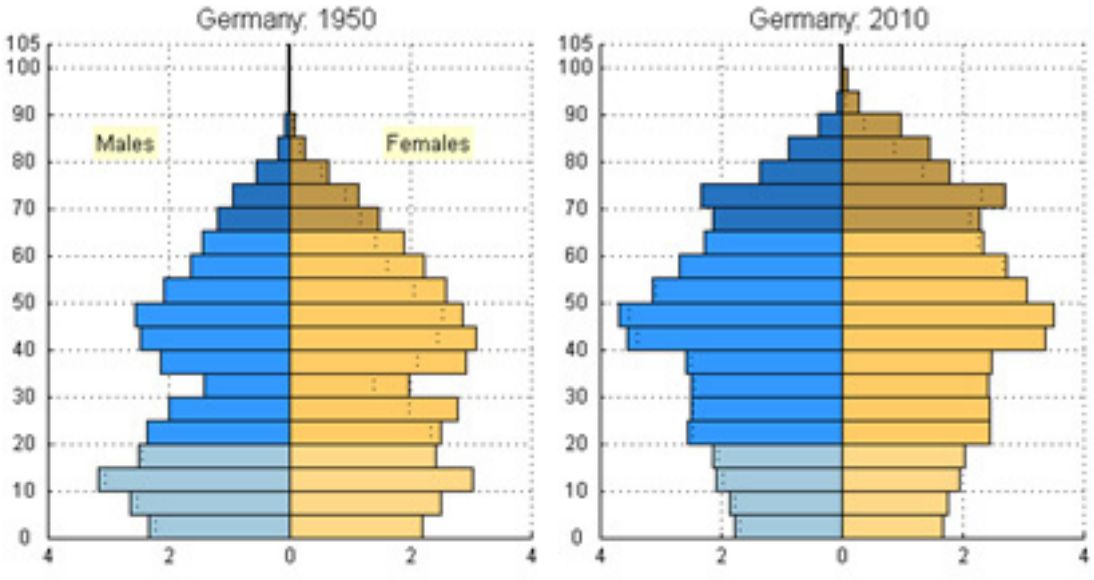


Graph 3: USA population trend from 1900-2050
Source: U.S. Senate Subcommittee on Aging; American Association of Retired Persons (10)

The traditional population pyramid that has a wide base and tapering end reflecting shape of the population with more of the younger generation than elderly has been changing over the years due to the changes in the population structure. In certain countries it can't be called a pyramid any more. (Graph 5 - example Germany). (11)

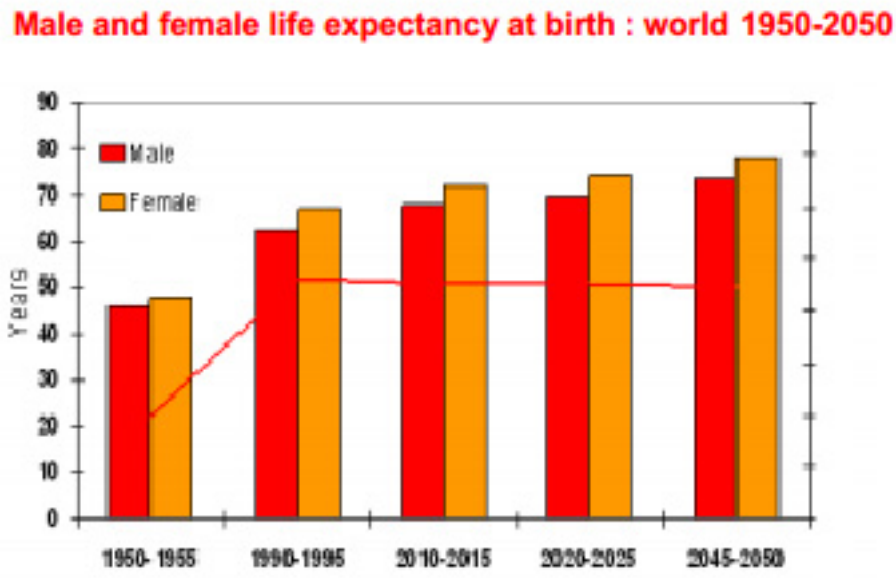


Graph 4: Trend of elderly population increase in the USA
Source: Economics and Statistics Administration, U.S. Department of Commerce (4)

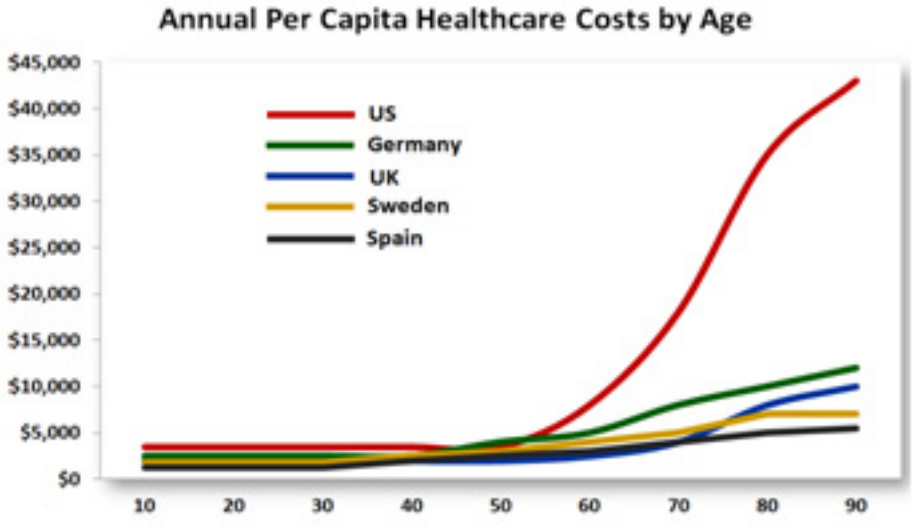


Graph 5 ; Population forecast I Germany
Source; United Nation Population database (11)

Life span in relation to gender:
Within all of the developed countries, and as is the case in many of the developing countries, there are improvements in the maternal and child health care services that are reflecting directly on the life span of the human being. In addition to that, other biological factors that are not related to the different socio-cultural issues have all lead women to live on average longer than men. (Graph No 6 - next page)



Graph 6: Life Expectancy by Gender
Source: World Population Ageing 2013 Report (12)



Graph 7: Per capita health cost by age
Source: Health Care Spending by Age and Country (18)

Socio-economic constraints

Politicians of the poorer countries are much more likely to neglect considering their responsibilities to older people, or worse, remain in a state of denial in which it is assumed that traditional values will ensure that 'the family will cope with the care of old people'. (13) Such ignorance will just add upon the problems and their complications. It is recommended by most agencies that the responsibilities of overlooking such problems should be shared between the government, society and the families where there is a social contract between the three parties emphasizing on the social values from which policies should grow.(14) It seems likely that in all countries there will be a need for re-defining the role of the state in 'welfarism' as suggested by Lloyd-Sherlock, who also highlighted the importance of changing the economic, social and cultural contexts in which social policies for older people are enacted.(15)

It should be clear that institutions or homes for the elderly are not always the solution for elderly problems. Studies have indicated that elderly people living in institutions are more prone to physical, health and social deterioration, than those living within their family at home. (16) It is also reported that at least 3% of the elderly among the age group 65-75 years are affected with some cognitive impairment, while many of those who are older than 85 years of age could get dementia (4) that increases to 66% when they are residing in social institutions. (17)

Whether it is a rich or poor country, the fact is that the cost of health care for old people is increasing. The rising costs for social welfare, has led consequently to the increasing emphasis on identifying what are seen as 'cost-effective' measures, such as enhancing the caring capacity of families and communities, asserting the responsibility of individuals to make provision for their own old age and drawing on collective support for older people from 'civil society' institutions, including non-governmental organizations (NGO).(2) According to a UK study

a few years ago, the cost of health care of a young person in England averaged to about £ 140 per year, while for the elderly it shot up to reach £500- £600 per year. Graph No.7, highlights the pattern of increasing health care cost with increasing age in the developed countries. However, despite such high cost pertaining to the health care and social services to elderly, the developed countries consider caring for them as a moral and social obligation.

Ageing Process

Ageing occurs in all people, even to those who have means of a good living. No matter how much effort is put into maintaining health and living a healthy life, we should accept the certainty of getting old, ageing and eventually, death. (19) Although it commences from early stages of life, even since the embryo stages, ageing is still considered to be a mystery which continues to be not very well understood.

Ageing is a process in which individuals undergo an exponential decline in vitality that transforms a salubrious person to a frail one. (19) Moreover ageing impacts human's health in a way that is more destructive to the body than any other disease. The efficiency of most organ systems is decreased as well and there is a loss of function at a rate of 1% a year starting from the age of 30 years. (20) The progressive decline in the efficiency of body cells lead to lack of cell ability for auto repair while the disturbance of the immune systems lead to functional decline in the ability to respond to new pathogens.(1) In addition one of the most important elements in ageing is the decreased ability to respond to stress and as a result of gradual loss of homeostatic mechanisms.(6) It is a prime major factor that contributes to the likelihood of disease occurrence leading to decline in all of man's physical and mental abilities.

Bergamini et al, 2007 described ageing as "a post-maturational deterioration of cells and organisms with the passage of time, an increased vulnerability to challenges and prevalence of age-associated diseases with decreased ability to survive". (21) While Atwood et al, 2011 in defining ageing theory stated "The Reproductive-Cell Cycle Theory posits that the hormones that regulate reproduction act in an antagonistic manner to control aging via cell cycle signaling; promoting growth and development early in life in order to achieve reproduction, but later in life, in a futile attempt to maintain reproduction, become dys-regulated and drive senescence. Since reproduction is the most important function of an organism from the perspective of the survival of the species, if reproductive-cell cycle signaling factors determine the rate of growth, determine the rate of development, determine the rate of reproduction, and determine the rate of senescence, then by definition they determine the rate of aging and thus lifespan". (22)

It is due to the cellular changes that happen specifically in the chemical structure of the body that makes the waste bio-products build up in tissues due to oxidation of some unsaturated fats causing the deposition and accumulation of certain fatty brown pigments called lipofuscin. Such deposition that is observed mainly in the nerve, liver, kidney and thyroid cells leads to decrement in the cell size, damage beyond repair, loss of chromatin and ultimately loss of cell function and in some cases the occurrence of fibrosis despite retention of cell activities for a period of time till it ceases completely. (23) The most vital tissues in the body that are affected by ageing are the fibroblasts, connective tissues, collagen and elastic fibers. When these tissues age, they lose their properties. For example, when the elastic property of certain cells is lost, its smooth contraction and relaxation function is affected, leading to stiffness that makes organs, blood vessels, and airways more rigid. (24) In addition lack of elasticity of the lung cells' affects respiration while altered vessel wall elasticity causes stiffness leading to increased pressure. Also, during ageing the collagen in certain body components is distorted or decreased leading to multiple complications. For instance, the transmutation of joints' cartilage causes rigidity mainly due to the disturbances in its collagen. The skin weakness is prone to facile laceration due to changes in the fibroblasts while (25) every change in any organ might be a result of many direct or indirect causes that are related to genetics, environmental or ageing related factors. All of these changes will ultimately lead to death which increases as ageing progress. It is estimated that the risk of death after the age of thirty doubles every eight years.

Challenges faced by old people

As man grows, his appearance, moving abilities, mental and psychological wellbeing, as well as the efficiency of his internal organs diminish. Moreover, ageing has been associated with numerous pathologies at the cellular, tissue, and organ level reflected on most of the vital system in the body. Hence, the size of different organs is decreased, such as the brain, heart, kidneys and lungs. (25,26,27) In addition there is decline in cardiovascular function, bone strength, muscle mass and deterioration or loss of brain functions, that include learning and memory. (28) Such changes lead to various challenges faced by old people, among which the most important are; Immobility, Instability, Incontinence, Intellectual impairment, susceptibility to Infection, Impairment of vision and hearing, malnutrition, Insomnia, Immune deficiency and Impotence. (20) All will play part in their psychological wellbeing increasing the probabilities of isolation and ultimately depression.

Is it possible to prevent ageing?

Scientists have not been able today to avert the process of ageing. However, its deteriorating signs can be delayed through screening and early detection of the factors that play a role in speeding up its process. Moreover, the illnesses' complications could be prevented or diminished by early diagnosis of damaging factors. Resorting to a salubrious healthy life style (in diet and exercise) from as early as childhood will no doubt delay such complications and result in an active senescent person. Cell death usually occurs due to the accumulation of bio products resulting from metabolism, (2) therefore, antioxidants could protect the body from the harmful effects of those free radicals that are normally produced during metabolic processes. Recent studies indicated that any reduction in the amount of calories of the circadian food intake without affecting the daily needed elements, (e.g. minerals, vitamins and fluids) would definitely delay the ageing process and extend lifespan. (21,25) Although, the downstream cellular targets regulated by dietary

restriction are largely unknown, (29) in many organisms, dietary restriction appears to, at least in part, act by down-regulating the nutrient-sensor TOR (Target of Rapamycin). TOR inhibition elicits autophagy, the large-scale recycling of cytoplasmic macromolecules and organelles.(30)

Conclusion

The number of old people is on the rise worldwide, although it is more prominent in the developing world where the highest problems due to its consequences, occur. Due to many factors of which the most important are lack of resources and policies, the developing countries will face a predicament, unless they start amending such policies for the provision of better social and health care services for the old people. Although ageing is inevitable, healthy living with proper sanitation, nutrition, exercise, health screening and health education will no doubt reduce its undesirable effects and help in active ageing.

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