

# Impact of Geographical Proximity on Health Care Seeking Behaviour in Northern Oman

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## تأثير القرب الجغرافي كسبب لسلوك اللجوء للرعاية الصحية في شمال عمان

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**الملخص: الهدف:** على الرغم من تأثيرها على السياسة الصحية فإن العلاقة بين القرب الجغرافي واللجوء للرعاية الصحية لاقت القليل من الاهتمام في الأدبيات الطبية. تهدف هذه الورقة إلى تقييم العلاقة بين القرب الجغرافي وسلوك استخدام الرعاية الصحية بين المرضى الذين يلجأون للاستشارة الطبية في مناطق شمال عمان. **الطريقة:** تم جمع المعلومات خلال سنتي 2006-2007 وذلك عن طريق المقابلة الشخصية لـ 428 مريضاً تم اختيارهم عشوائياً من بين المرضى المراجعين لمراكز الرعاية الصحية الأولية المختلفة بمناطق شمال عمان. تم تحليل العلاقة بين القرب الجغرافي كسبب للجوء للرعاية الصحية والمؤثرات الأخرى وذلك باستخدام تحوّل الامداديات متعددة المتغير. **النتائج:** أظهرت البيانات أن تفضيل القرب الجغرافي كأحد أسباب اللجوء للرعاية الصحية مرتبط ارتباطاً وثيقاً بالحالة الزوجية والاستخدام السابق للطب الشعبي وحضور جلسات التنقيف الصحي وإجراء التطعيم في الماضي. **الخلاصة:** نتائج البحث تدعم الدراسات السابقة حيث يظل القرب الجغرافي سبباً قوياً للجوء للرعاية الصحية في عمان. تم مناقشة تأثير العوامل النفسية والاجتماعية على ذلك السلوك في محتوى الورقة.

**مفتاح الكلمات:** القرب الجغرافي، استخدام الرعاية الصحية، عربي/إسلامي، دراسة سريرية، عمان.

**ABSTRACT Objectives:** Despite its impact on health policy, the relationship between geographical proximity and health care seeking has received scant attention in the medical literature. This paper aims to evaluate the relationship between geographic proximity and health care usage behaviour among patients seeking medical consultation in the northern region of Oman. **Methods:** During 2006-2007, data was collected via face-to-face interviews among 428 randomized patients seeking medical consultation in various primary health care centres in the northern region of Oman. The association between geographical proximity as a reason to seek health care and other predictors was also analysed using multivariable logistic regression. **Results:** The data suggest that preference for geographical proximity as a reason for seeking health care is strongly associated with marital status, previous exposure to traditional medicine and health education, as well as history of immunisation. **Conclusion:** This finding supports the view from elsewhere that geographical proximity remains a strong catalyst for care seeking in Oman. The psychosocial factors affecting care seeking are discussed.

**Keywords:** Geographic proximity; Health care utilization; Arab/Islamic; Clinical-based study; Oman.

### Advances in Knowledge

- The study shows that geographical proximity remains a strong catalyst for health care seeking in Oman.
- Socio-cultural teaching appears to play a major part in what may appear to be a paradoxical and idiosyncratic relationship between geographical proximity and health care seeking behaviour.
- The study stimulates the need to conduct further studies that look more closely at the issues of health care seeking behaviour, particularly in remote areas and with regard to the use of traditional medicine centres.

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*Application to Patient Care*

- Some populations are sparsely distributed in many parts of a country, therefore health planners have been obliged to build health care services that can be accessed by all. This is particularly applicable to preventive services such as vaccination.

SINCE THE WORLD HEALTH ORGANIZATION launched *Health for All by Year 2000*,<sup>1</sup> many health planners in developing countries have expanded and diversified health care services in order to achieve viable health equity. However, one source of attrition around this endeavour is the lack of understanding surrounding care seeking behaviour among health care consumers. An understanding of care seeking behaviour can act as a basis on which to lay the groundwork for developing strategies to improve awareness and to identify barriers to timely interventions and treatments. Attention to care seeking behaviour would likely impact health care utilisation and, albeit indirectly, reduce the high maternal and infant mortality rates, as well as heightening the health indicators of a country.

Various studies have converged on the view that the use of health care services is related to factors such as service accessibility and quality of service, beliefs underpinning avoidance of distress and individual differences.<sup>2, 3, 4, 5</sup> Although most of these studies have been derived from a variety of populations, to our knowledge, few studies examine the factors leading to health care seeking behaviour in Arab populations,<sup>6, 7</sup> and their generalisation is often limited to specific clinical populations.<sup>8, 9</sup>

This paper attempts to examine the factors associated with the utilisation of health care among general health care consumers in Oman, an Arab/Islamic country situated in the south-eastern corner of the Arabian Peninsula. Once observers labelled Oman the "Tibet of Arabia" or characterized it as a "beleaguered hermit kingdom"<sup>10</sup> due to its isolation and mediaeval-like society; however, Oman has experienced rapid modernisation in the past few decades. The British Medical Journal has stated that, "Money from oil has brought Omanis progress through development in less than 20 years, development that took a thousand years in Europe".<sup>11</sup> Two of the major benefits of the recent modernisation in Oman are the major improvement in the standard of living, and the establishment of a modern health care delivery system. Hospital bed space grew from 12 beds in a single hospital in 1970 to

4,549 beds and more than 150 health centres in 2006.<sup>11</sup> With the improvements in health care, the country has experienced a significant decline in maternal and child mortality.

Studies from other countries around the world are beginning to show that the use of health care services is related to geographical proximity to health care centres.<sup>12, 13, 14, 15, 16</sup> Emerging views suggest that many clinical conditions and their outcomes often depend, among other things, on the geographical proximity of care facilities.<sup>17, 18</sup> For example, in some emerging economies in many parts of the world, health care accessibility is limited to urban areas,<sup>19, 20</sup> and therefore health inequity has been heightened simply due to an asymmetry in the availability of health care services reflecting an urban-rural disparity.<sup>21, 22</sup> In some studies, it has been reported that morbidity and mortality in a clinical population are invariably related to the geographical proximity of the health care centres.<sup>23</sup> Although the ability to access health care is influenced by myriad factors, the relationship between care seeking and distance travelled has not been widely reported in developing countries.<sup>24, 25</sup> This is problematic when one bears in mind that in many developing countries there exists a drastic disparity in the availability of health care services between different geographical regions of the country. With the spread of universal free health care in Oman, the question remains: 'How does geographic proximity contribute to care seeking and, by implication, health equity in the country?'

The recent rise in affluence in Oman has blurred the once-clear gap between rural and urban environments, as social services and infrastructure developments have spread equally to all regions of the country.<sup>12</sup> The United Nations Children's Fund<sup>26</sup> has estimated that for the past several years 96 percent of the population of Oman has had access to health care services. The population density of Oman has been estimated at 8.3/km<sup>2</sup>. The bulk of the population is located in the towns and villages adjacent to the capital, Muscat, and towns along the northern Batinah coast. The rest of the population is distributed throughout the southern and interior regions of the country. In a recent health

**Table 1: Demographic, clinical and health resource characteristics of the study cohort stratified by geographical proximity to a health centre as a reason to seek healthcare (n = 428).**

Characteristic	Short distance as a reason to seek healthcare		p-value
	No (n=46)	Yes (n=382)	
Age, mean ± SD, years	29±12	33±12	0.034
Gender, n (%)			0.399
Female	31 (67%)	233 (61%)	
Male	15 (33%)	149 (39%)	
Marital status, n (%)			0.001*
Single, divorced, widowed	26 (57%)	121 (32%)	
Married	20 (43%)	261 (68%)	
Literacy, n (%)			0.539
Illiterate (cannot read or write)	6 (13%)	70 (18%)	
Literate (can read or write)	40 (87%)	312 (82%)	
Attended a health education program			0.035*
No	37 (80%)	248 (65%)	
Yes	9 (20%)	134 (35%)	
History of chronic illness, n (%)			0.518
No	33 (72%)	256 (67%)	
Yes	13 (28%)	126 (33%)	
Takes regular medication, n (%)			0.533
No	30 (65%)	231 (60%)	
Yes	16 (35%)	151 (40%)	
Number of visits attended per month			0.253
Mean±SD	1.67±2.53	1.27±2.30	
Median (absolute range)	1 (0 to 15)	1 (0 to 30)	
Reason to seek healthcare, n (%)			0.065
Treatment of acute condition	25 (54%)	142 (37%)	
Follow-up visit	12 (26%)	118 (31%)	
Vaccination or other	9 (20%)	122 (32%)	
Source of healthcare, n (%)			0.080
Government	34 (74%)	272 (71%)	
Private	7 (15%)	29 (8%)	
Traditional	5 (11%)	81 (21%)	

SD = Standard deviation.

Percentages are column percents.

p-values were generated using Student's and Wilcoxon Mann-Whitney tests, Pearson's  $\chi^2$  test, and Fisher's Exact test whenever appropriate.

system ranking, the WHO ranked Oman as the most “efficient” health care system in the world in terms of outcome.<sup>27</sup> Therefore, given the quality of the health care services, and the geographical characteristics of

the country, Oman, is an interesting ground to explore the influence of geographical proximity to health care centres on health care seeking behaviour. It is hypothesised that health care seeking behaviour is invariably

influenced by the geographical proximity of care centres to target populations.

## METHODS

### STUDY AREA AND POPULATION

According to the World Bank, Oman is categorised as an upper-middle-income economy.<sup>28</sup> The majority of Oman's population is located either in the north or in the far south of the Sultanate; these two regions are separated by a stretch of desert known as the Empty Quarter. For logistical reasons, the present study was limited to the northern regions of Oman, which include a number of larger coastal towns, including the capital, Muscat, as well as a number of towns in the more mountainous interior. This population segment was found to reflect the ethno-cultural variety present in Omani society.<sup>29</sup>

### DATA COLLECTION

Oman offers universal free health care to its approximately 2.5 million citizens. The present study was conducted in 2006-2007 in a number of public hospitals located in the region of interest. Data was collected using face-to-face interviews. For consistency, and to accommodate illiterate patients, questionnaires were read out loud to the subjects rather than being self-administered. The interviews were conducted by trained researchers, predominantly second and third year medical students from the College of Medicine and Health Sciences, Sultan Qaboos University. During our preparation for this study, the interviewers were trained to read out the items of the questionnaire and to code the responses with precision and reliability; we observed substantial inter-coding agreement for the scale items ( $r = 0.86$ ,  $p < 0.001$ ).

The study population consisted of Omani patients visiting the sampled health centres. Inclusion criteria required participants to be at least 18 years old and cognitively intact. The participant sample was randomised in the following way: one out of every five patients entering the reception area of each health centre for a routine outpatient visit was invited to volunteer for an interview. The participants were explicitly informed that any information they provided in the course of the interview would remain completely anonymous and that their participation would not in any way affect their treatment. No invited patient declined to be interviewed.

The interview process was carried out in the health

centres over a two week period. At each health centre a minimum of 50 patients per research assistant were interviewed during the span of this study. Data from the Ministry of Health have shown that, on average, the present targeted health care centres cater to the needs of approximately 90% of the population of this particular region of Oman.<sup>30</sup> In total, 428 subjects participated in this study.

### ASSESSMENT MEASURES

The questionnaire was developed to fit the situation on the ground, using a number of items that have been used in previous studies, modified for the present context.<sup>31, 32</sup> As detailed in Table 1, the information elicited from the participants included demographic data such as age, sex, marital status, and level of education. In addition, other information germane to the framework of care seeking, such as history of chronic illnesses, usual source of health care, frequency of health care facility usage, and attendance at health education sessions was also sought. The concept of geographical proximity, although variously defined elsewhere, in the present context is defined as a measure of nearness to the health care setting. This item was elicited by asking the participants whether they perceived the nearest health centre as close to them or as far away. The answers were quantified in terms of (1) 'yes' or (0) 'no'. The final questionnaire was pre-tested and piloted on convenience samples among students and staff at the College of Medicine and Health Sciences.

### STATISTICAL ANALYSIS

Descriptive statistics were used to illustrate the data. For categorical variables, frequencies and percentages were reported. Differences between groups were analysed using Pearson's  $\chi^2$  tests or Fisher's Exact tests (for cells of less than 5). For continuous variables, means and standard deviations ( $\pm$ SD) or medians and absolute ranges were presented as appropriate. Mean differences between groups were analysed using the Student's *t*-test and the Wilcoxon Mann-Whitney test whenever appropriate.

The association between participants' geographical proximity to a health centre as a reason to seek health care and various other predictors were analysed using multivariable logistic regression. The predictors in the model included age, gender, marital status, literacy, history of chronic illness, use of regular chronic medications, type of health care resource facility attended,

reason for attending the health care resource facility, number of visits to a health care facility, and attending a health education program. All of the variables in the logistic model were entered simultaneously.

The multivariate logistic model was extensively examined by evaluating the model's assumptions and overall model fit. The overall model fit was assessed using the Hosmer & Lemeshow goodness-of-fit statistic.<sup>33</sup> This approach analyses the actual responses versus the predicted responses; theoretically, the observed and expected counts should be close or equal. Based on the  $\chi^2$  distribution, a Hosmer & Lemeshow statistic with a *p*-value greater than 0.05 is considered a good fit. Another measure of good fit is the area under the Receiver Operating Curve (ROC).<sup>34</sup> The ROC is a graph of sensitivity versus one-minus-specificity, as the threshold cut-off is varied, and also calculates the area under the curve. Sensitivity is the fraction of true positives, while specificity is the fraction of the true negatives. The ROC provides a measure of the model's discriminatory power. A model with perfect prediction has an ROC of 1.0, while an area of 0.5 provides no better discrimination than chance. An *a priori* two-tailed level of significance was set at the 0.05 level. Statistical analyses were performed using STATA (Data analysis and statistical software) Version 9.2.

## RESULTS

The study enrolled a total of 428 participants. The demographic, clinical and health care resource characteristics of the cohort are shown in Table 1. The overall mean age of the cohort was  $33 \pm 12$  years with an age range from 18 to 74 years. Sixty two percent ( $n = 264$ ) of the participants were females. The majority of the participants were married ( $n = 281$ , 66%), literate ( $n = 352$ , 82%), did not have a history of chronic illness ( $n = 289$ , 68%) and were not taking regular medications ( $n = 261$ , 61%). Most of them listed the government as their main source of health care ( $n = 306$ , 72%). However, 20% ( $n = 86$ ) of the participants listed their main source of health care delivery as being from a traditional system. The reasons to seek health care included visits for treatment of acute ailments ( $n = 167$ , 39%), follow-up visits ( $n = 130$ , 30%), and visits for vaccination ( $n = 131$ , 31%). Only just over a third of the participants had attended health education programmes ( $n = 143$ , 33%).

The final model was significant [Wald  $\chi^2$  (12) = 32.21; log likelihood = -129.9298;  $p = 0.001$ ] and all the

variables accounted for 11 percent of the variance in the model (Pseudo  $R^2 = 0.11$ ). Furthermore, the goodness-of-fit statistics indicated an overall good model fit (Hosmer & Lemeshow  $\chi^2$  (8) = 13.78,  $p = 0.087$ ; area under the ROC curve = 0.75). Married participants were 2.56 times more likely to endorse close proximity to a health care centre as a reason to seek health care than the unmarried participants (95% CI 1.24 to 5.29,  $p = 0.011$ ). The participants using traditional health care compared with those using government health care sources were 2.95 times more likely to use close proximity to a health care centre as a reason to seek health care (95% CI 1.03 to 8.44,  $p = 0.043$ ). Furthermore, those attending the health care centre for vaccination compared to those attending the centre for the treatment of acute conditions were 3.53 times more likely to use close proximity to a health care centre as a reason to seek health care (95% CI 1.47 to 8.48,  $p < 0.001$ ). Additionally, the participants that had attended health education programs were 2.28 times more likely to endorse close proximity to a health care centre as a reason to seek health care resources than those who had not attended health education programs (95% CI 1.03 to 5.04,  $p = 0.042$ ).

## DISCUSSION

Some interesting findings have emerged from the present data. First of all, close inspection of the descriptive analysis suggests that geographical proximity was preferred among Omanis of a slightly greater age ( $33 \pm 12$  versus  $29 \pm 12$ , years), who were married, or who had sought health education. Furthermore, geographical proximity was perceived to play a significant role among Omanis who had sought health care for medically acute complications, those attending follow-up visits or those who were seeking vaccination.

In logistic regression, four factors appeared to have the greatest impact on the trajectory between geographical proximity and care seeking. First of all, being married was a significant predictor for endorsing geographical proximity as essential for health care seeking. A possible explanation for this is that being married would entail parenthood and, for most people in Oman, embracing a more connected lifestyle within the extended family. In traditional Omani society, individuals who have reached puberty are expected to marry, at least in rural communities. Newly married couple often reside in the paternal family's residence, which requires them to fulfil the typical role of a mem-

ber of the extended family. Marriage itself is considered a sacred and unbreachable institution that entails procreation. Current population patterns in Oman fit with a second phase 'demographic transition' which entails a declining death rate complemented by a high birth rate, with the bulk of the population falling in the infant to adolescent age group.<sup>35</sup> While infant mortality was 242 per 1,000 live births in 1970, it has since fallen to 13 per 1,000 live births in 2004.<sup>36</sup> The fertility rate, which indexes the average number of children per couple, was 7.2 in the 1970's, to 6.6 in 1990s and more recently has become 3.4.<sup>37</sup> Having a greater number of children in the household is likely to increase the frequency with which an individual would need to attend a health care centre, thus making it vital to have health care at one's reach. It is likely that being married will correlate highly with parenthood, and that child care is one cause for an individual to prefer geographical proximity to health care centres.

Health education is the second variable that played a major role in determining preference for close proximity to health care services. The data suggest that subjects who have attended health education programs were more likely to suggest close proximity to a health care centre as a reason to seek health care resources than those who did not attend health education programmes. There are two potential explanations for this finding. One is the possibility that those who seek health education are the type of people who are generally overly concerned about their health. The literature abounds with reports describing how some individuals insist that they are 'diseased' despite repeated assurance to the contrary. Such patients tend to seek care in primary as well as tertiary medical settings, and account for a large number of consultations, 'doctor shopping,' unnecessary tests, multiple surgeries, and a variety of other procedures which result in what is known in some hospitals as the 'fat file syndrome.'<sup>38</sup> It is possible that those who are overly concerned about their health have a tendency to attend health education courses, and therefore are more likely also to prefer geographical proximity to health care. Individuals with such a disposition would therefore prefer a short distance to their health care centre because it represents quick accessibility to health care and, subjectively, provides reassurance in the event of ill health. Another possibility is that those who have attended health education courses may have been exposed to one's propensity for disease and ill-health.

Awareness about potential risk factors for illness may instil a preference for geographical proximity to health care centres.

While immunisation campaigns have been met with some resistance in certain parts of the world, with universal free health care Oman has succeeded spectacularly in overcoming rampant infectious diseases.<sup>39, 40</sup> Disease eradication and immunisation programs are quickly reaching all corners of the country. Therefore, it was not seemingly surprising that vaccination plays an important role in care seeking in the present data. It can be speculated that the improvement in quality of life in Oman, among other things, assisted by a universal immunisation programme, has heightened Omanis' faith in modern health care to the extent that proximity to a health care centre is considered an essential pathway for disease eradication and prevention.

The final variable that made a significant contribution to the significance of geographical proximity was the tendency to seek traditional medicine. It has been reported that the traditional health care system meets 60-80 percent of health care needs in many parts of the world.<sup>41</sup> Traditional medicine, sometime referred to as ethno-medicine, is a vague term used loosely to distinguish ancient culture-bound health care practices that existed before the application of modern scientific medicine. Despite the poor efficacy of ethno-medicine from a scientific perspective,<sup>42</sup> there is evidence that its popularity knows no bounds in many parts of the world.<sup>43</sup> The reason for such an esteemed status involves the fact that its explanatory models are deeply grounded in the local folklore concepts of health and illness. Contrary to modern health care, traditional medicine does not relegate human beings to mechanistic organisms.<sup>44</sup> There is also the suggestion that some of the healing rituals common in traditional medicine may serve as psychotherapeutic support.<sup>45</sup> Within this relevant discourse, reports have emerged to suggest that there are a substantial number of health care seekers who transverse both traditional and modern health care systems, often in tandem.<sup>46</sup> Given this complex situation, it is not therefore surprising that those subjects who have utilised traditional medicine may also prefer to have close proximity to modern health care centres. It would be theoretically interesting in the future to index psychosocial correlates of care seeking behaviour among those people who have a tendency to seek help from both traditional and modern health

care settings.

There are issues that warrant caution in interpreting the results of this study. First of all, the generalisation of this study may be limited by the fact that the data was collected only in one specific region of Oman, and was restricted to those seeking health care services. There is evidence to suggest that people in a clinical setting tend to respond differently to questioning than those approached in a community setting.<sup>47</sup> Notwithstanding this view, the study focused on factors affecting health care seeking behaviour and therefore it was practical to explore a clinical population. An important omission in the present study is that the actual distance between the patient's domicile and the health care centre was not examined. Previous studies have suggested an inverse relationship between travel distance and health care utilisation,<sup>48</sup> and the fact that sampling was conducted in health care centres may have skewed our results. Secondly, data was collected using an interview method rather than a self-administered format. This may have confounded patient responses because of lack of anonymity. Since the literacy rate in Oman is 74.4 percent, it was decided to read the items to all subjects, rather than allowing them to self-administer the survey. It is possible that this approach may have resulted in a reluctance to reveal sensitive information. There is an indication that the lay public in Oman regard their doctor with high esteem, and as someone one could confide in.<sup>49</sup> However, there is no indication that the items on the questionnaire were overly sensitive. Thirdly, the items on the questionnaire had not been subjected to protracted validation methods, and therefore the efficacy of the questions may be uncertain, both psychometrically and conceptually. This is especially the case given that this study was conducted in a cultural setting where research is not usual, and among patients who are not often studied. Further research of a similar nature but with more rigorous methodology is therefore recommended.

### CONCLUSION

With the much-heralded *Health for All by Year 2000*,<sup>1</sup> a genuine effort to heighten health care delivery that transcends geographic location has been attempted in many parts of the world. Because some populations are sparsely distributed, health planners have been obliged to build health care services that can be accessed by all. However, that is a dearth of studies that have examined the relationship between

the geographical proximity of health care centres to the target population and health care utilisation. From the present study conducted in Oman, the data suggest that there are four factors that play a part in the relationship between geographical proximity and health care seeking: demographic variables such as marital status, history of health education and vaccination, as well as previous exposure to traditional medicine. Socio-cultural teaching appears to play a major part in what may appear to be a paradoxical and idiosyncratic relationship between geographical proximity and health care seeking. The study stimulates the need to conduct further studies that look more closely at the issues of health care seeking behaviour, particularly in remote areas and with regard to the use of traditional medicine centres.

### REFERENCES

1. WHO/UNICEF. Alma-Ata 1978, Primary Health Care. Geneva: WHO, 1978.
2. Ben-Shlomo Y, Naqvi H, Baker I. Ethnic differences in health care seeking behavior and management for acute chest pain: Secondary analysis of the MINAP dataset 2002-2003. *Heart* 2007; 94:354-359.
3. Haynes R. Geographical access to health care. In: Gulliford MC, Morgan M, Eds. *Access to health care*. London: Routledge, 2003. p. 13-35.
4. Weiner SJ, Vangeest JB, Abrams RI, Moswin A, Warnecke R. Avoiding free care at all costs: a survey of uninsured patients choosing not to seek emergency services at an urban county hospital. *J Urban Health* 2006; 83:244-252.
5. Onwujekwe O. Inequities in healthcare seeking in the treatment of communicable endemic diseases in South-east Nigeria. *Soc Sci Med* 2005; 61:455-463.
6. Al-Krenawi A, Graham JR, Dean YZ, Eltaiba N. Cross-national study of attitudes towards seeking professional help: Jordan, United Arab Emirates (UAE) and Arabs in Israel. *Int J Soc Psychiatry* 2004; 50:102-114.
7. Eapen V, Ghubash R. Help-seeking for mental health problems of children: preferences and attitudes in the United Arab Emirates. *Psychol Rep* 2004; 94:663-667.
8. Rizk DE, Hassan MY, Shaheen H, Cherian JV, Micallef R, Dunn E. The prevalence and determinants of health care-seeking behavior for fecal incontinence in multiparous United Arab Emirates females. *Dis Colon Rectum* 2001; 44:1850-1856.
9. Rizk DEE, Shaheen H, Thomas L, Dunn E, Hassan MY. The prevalence and determinants of health care-seeking behavior for urinary incontinence in United Arab Emirates women. *Int Urogynecol J Pelvic Floor Dysfunct* 1999; 10:160-165.

10. Peterson JE. Oman's diverse society: Southern Oman. *Middle East J* 2004; 58:254.
11. Ministry of Health Annual Health Report 2007. Department of Information and Statistics, Directorate General of Planning. Muscat: Ministry of Health, 2007.
12. Israelski D, Gore-Felton C, Power R, Wood MJ, Koopman C. Sociodemographic characteristics associated with medical appointment adherence among HIV-seropositive patients seeking treatment in a county outpatient facility. *Prev Med* 2001; 33:470-475.
13. Meechan G, Collins J, Petrie KJ. The relationship of symptoms and psychological factors to delay in seeking medical care for breast symptoms. *Prev Med* 2003; 36: 374-378.
14. Sudha G, Nirupa C, Rajasakthivel M, Sivasubramanian S, Sundaram V, Bhatt S, et al. Factors influencing the care seeking behaviour of chest symptomatics: a community-based study involving rural and urban population in Tamil Nadu, South India. *Trop Med Int Health* 2003; 8:336-341.
15. Ross SM, Turner C. Physical proximity as a possible facilitator in post-detoxification treatment-seeking among chemically dependent veterans. *Addict Behav* 1994; 19:343-348.
16. Adams J, White M. Socio-economic deprivation is associated with increased proximity to general practices in England: an ecological analysis. *J Public Health* 2005; 27:80-81.
17. Billi JE, Pai CW, Spahlinger DA. The effect of distance to primary care physician on health care utilization and disease burden. *Health Care Manage Rev* 2007; 32:22-29.
18. Arcury TA: The effects of geography and spatial behavior on health care utilization among the residents of a rural region. *Health Serv Res* 2005; 40:135-155.
19. Kloos H, Assefa Y, Adugna A, Mulatu MS, Mariam DH. Utilization of antiretroviral treatment in Ethiopia between February and December 2006: spatial, temporal, and demographic patterns. *Int J Health Geogr* 2007; 6-45.
20. Onah HE, Ikeako LC, Iloabachie GC. Factors associated with the use of maternity services in Enugu, Southeastern Nigeria. *Soc Sci Med* 2006; 63:1870-1878.
21. Gregory PM. Impact of geographic proximity to cardiac revascularization services on service utilization. *Medical Care* 2000; 38:45
22. Engelman KK. Impact of geographic barriers on the utilization of mammograms by older rural women. *J Am Geriatr Soc* 2002; 50:62-68.
23. Tonelli M, Manns B, Culleton B, Klarenbach S, Hemmelgarn B, Wiebe N, et al.: Alberta Kidney Disease Network. Association between proximity to the attending nephrologist and mortality among patients receiving hemodialysis. *CMAJ* 2007; 177:1039-1044.
24. Uzochukwu BS, Onwujekwe OE: Socio-economic differences and health seeking behavior for the diagnosis and treatment of malaria: a case study of four local government areas operating the Bamako initiative programme in south-east Nigeria. *Int J Equity Health* 2004; 3:6.
25. Amoran O, Lawoyin T, Lasebikan V: Prevalence of depression among adults in Oyo State, Nigeria: a comparative study of rural and urban communities. *Aust J Rural Health* 2007; 15:211-215.
26. UNICEF: The State of the World's Children 1997. Oxford: Oxford University Press, 1997.
27. Jamison DT, Sandbu ME. Global health. WHO ranking of health system performance. *Science* 2001; 293:1595-1596.
28. The World Bank. World Development Report 2007: Development and the Next Generation. Washington, DC: The World Bank, 2006.
29. Ministry of Health: National Health Survey 2000. Muscat: Ministry of Health, 2000.
30. National Health Survey 2000: Study of lifestyle risk factors. Directorate of Research and Studies and Directorate of General Health Planning (Vol.1). Muscat: Ministry of Health, 2000.
31. Jenkinson C, Coulter A, Bruster S. The Picker Patient Experience Questionnaire: Development and validation using data from in-patient surveys in five countries. *Int J Qual Health Care* 2002; 14:353-358.
32. Cheng JW, Kalis MM, Feifer S. Patient-reported adherence to guidelines of the Sixth Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Pharmacotherapy* 2001; 21:828-841.
33. Hosmer DW Jr, Lemeshow S. Applied Logistic Regression. 2nd ed. John Wiley & Sons: New York, 2001.
34. Hardin J, Hilbe J. Generalized Linear Models and Extensions; College Station, TX: Stata Press, 2001.
35. Mohammed NSA. Population and Development of the Arab Gulf States: The Case of Bahrain, Oman and Kuwait. Basingstoke: Ashgate Pub Ltd, 2004.
36. Sulaiman AJ, Al-Riyami A, Farid S, Ebrahim GJ. Oman Family Health Survey 1995. *J Trop Pediatr* 2001; 47:S1-33.
37. UNICEF. Oman. From [http://www.unicef.org/infoby-country/oman\\_statistics.html](http://www.unicef.org/infoby-country/oman_statistics.html). Accessed April 2008.
38. Al Lawati J, Al Lawati N, Al Siddiqui M, Antony SX, Al Naamani A, Martin RG, et al. Psychological morbidity in primary health care in Oman: A preliminary study. *SQU J Sci Res: Med Sci* 2000; 2:105-110.
39. Al-Dhahry SH, Koul RL, Al-Busaidy SM, Al-Awaidy ST,



- Al-Khusaiby SM, Suleman AJ. Poliomyelitis in Oman. I. The last outbreak? *Acta Trop* 2001; 80:125-130.
40. Khandekar R, Mohammed AJ, Al Raisi A, Kurup P, Shah S, Dirir MH, et al. Prevalence and distribution of active trachoma in children of less than five years of age in trachoma endemic regions of Oman in 2005. *Ophthalmic Epidemiol* 2006; 13:167-172.
41. Al-Adawi S. A glimpse into traditional outlook towards health: A literature review. *J Med Humanit* 1993; 14:67-79.
42. Nicholson T. Complementary and alternative medicines (including traditional Maori treatments) used by presenters to an emergency department in New Zealand: a survey of prevalence and toxicity. *N Z Med J* 2006; 119: U1954.
43. Han GS, Ballis H. Ethnomedicine and dominant medicine in multicultural Australia: a critical realist reflection on the case of Korean-Australian immigrants in Sydney. *J Ethnobiol Ethnomed* 2007; doi: 10.1186/1746-4269-3-1.
44. Chan CL, Ho RT, Fu W, Chow AY. Turning curses into blessings: an Eastern approach to psychosocial oncology. *J Psychosoc Oncol* 2006; 24:15-32.
45. Ricotti V, Delanty N. Use of complementary and alternative medicine in epilepsy. *Curr Neurol Neurosci Rep* 2006; 6:347-353.
46. de-Graft Aikins A. Healer shopping in Africa: new evidence from rural-urban qualitative study of Ghanaian diabetes experiences. *BMJ* 2005; 331:737.
47. Bursi F, Weston SA, Redfield MM, Jacobsen SJ, Pakhomov S, Nkomo VT, et al. Systolic and diastolic heart failure in the community. *JAMA* 2006; 296:2209-2216.
48. LaVela SL, Smith B, Weaver FM, Miskevics SA. Geographical proximity and health care utilization in veterans with SCI&D in the USA. *Soc Sci Med* 2004; 59:2387-2399.
49. Al-Jabri AA, Dorvlo ASS, Al-Rahbi S, Al-Abri J, Al-Adawi S. Knowledge of tuberculosis among medical professionals and university students in Oman. *East Mediterr Health J* 2006; 12:509-521.