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SOUNDING BOARD

Emerging Burden of Frail Young and Elderly Persons in Oman

For whom the bell tolls?

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أعباء رعاية الشباب وكبار السن في عُمان

لمن تقرع الأجراس ؟

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الملخص: أدى التحسن الملحوظ في الصحة وزيادة مستوى المعيشة في عُمان في العقود الأخيرة إلى انحسار الأمراض ذات الصلة بالبيئة والأمراض المعدية. لكن تشهد البلاد الآن تحولا وبائيا يتميز بزيادة مضطردة لأعداد المواليد، وتضخم قطاع الشباب، مشفوعا بزيادة عُمر الفرد. الحكمة الشائعة تشير إلى أنه سوف تقل معاناة العُمانيين من الأمراض، لكن دراسة سريعة في الأدبيات الموجودة تشير إلى أن الأمراض المزمنة غير المعدية أصبحت منتشرة وبشكل غير متوقع. ومن الممكن أن تُؤجج هذه الأمراض بعض الأنماط الاجتماعية والثقافية السائدة في هذا البلد، فضلا عن التناقض الموجود بين الصحة والعصرنة. مع الأسف مثل هذه ألأمراض الجديدة تصيب صغار السن، والذي يحتاج بعضهم نفس الرعاية التي تُخصّص لكبار السن. إضافة لذلك، وبسبب الطبيعة الشمولية والمستعصية لتلك الأمراض المزمنة غير المعدية فإنها تكون منيعة ضد نظام الرعاية الصحية الموجه نحو الشفاء. لذلك تستدعي هذه الحالة نقلة نوعية نحو نظام رعاية صحية يتجاوز التوجه التقليدي للشفاء لتوفير خدمات الرعاية للمصابين بالأمراض المزمنة من كافة الاعمار.

مفتاح الكلمات: اعتلال مزمن، أمراض غير مُعدية، تحول ديمغرافي، إعاقة، عبء المرض،عُمان.

ABSTRACT: Recent improvements in health and an increased standard of living in Oman have led to a reduction in environment-related and infectious diseases. Now the country is experiencing an epidemiological transition characterised by a baby boom, youth bulge and increasing longevity. Common wisdom would therefore suggest that Omanis will suffer less ill health. However, a survey of literature suggests that chronic non-communicable diseases are unexpectedly becoming common. This is possibly fuelled by some socio-cultural patterns specific to Oman, as well as the shortcomings of the 'miracle' of health and rapid modernisation. Unfortunately, such new diseases do not spare younger people; a proportion of them will need the type of care usually reserved for the elderly. In addition, due to their pervasive and refractory nature, these chronic non-communicable diseases seem impervious to the prevailing 'cure-oriented' health care system. This situation therefore calls for a paradigm shift: a health care system that goes beyond a traditional cure-orientation to provide care services for the chronically sick of all ages.

Keywords: Chronic disease; Non-communicable diseases; Transition, demographic; Disability; Burden of illness; Oman.

In the majority of the countries around the world, there is a variability of human lifespan, with the Japanese having the longest living population.[1] Although it is widely assumed that ageing or longevity or senescence is not a 'disease', and while Erikson[2] has portrayed old age as time of culmination of 'wisdom' that could be a gift for the succeeding generation, ageing does have its own unique challenges. Every health practitioner will attest to the view that longevity and the resultant ageing process often herald not only decreased vitality and capability, but also increased impairment, disability and a compromised quality of life.[3,4] The question is whether Oman should now be concerned with the welfare of the elderly even while its population

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structure is largely youthful. In this paper, it is urged that although the elderly constitute the minority of Oman's population, nevertheless, the country is likely to be beset with a silent epidemic of medically compromised individuals (MCI). This stems from the emerging trend of Omani youngsters suffering from a compromised wellbeing that was previously associated with the middle-aged or elderly. Such a trend would likely pose a challenge as the country moves away from the threat of environment-related and infectious diseases to the 'potential minefield' of impairment, disability, and handicaps arising from other conditions. These owe their origin to the modernisation and acculturation process which has taken place in the last 40 years in Oman.

Socio-Demographic Pattens

Life expectancy in Oman has increased dramatically in a little more than four decades from 50 years in 1970 to 74.22 years in 2011.[5] Socio-demographic patterns in Oman are deemed to be in an 'epidemiological transition' phase marked by the 'shift from the acute infectious and deficiency diseases characteristic of underdevelopment to the chronic non-communicable diseases characteristic of modernization and advanced levels of development' (p.8).[6] Recent affluence, as well as cultural patterns, have triggered a 'baby-boom' and the population structure is characterised by a youth bulge,[7] where 'tomorrow's people' constitute the bulk of the population.[8] In contrast to this youth bulge, available estimates suggest that the elderly, defined as over 60+ years, constitute barely 4.8% of the population.[9] One would speculate that such a youthful population should spare society in general, and the health care system in particular, from the burden of diseases which commonly results from a large population of frail and dependent senior citizens. There might therefore seem to be less need to allocate resources to this 'minority' of the population.

Factors Influencing the Burden of MCI in Oman

Although Oman's populations is indeed predominantly young, the country nevertheless has many MCI, some of whom are not elderly. In Oman, there is an unusual trend whereby youth people are seeking types of health care often perceived as only relevant for the elderly. Such a trend is likely to have been fostered by the following five interrelated factors.

THE CHALLENGE OF NON-COMMUNICABLE DISEASES

Oman has generally triumphed over communicable disease.[10,11] The country now faces the challenges of a rising tide of non-communicable diseases, sometimes labelled 'diseases of affluence'.[7] These 'elderly-onset', intransigent, and debilitating diseases seem to be affecting Oman's youngsters.[12-14] Such an emerging pattern of disease would suggest the need for a different approach in order to ensure enlightened health care planning and resource allocation. As will become apparent below, many of these emerging diseases of affluence are triggered by lifestyle changes and combatting them will require concerted efforts in the domain of rehabilitation and remedial services rather than simply curative medicine.[15]

ROAD TRAFFIC HAZARDS

Another contributor to impairment, disability and handicap in Oman is what is referred to as 'flying coffins', the mishap that happens to motor vehicle and their occupants on the road.[16] Unsubstantiated data published in the media reveal that the road accident rate in Oman is 28 per 100,000 of the population; if true, this is likely to be highest in the world.[17] It has been well established that although an 'accident is an accident', road traffic injuries are a major public health problem in Oman disproportionately affecting the section of the population under 40 years of age.[17,18] The type of health care provision needed, if the claim of a tsunami of road traffic accidents is substantiated, would parallel that often provided for the elderly.

CONGENITAL DISEASES

New reports suggest that Oman is not immune to congenital and inheritable genetic diseases as well those that are thought to be triggered by new mutations.[19,20] As consanguinity is intimately embedded in Omani culture (due to the practice of first cousin marriages), this is likely to exacerbate the development of diseases that owe their origin to inherited genetic traits and health impairing

mutations.[21] This will lead to more youngsters with a dented quality of life and level of dependency that will echo those of the elderly. On such grounds, social engineering, framed in the parlance of rehabilitation and remedial intervention, would be essential. From the global perspective, the 'potential minefield' due to genetically determined disorders has been difficult to ascertain due to differences in case ascertainment methods, criteria definition problems, and variations due to methodology. Nevertheless, the rate of genetically determined diseases reported in Oman appears to be startling, if not outright alarming, with a 2% prevalence rate for beta thalassaemia trait, and 6% for sickle cell trait.[22] Accordingly, it has been stated that congenital anomalies and birth defects are a leading cause of morbidity and mortality in Omani youngsters.[23,24]

HEALTH CARE 'MIRACLE'

In less than three decades, a once impoverished people has experienced such dramatic health care changes that Oman was recently voted by World Health Organization as one of the most efficient health care systems in the world.[25]. This 'miracle' has triggered some unforeseen consequences.

Despite spending only 2.4% of its of gross domestic product on health,[26] the health care system in Oman has been equipped with versatile medical technology capable of saving lives once deemed beyond redemption.[27] Medical conditions that previously appeared impervious to medical treatment are now treatable to the extent that patients can survive and regain some quality of life. The paradoxical consequence of this a miracle is that people whose lives are saved by medical technology will nonetheless live with severe physical, cognitive and emotional impairment, disability and handicap. Many of them will require a type of palliative care often reserved for the elderly.

MENTAL ILLNESS

By definition, mental illnesses are associated with persistent and pervasive cognitive, emotional and behavioural disorders (CEBD). A sufferer is likely to have a compromised quality of life. Therefore, mental illness is one of the contributory factors to the magnitude of the problem under scrutiny here, namely the growing number of MCI. Despite this, CEBD have largely been relegated to a less prominent position in the algorithms of health care.[28,29] In general, in the countries labelled 'emerging economies', concerted efforts to improve the welfare and care of MCI due to CEBD are ostensibly absent.[30] Instead, health care priorities are still the perceived enemies of health such as infectious diseases and reproductive, maternal, and child health conditions. This is similar to the situation in industrialised countries that have so far focused their attention on the prevention and treatment of cancer and heart diseases.[31] However, such a prioritisation appears to be myopic when one considers the enormous negative repercussions of CEBD. Despite their protean nature, when defined using disability-adjusted life year (DALY), CEBD appears to outstrip all other medical conditions in term of number of years lost due to ill-health, disability or early death.[32] This is consistent with the view that CEBD tend to compromise the very essence of being human, namely, the capacity to think and act rationally. It is worth noting that CEBD tend to peak when afflicted individuals are still at a young age, thus depriving them of meaningful existence for many years. This has obvious implications for society. In addition to impairment, disability and handicap, CEBD tend affect other areas of health. For example, emotional disorders tend to have a strong link with physical illness.[33] The relationship between emotional disorders and physical illness has been unequivocally shown in emerging literature, including in Oman.[34]

In addition to this, there is strong evidence to suggest that some well known physical illnesses tend to create a psychological burden.[35] For example, following diagnosis of cancer, some individuals may succumb to reactive depression which, in turn, can affect the prognosis. The Omani population, with its 'baby boom', 'youth bulge' and increased longevity, should therefore expect to see an exponential increase in the number of the people succumbing to CEBD. The available data are consonant with such a view. Although sometimes framed in the local idioms of distress, CEBD are widely recognised in Oman. The magnitude of some CEBD (e.g. deliberate self-harm,[36] hyperkinetic disorder,[37] depressive symptoms,[38] factitious disorder[39] and eating disorders in the form of deliberate food restriction[40]) is much lower compared to international standards, but Oman is the 'world leader' in those distresses that owe their origin to social and cultural patterning (e.g. social

phobias[41] and dissociative disorders[42]).

Possible Solutions to this Emerging Issue

With the rising tide of non-communicable diseases; impairment, disability and handicap triggered by road traffic behaviour, some of consequences of the modern medical revolution, and the enduring cultural patterns that may sustain genetically determined disorders, Oman needs to contemplate a new direction for its health care system. Rather than focusing on environment-related and infectious diseases, an integral part of Oman's health system should be meeting the needs of MCI through remedial services—since it would be an untenable aspiration to find a cure for all the causes of impairment, disability and handicap in Oman.

NEW TYPES OF HEALTH CARE SERVICES

The importance of improving neurobehavioural rehabilitation in Oman was previously highlighted;[43] here, it is worthwhile discussing the relevance of the compensatory efforts needed to support MCI with persistent and debilitating medical conditions.[27] Health care services should enable MCI to reach and maintain their optimal levels of physical, sensory, intellectual, psychological and social functioning in order to achieve a measure of self-determination and meaningful and independence existence. [44] Due to their focus on chronic disease, modern cure-based hospitals may be the least attractive option. Rehabilitation or remedial services need multidisciplinary medical teams, with a range of skills from social work to neurosurgery, which are also supported by educational/vocational institutions and other social agencies.

If the available data circulating in the media would bear scientific scrutiny, it appears that 0.3 to 0.4% of Omanis are likely to incur impairment, disability and handicap arising from road accidents. This trend dovetails with the present discourse that Oman is likely to experience an increased number of youngsters with MCI. Extrapolating from this trend, it could be thought that some MCI are likely to use acute hospital beds as a 'care home'. Extended hospital stays for MCI can often trigger bed shortages for other clinical populations and result in increased health care expenditure. Some of the MCI who tend to 'over-stay' are likely to be too frail to be discharged home—as has been found in other Arab countries.[45-47]

CARE IN THE FAMILY

Care for MCI often depends on the prevailing Zeitgeist and history is full of approaches to helping those who are deemed unfit or dependent. Nowadays, health care facilities are mushrooming in different parts of the world to cater to the needs of MCI. These are specifically designed to provide a place of abode for MCI who cannot independently undertake their activities of daily living. In the present discussion, such health care facilities aim to provide a compensatory mechanism so that MCI can have a meaningful existence.

Thesiger fondly praised Omanis for "…their sense of fellowship, … their generosity and sense of hospitality; their dignity and their regard which they have for the dignity of others as fellow human beings." (Cited in Smith p.541).[48] It is not clear what impact modernity (as result of acculturation) has had in recent times on such an ideal humanity. Nonetheless, in family-oriented societies like Oman, interdependence is still encouraged. Such cultural patterning means that MCI will be cared for in the realm of the family. It is a widely held belief (though one that lacks empirical support) that given this type of society the fate of MCI is likely to be favourable. The question, however, is whether the modern Omani family is equipped to provide the family care needed by MCI. It has been indicated that recent affluence in Oman has resulted in the nuclear family supplanting the traditional extended family leading to a reported emergence of socially valued individualism and the erosion of interpersonal relationships that stems from modern education systems.[49,50] There are also anecdotal reports indicating that the young generation "has little time for elderly people". [51]

It is not clear, however, what implication this sociological observation has on the welfare of MCI. Despite such caveats, the family plays a central role in Omani society. On these grounds, it would be essential to contemplate a health care model that has affinity to Omani socio-cultural teaching.

Although, to our knowledge, there is published work, relating to the elderly, articles in the popular media indicate that the country is "not encouraging the establishment of such homes because we still

believe that the Omani community will be able to take care of their elderly population as our religion and tradition teaches us to do so.[52] Given the lack of organised services in Oman for the MCI, some individual initiatives have already been seen in the community. To cope with the burden of caring for MCI, with their complex physical and emotional needs, some families employ private carers who undertake the physical aspect of caring (feeding and washing). However, employing an in-house carer is limited to those who have sufficient disposable income and may not apply to the majority of Omanis. Nevertheless, the presence of private carers spares family members from the task of constant physical caring for their MCI.

SUPPORTED HOME AND COMMUNITY CARE

Within the context of a family-oriented society, one approach that might be appropriate for MCI in Oman is outreach services similar to home health care, otherwise known as domiciliary care or social care. As the term implies, home health care serves the myriad needs of MCI in their homes by outreach teams that include all types of health care professionals such as nurses, occupational therapists and social workers. This type of care has some subtle benefits that outweigh other approaches. First, the services will be tailor-made for the MCI's functional limitations. Second, the MCI not need to travel outside for help which may be difficult due to their medical complications. Third, the MCI will be protected from psychological trauma—the feeling of unfamiliarity that can heighten anxiety and the feeling of being uprooted from home and having to part with possessions that are usually experienced by those put in care homes. This means MCI have their health needs met within their own community which mean they are likely to remain closer to their social network of friends, neighbours and family thus mitigating loneliness, depression and other existential dilemmas. International surveys show that over 95% of MCI would prefer to stay in their own home for as long as possible.[53]

Finally, for the family and society in general, such a care model is likely to be more cost effective than hospital care. There is evidence to suggest that even if MCI tend to be marked by a high level of dependency, home care is likely to be cost-effective. Such a view is supported by studies carried out in Denmark, Ireland and Italy where home-based care is generally more cost-effective for such MCI.[54]

Another alternative approach is a non-residential facility that provides activities for the MCI during the day. This would mean that MCI could spend 10–12 hours per day in a setting possibly with access to a medical facility. Under this scheme, meals, social and recreational outings, and general supervision are provided by a team of experts. There are several advantages to such a proposal. First, regular proximity to health care delivery is likely to prevent re-hospitalizations as medical assessments and medications are readily available. Second, the benefit of social stimulation will emerge. MCI who would otherwise stay at home are provided with recreational activities and other social stimulations that maybe therapeutic on their own right. There are some empirical studies suggesting that social stimulation can ward off the emergence of cognitive impairment and other debilitating emotional conditions common in MCI.[55] Relevant to this, while such centres could provide remedial education and rehabilitation for MCI, in the interim, caregivers would get much needed respite to seek employment or simply to recuperate from the stress of caring for MCI with their particular problems. It is worth noting in this context that many MCI are marked by erratic behaviour and a rigidity of personality that may exhaust their caregivers.

Conclusion

Oman has been internationally lauded for taking vigorous action to combat disease and to improve the condition of its people Such a health service 'miracle', associated with an increased standard of living, has led to the progressive demographic transformation of society. Recent socio-economic trends have reduced the occurrence of environment-related and infectious diseases. Instead, there is a rising tide of death, morbidity, handicap and disability due to genetically determined disorders and other sequelae of acculturation and modernisation including road traffic accidents and the very success of the medical revolution. This has occurred in the midst of a 'baby boom', a prevailing youth bulge and increased life expectancy. As result of such socio-demographic trends, the country is

witnessing a rising tide of MCI among both young and elderly populations. Due to their persistent, pervasive and refractory nature, the emerging health conditions appear to be impervious to the benefits of the modern 'cure-oriented' health care system which was effective for the environment-related and infectious diseases of the previous era. This therefore calls for a paradigm shift: a health care system that goes beyond strict adherence to the traditional 'comfort zone' of cure-oriented health care system. New pragmatic solutions need to be found to meet the new challenge of the increasing numbers of MCI in Oman.

References

1. Cheung SL, Robine JM. Increase in common longevity and the compression of mortality: the case of Japan. Popul Stud (Camb) 2007; 61:85–97.
2. Erikson H. Childhood and Society. New York: W. W. Norton & Company, 1993.
3. Berlau DJ, Corrada MM, Peltz CB, Kawas CH. Disability in the oldest-old: incidence and risk factors in the 90+ study. Am J Geriatr Psychiatry 2012; 20:159–68.
4. AbiHabib LE, Chemaitelly HS, Jaalouk LY, Karam NE. Developing capacities in aging studies in the Middle East: Implementation of an Arabic version of the CANE IV among community-dwelling older adults in Lebanon. Aging Ment Health 2011; 15:605–17.
5. Central Intelligence Agency. The World Factbook: Oman. From: https://www.cia.gov/library/publications/the-world-factbook/geos/mu.html. Accessed: Feb 2012.
6. Wahdan M.H. The epidemiological transition. East Mediterr Health J 1996; 2:8–20.
7. Ganguly SS, Al-Lawati A, Al-Shafaee MA, Duttagupta KK. Epidemiological transition of some diseases in Oman: a situational analysis. World Hosp Health Serv 2009; 45:26–31.
8. Sulaiman AJ, Al-Riyami A, Farid S, Ebrahim GJ. Oman Family Health Survey 1995. J Trop Pediatr 2001; 47:S1–33.
9. Health statistics and health information systems. Definition of an older or elderly person. World Health Organization.http://www.who.int/healthinfo/survey/ageingdefnolder/en/index.html. Accessed March 2012.
10. Al-Lamki L. Acute coronary syndrome, diabetes and hypertension: Oman must pay more attention to chronic non-communicable diseases. Sultan Qaboos Univ Med J 2011; 11:318–21.
11. Al Awaidy ST, Bawikar S, Patel PK, Kurup P, Sonal GS, Al Mahrooqi S, Ramzy R. Absence of lymphatic filariasis infection among secondary-school children in Oman. East Mediterr Health J 2010 16:1059–63.
12. Gujjar AR, William R, Jacob PC, Jain R, Al-Asmi AR. Transcranial Doppler ultrasonography in acute ischemic stroke predicts stroke subtype and clinical outcome: a study in Omani population. J Clin Monit Comput 2011; 25:121–8.
13. Woodhouse NJ, Elshafie OT, Al-Mamari AS, Mohammed NH, Al-Riyami F, Raeburn S. Clinically-defined Maturity Onset Diabetes of the Young in Omanis: Absence of the common Caucasian gene mutations. Sultan Qaboos Univ Med J 2010; 10:80–3.
14. Asfour MG, Lambourne A, Soliman A, Al-Behlani S, Al-Asfoor D, Bold A, et al. High prevalence of diabetes mellitus and impaired glucose tolerance in the Sultanate of Oman: results of the 1991 national survey. Diabet Med 1995; 12:1122–5.
15. Probst-Hensch N, Künzli N. Preventing noncommunicable diseases-beyond lifestyle. Epidemiology 2012; 23:181–3.
16. Nantulya VM, Reich MR. The neglected epidemic: road traffic injuries in developing countries. BMJ 2002; 324:1139–41.
17. Al-Naamani A, Al-Adawi S. 'Flying coffins' and neglected neuropsychiatric syndromes in Oman. Sultan Qaboos Univ Med J 2007; 7:75–81.
18. Directorate General of Traffic, Royal Oman Police Traffic Statistics Report (1971-2009). Muscat: Royal Oman Police, 2010.
19. Al-Futaisi AM, Al-Kindi MN, Al-Mawali AM, Koul RL, Al-Adawi S, Al-Yahyaee SA. Novel mutation of GLRA1 in Omani Families with hyperekplexia and mild mental retardation. Pediatr Neurol 2012; 46:89–93.
20. Al-Mayouf S, Abdwani R, Al-Brawi S. Familial juvenile systemic lupus erythematosus in Arab children. Rheumatol Int 2011. Doi: 10.1007/s00296-011-1886-y.
21. Islam MM. The practice of consanguineous marriage in Oman: prevalence, trends and determinants. J Biosoc Sci 2012; 9:1–24.
22. Al-Riyami A, Ebrahim GJ. Genetic blood disorders survey in the Sultanate of Oman. J Trop Pediatr 2003; 49:1–20.
23. Rajab A, Vaishnav A, Freeman NV, Patton MA. Neural tube defects and congenital hydrocephalus in the Sultanate of Oman. J Trop Pediatr 1998; 44:300–3.
24. Kenue RK, Raj AK, Harris PF, el-Bualy MS. Cytogenetic analysis of children suspected of chromosomal abnormalities. J Trop Pediatr 1995; 41:77–80.
25. Jamison DT, Sandbu ME. Global health. WHO ranking of health system performance. Science 2001;

293:1595–6.

26. Alshishtawy MM. Four decades of progress: Evolution of the health system in Oman. Sultan Qaboos Univ Med J. 2010;10:12–22.
27. Al-Adawi S. Emergence of diseases of affluence in Oman: Where do they feature in the health research agenda? Sultan Qaboos Univ Med J 2006; 6:3–9.
28. Maziak W, Asfar T, Mzayek F, Fouad FM, Kilzieh N. Socio-demographic correlates of psychiatric morbidity among low-income women in Aleppo, Syria. Soc Sci Med 2002; 54:1419–27.
29. Bass JK, Bornemann TH, Burkey M, Chehil S, Chen L, Copeland JR, et al. A United Nations General Assembly Special Session for mental, neurological, and substance use disorders: the time has come. PLoS Med 2012; 9:e1001159.
30. Okasha A, Karam E, Okasha T. Mental health services in the Arab world. World Psychiatry 2012; 11:52–4.
31. Prince M, Patel V, Saxena S, Maj M, Maselko J, Phillips MR, et al. No health without mental health. Lancet 2007; 370:859–77.
32. Mathers C, Boerma T, Ma Fat D. Global burden of disease 2004 update. Geneva: World Health Organization, 2008.
33. Al Lawati J, Al Lawati N, Al Siddiqui M, Antony SX, Al Naamani A, Martin RG, et al. Psychological morbidity in primary healthcare in Oman: A preliminary study. Sultan Qaboos Univ Med J 2000; 2:105–10.
34. Al-Maskari MY, Petrini K, Al-Zakwani I, Al-Adawi SSH, Dorvlo ASS, Al-Adawi S. Mood dysfunction and health-related quality of life among type 2 diabetic patients in Oman: Preliminary study. Int J Nutr Pharmacol, Neurol Dis 2011; 1:56–63.
35. Kim SW, Kim SY, Kim JM, Park MH, Yoon JH, Shin MG, et al. Relationship between a hopeful attitude and cellular immunity in patients with breast cancer. Gen Hosp Psychiatry 2011; 33:371–6.
36. Zaidan ZA, Burke DT, Dorvlo AS, Al-Naamani A, Al-Suleimani A, Al-Hussaini A, et al. Deliberate self-poisoning in Oman. Trop Med Int Health 2002; 7: 549–56.
37. Al-Sharbati M, Al-Adawi S, Ganguly S, Al-Lawatiya S, Al-Mshefri F. Hyperactivity in a sample of Omani schoolboys. J Atten Disord 2008; 12:264–9.
38. Jaju S, Al-Adawi S, Al-Kharusi H, Morsi M, Al-Riyami S. Prevalence and age-of-onset distributions of DSM IV mental disorders and their severity among school going Omani adolescents and youths: WMH-CIDI findings. Child Adolesc Psychiatry Ment Health 2009; 3:29. Doi: 10.1186/1753-2000-3-29.
39. Bhargava D, Al Okbi MH, Al-Abri R, Bhargava K, Rizvi SGA, Al-Adawi S. Phenomenology and outcome of factitious disorders in otolaryngology clinic in Oman. Int J Psychiatry Med 2007; 37:229–40.
40. Al-Adawi S, Dorvlo AS, Burke DT, Al-Bahlani S, Martin RG, Al-Ismaily S. Presence and severity of anorexia and bulimia among male and female Omani and non-Omani adolescents. J Am Acad Child Adolesc Psychiatry 2002; 41:1124–30.
41. Al-Hinai SS, Al-Saidy O, Dorvlo ASS, Al-Riyami BMS, Bhargava K, Northway MG, et al. Culture and prevalence of social phobia in a college population in Oman. In: Landow MV, Ed. College Students: Mental Health and Coping Strategies. Hauppauge, New York: Nova Science Publishers, 2006. Pp.2–19.
42. Chand SP, Al-Hussaini AA, Martin R, Mustapha S, Zaidan Z, Viernes N, et al. Dissociative disorders in the Sultanate of Oman. Acta Psychiatr Scand 2000; 102:185–7.
43. Al-Adawi S, Burke DT. Revamping neuro-rehabilitation in Oman. Sultan Qaboos Univ Med J 2001; 3:61–4.
44. Rehabilition. World Health Organization. From: http://www.who.int/topics/rehabilitation/en/ Accessed: Feb 2012.
45. Margolis SA, Reed RL. Changing use of the emergency department by the elderly in the United Arab Emirates, 1989 and 1999. East Mediterr Health J 2002; 8:409–15.
46. Shaltout T, Bener A, Al Abdullah M, Al Mujalli Z, Shaltout HT. Acute and transient psychotic disorders in a rapidly developing country, State of Qatar. Medicina 2007; 43:575–9.
47. Margolis SA, Reed RL. Institutionalized older adults in a health district in the United Arab Emirates: health status and utilization rate. Gerontology 2001; 47:161–7.
48. Smith R. Oman: leaping across the centuries. BMJ. 1988;297:540-4.
49. Al-Barwani TA, Albeelyb TS. The Omani family: strengths and challenges. Marriage Fam Rev 2007; 41:119–42.
50. Al-Adawi S. Adolescence in Oman. In: Arnett JJ, Ed. International Encyclopedia of Adolescence: A Historical and Cultural Survey of Young People around the World. New York: Routledge, 2006, Pp. 713–28.
51. Vaidya SK. State steps in to take care of elderly in Oman. From: http://gulfnews.com/news/gulf/oman/state-steps-in-to-take-care-of-elderly-in-oman-1.206123. Accessed: Feb 2012.
52. Care at hand for the elderly. OmanInform.com. From: http://www.omaninfo.com/news/care-hand-elderly.asp Accessed: Feb 2012.
53. Wilson A. Improving life satisfaction for the elderly living independently in the community: care recipients' perspective of volunteers. Soc Work Health Care 2012; 51:125–39.

54. Wilson A. Improving life satisfaction for the elderly living independently in the community: care recipients' perspective of volunteers. Soc Work Health Care 2012; 51:125–39.

55. Woods B, Aguirre E, Spector AE, Orrell M. Cognitive stimulation to improve cognitive functioning in people with dementia. Cochrane Database Syst Rev 2012; 2:CD005562.