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Primary health care services for the aged in the United Arab Emirates: A comparison of two models of care

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Abstract

Aim: To compare the quality of aged care provided by two different models of primary health care services in the United Arab Emirates.

Methods: Cross sectional survey by chart review of 200 consecutive people aged 65 years and over attending two primary health care centers located in adjacent suburbs and serving populations with similar characteristics; a resource intensive center (RIC) and the other a resource thrifty center (RTC). Quality indicators were blood pressure levels in hypertensives and glycosylated hemoglobin (HbA1c) levels in diabetics.

Results: There was no variation in age, sex or number of visits per year between the clinics. Osteoarthritis, hypertension, and diabetes were the most common diagnoses at both. The people attending the RIC had a substantially higher level of comorbidity (RIC = 1.19 ± 1.18 , RTC = 0.63 ± 0.68 , $p < 0.001$), the average systolic and diastolic blood pressure for those diagnosed with hypertension was in the normal range at the RIC ($138.5 \pm 19.8/77.1 \pm 9.9$), whereas it was significantly higher and in the elevated range at the RTC ($149.5 \pm 17.7/85.2 \pm 9.1$, $p < 0.001$) and the HbA1c was significantly lower at the RIC (7.7 ± 1.4) than at the RTC (9.5 ± 2.0 , $p < 0.001$).

Conclusions: The quality of health outcomes for the two chronic diseases, hypertension and diabetes, appeared significantly higher at the RIC, when compared with the RTC. However, there may have been significant selection bias. Further studies are needed to determine if the RIC improves quality measures in other aspects of chronic disease care and provides a more cost effective health care service.

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Key words: clinical outcomes, developing country, models of care, primary care, quality of care.

Introduction

Quality of care is an increasingly important concept, with governments and other funding health care services wanting the best return for their investment. This is a particularly important issue for countries on the Arabian Gulf, which may have sufficient resources to provide a clinical care model similar in resource intensiveness to those present in Western countries.

However, these additional costs need to be justified and determined to be the best use of limited resources. Little evidence exists on whether more resource intensive models of care provide extra value in this environment.

The quality of care provided by general practitioners/family physicians have different domains: the individual practitioners training and skill, the structure of the clinic where he or she works, the process of how care is provided, the impact on the health status of those receiving this care and whether the patient feels satisfied with the care received.^{1–3} The quality of health outcomes can be measured in a number of ways, including immunization rates, mortality rates, clinical signs and laboratory results.^{4,5}

The United Arab Emirates (UAE), a union of seven

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sovereign sheikhdoms in the Arabian Gulf, was formed in 1971. As recently as 1950 'their traditional way of life had scarcely been disturbed. There were no boundaries, and no roads, no newspapers and no telephones, indeed no electricity supply. Almost every drop of water had to be hauled from man made wells.⁶ Education and health development were negligible until the late 1950s. A relentless pace of development in the last 40 years has created an unusual environment, with an eclectic mixture of features in a developing country. A high fertility rate, small number of elderly, very low aged dependency ratio, and strong traditional culture sit beside a high-income economy, highly urbanized population, and high growth rate of people aged 65 years and over.⁷⁻⁹ Education and health infrastructure are extensive, with each sector undergoing continuous development and expansion.

The UAE constitution affirms the right of every individual to health care, with the state responsible for providing facilities for health prevention and treatment, promotion and rehabilitation.¹⁰ In 1986, the federal government of the UAE declared the centrality of Primary Health Care (PHC) in accordance with the World Health Organization 'Health for all' concept.¹⁰ Hence, a comprehensive network of 105 government funded PHC clinics was established by 2001,¹¹ providing a locally based clinic for almost all people.¹² Clinics with less infrastructure and service provision are present throughout this system, funded by the federal Ministry of Health and in Dubai Emirate by the state Dubai Ministry of Health (resource thrifty clinic (RTC)). There is little variation between clinics, although smaller clinics do not have onsite pathology and X-ray services.

However, one PHC clinic, financed and managed by the state based Abu Dhabi Health Authority, has a high level of human, physical and economic resources, a similar level to that seen in Western countries (resource intensive clinic (RIC)). This PHC plays an equal and integral role in the provision of PHC services to Emirati citizens, as people are allocated to attend this highly resourced clinic or a clinic with fewer resources, entirely on the basis of the geographic location of their principal place of residence.

Although the number of people aged 65 years and over in the UAE is currently quite low at 1% of the total population,¹³ the predicted average annual growth rate in the UAE for those aged 65 and over is 10.3% (1999–2025), by far the highest in the world.⁹ Consequently, by 2050 those aged 65 and over will form 27% of the UAE population, the same proportion predicted for the USA.¹⁴

Although a previous study reported on patient satisfaction in these primary care clinics, no studies have examined the quality of health outcomes.¹⁵ The aim of the present study was to compare the quality of aged

care provided by two different models of government funded primary health care services in the UAE, using clinical outcomes as a marker of quality.

Methods

Setting

The present cross sectional survey was conducted in Al Ain, an inland oasis city of 250 000 people and the location of the sole RIC. The comparison RTC chosen to compare with the RIC was the clinic, which was most similar. This included: a similar patient population (Emirati patients comprised 100% of the patient load at the resource intensive clinic and >90% at the resource poor clinic), geographic location (the clinics serviced adjacent and similar suburbs in Al Ain), patient numbers (the RIC had the highest number of consultations ((123 044 in 2000), the RTC the second highest (91 554 in 2000), in the Al Ain health district)) and physical structure (both centers were housed in identical buildings and had onsite pathology and X-ray services).⁸

A detailed description of these two clinics has been reported previously.¹⁵ The key differences were:

- 1 The RIC received higher funding.
- 2 The medical, nursing, administrative, and quality assurance staff at the RIC had substantially higher levels of training and experience.
- 3 Virtually all the staff at both clinics were expatriates from regions other than the Arabian Gulf Peninsula.
- 4 Medications could be dispensed for 1 month rather than 2 weeks at the RIC, which also had a more extensive pharmacopoeia.
- 5 Continuing medical education programs were more frequent and compulsory at the RIC.
- 6 The quality assurance program was highly structured at the RIC.
- 7 There were higher levels of telecommunication and computer services at the RIC.
- 8 The number of consultations per doctor per day at the RTC was approximately twice that of the RIC, primarily due to (i) higher staff patient ratio at the RIC; and (ii) RIC nurses provided direct care to patients.

Design

Hypertension and diabetes were chosen as indicator diseases, being the second and third most common chronic diseases after osteoarthritis in the aged community.¹² They are also the reason for presentation by aged people to PHC centers in this health district.⁸ The prevalence of diabetes is very high by world standards (33.9%) and presents a major health care challenge.¹⁶

The clinical outcome measure for hypertension was blood pressure level as: (i) in the absence of complications, this is the only abnormal clinical or laboratory finding; and (ii) the risk of death is directly related to the blood pressure level.¹⁷ The clinical outcome measure for diabetes was glycosylated hemoglobin (HbA1c), a valid and objective measure of short to medium term control.¹⁸

The data was abstracted from the medical records by an experienced clinician (TC). The weighted index of comorbidity, an index of clinical ill health determined by diagnosis, was also calculated from the abstracted data.¹⁹

Study sample

The first 200 people aged 65 and over, who attended each clinic on or after 1 September, 2001 were included in the present study. Subsequent attendances by the same person were disregarded. There were no other exclusion criteria.

The most recent blood pressure, blood glucose and HbA1c were abstracted from each chart, as long as the entry date was no further than 24 months from the date of the most recent visit. All diagnoses recorded on the chart, regardless of the date of entry, were included in the analysis. More than one diagnosis could be recorded for each person.

Analysis methodology

The Statistical Package for the Social Sciences (SPSS) was used. Simple frequency analysis was used to describe demographic and diagnostic data. Comparative statistics for discrete variables were calculated using χ^2 analysis, or when the total sample size and the expected values were small, the Fisher's exact test. Continuous variables were analyzed with the independent sample *t*-test, unless they did not display normal distributions, when the Mann-Whitney *U*-test was used. The level of statistical significance was defined as $p < 0.05$.

Approval by institutional review board

The present project was approved by the Research Ethics Committee, Faculty of Medicine and Health Sciences, United Arab Emirates University and the Research Review Committee, Tawam Hospital, Abu Dhabi Health Authority, both of which comply with the ethical rules for human experimentation that are stated in the Declaration of Helsinki 1995 and as revised in Edinburgh 2000.

Results

Two hundred people aged 65 and over at each of the two clinics, were recruited into the study. At the RIC,

this number was achieved after 18 working days, while at the RTC this required 79 working days. There was no significant difference between clinics in the average age (RIC: 73.3 ± 7.7 , RTC: 72.1 ± 7.0), female : male ratio (RIC: $104/96 = 1.08$, RTC: $96/104 = 0.92$) or number of visits per year (RIC: 10.7 ± 8.8 , RTC: 11.2 ± 8.2).

The diagnoses are detailed in Table 1. Osteoarthritis, hypertension, and diabetes were the three most common chronic diseases at both clinics. The weighted index of comorbidity is detailed in Table 2. The aged people attending the RIC had a substantially higher level of comorbidity (RIC = 1.19 ± 1.18 , RTC = 0.63 ± 0.68 , $p < 0.001$) and a larger range of chronic diseases (23 vs 16).

The results for all those with hypertension are detailed in Table 3 and those with diabetes in Table 4. While there was no significant difference in the age, sex and number of visits per year at each clinic, those patients with either diabetes, hypertension or both attending the RIC were sicker, with a higher degree of comorbidity in each group. The average systolic and diastolic blood pressure for those diagnosed with hypertension was in the normal range at the RIC ($138.5 \pm 19.8/77.1 \pm 9.9$), while significantly higher and in the elevated range at the RTC ($149.5 \pm 17.7/85.2 \pm 9.1$, $p < 0.001$).

The HbA1c was significantly lower at the RIC (7.7 ± 1.4) than at the RTC (9.5 ± 2.0 , $p < 0.001$). The comorbidity disease index for those 93 people with a HbA1c reading at the RIC was 1.92 ± 1.28 , significantly higher than for the 28 at the RTC (1.14 ± 0.448 , $p = 0.003$).

Discussion

The present study has demonstrated that the clinical outcomes of the RIC were statistically significantly better than the results in the RTC, for hypertension and diabetes, two of the three most commonly seen chronic diseases in the aged in this population. This occurred despite the RIC patients having a higher level of comorbidity. Of particular concern was that the average blood pressure reading at the RIC in those with hypertension was within the normal range, while the reading at the RTC was in the elevated range.

Diabetic control appeared better at the RIC. Although 90.3% (93/103) of diabetics had a HbA1c reading at the RIC, only 35.9% (28/78) had a recorded value at the RTC. This suggests that perhaps the RTC only tested HbA1c in a specific subgroup, e.g., those with poorer control. However, as the comorbidity index is higher in patients who had their HbA1c measured at the RIC compared to the RTC patients, the most likely explanation is better current control at the RIC. However, the rate of diabetic complications was high at the RIC. The reason is unknown but could

Table 1 Diagnoses recorded at the resource intensive center (RIC) and resource thrifty center (RTC)

	All		RIC		RTC		Significant	p-value
	n	%	n	%	n	%		
	400		200		200			
Osteoarthritis	249	62	109	55	140	70		0.001*
Hypertension	191	48	102	51	89	45	No*	
Diabetes	181	45	103	52	78	39		0.012*
Retinopathy	14	4	13	7	1	1		0.002**
Nephropathy	14	4	13	7	1	1		0.002**
Neuropathy	7	2	7	4	0	0		0.015**
Hyperlipidemia	115	29	89	45	26	13		<0.001*
Peptic disease	84	21	43	22	41	21	No*	
Chronic respiratory disease	63	16	33	17	30	15	No*	
Ischemic heart disease	58	15	34	17	24	12	No*	
Previous myocardial infarction	13	3	12	6	1	1		0.003**
Osteoporosis	33	8	30	15	3	2		<0.001**
Neurological disease	28	7	22	11	6	3		0.003**
Dementia	13	3	11	6	2	1		0.02**
Thyroid disease	16	4	13	7	3	2		0.02**
Cerebrovascular disease	15	4	12	6	3	2		0.03**
Hemiplegia (vascular cause)	5	1	4	2	1	1	No**	
Cardiac failure	7	2	7	4	0	0		0.015**
Peripheral vascular disease	6	2	6	3	0	0		0.03**
Chronic renal failure	3	1	3	2	0	0	No**	
Cancer	3	1	3	2	0	0	No*	
Metastases	1	0	1	1	0	0	No*	
Chronic liver disease	1	0	1	1	0	0	No**	

* χ^2 test, **Fisher's exact test.

Table 2 Weighted index comorbidity valued for the resource intensive center and resource thrifty center¹⁹

	All		Resource intensive clinic		Resource thrifty clinic		p-value
	n	%	n	%	n	%	
0	154	39	61	31	93	47	
1	179	45	86	43	93	47	
2	33	8	22	11	11	6	
3	22	6	20	10	2	1	
4	9	2	8	4	1	1	
5	3	1	3	2	0	0	
Average \pm standard deviation	0.96 \pm 1.07		1.19 \pm 1.18		0.63 \pm 0.68		<0.001*

*Mann-Whitney U-test. The comorbidity index provides an estimate of future mortality risk due to comorbid conditions, increasing stepwise as the index score rises. In the original study of 685 patients, the percentage of subjects dying over 10 years due to comorbidity for the different scores was: 0; 8%, 1; 25%, 2; 48%, >3; 59%.¹⁹

mean that the RTC is referring more patients with complications to secondary care or that the RIC is less effective.

There was a marked disparity in the number of working days it took to collect the 200 subjects at each clinic, 18 days at the RIC and 79 at the RTC. As the difference in patient numbers between the clinics was too

small to account for this difference and there is no evidence of a geographic maldistribution of elderly folk, aged people may have selectively attended the RIC, rather than the RTC. This would be consistent with other studies demonstrating higher patient satisfaction at the RIC.¹⁵ This selection bias may have accounted for part of the differences seen between the clinics.

Table 3 Clinical and laboratory results for all patients with hypertension

	Resource intensive clinic		Resource thrifty clinic		Significant	<i>p</i> -value*
	Result	<i>n</i> 102	Result	<i>n</i> 89		
Age	73.4 ± 7.9		71.3 ± 6.4		No*	
Female (%)	52.9	54	51.7	46	No**	
Number of visits/year	12.2 ± 8.8		14.0 ± 8.3		No*	
Weighted index Comorbidity ¹⁹	1.29 ± 0.84		1.26 ± 0.84			0.03***
Systolic blood pressure	138.5 ± 19.8		149.5 ± 17.7			<0.001*
Diastolic blood pressure	77.1 ± 9.9		84.2 ± 9.1			<0.001*

*Independent samples *t*-test, ** χ^2 test, ***Mann-Whitney *U*-test.

Table 4 Clinical and laboratory results for all patients with diabetes

	Resource intensive clinic		Resource thrifty clinic		Significant	<i>p</i> -value*
	Result	<i>n</i> 103	Result	<i>n</i> 78		
Age	72.9 ± 7.0		71.1 ± 6.3		No*	
Female (%)	52.5	54	46.2	36	No**	
Number of visits/year	13.1 ± 9.9		14.0 ± 7.8		No*	
Weighted index Comorbidity ¹⁹	1.9 ± 1.3		1.2 ± 0.58			<0.001***
Glycosylated hemoglobin	7.7 ± 1.4	93	9.5 ± 2.0	28		<0.001*

*Independent samples *t*-test, ** χ^2 test, ***Mann-Whitney *U*-test.

The present study only evaluated information recorded in the charts. Having an experienced clinician as the abstractor decreased the likelihood of misinterpreting the findings. However, there is a possibility of underreporting if the RTC doctors had used a more selective style of recording their findings. The higher comorbidity index found at the RIC could have occurred if physicians with higher levels of training were less likely to underreport disease than those with less training. Alternatively, the RIC physicians may have been more thorough in assessing their patients and hence diagnosed more diseases.

An alternative explanation is that the two clinics were in fact, providing different types of services, a comprehensive in house service at the RIC and limited service at the RTC, but in conjunction with hospital based services. This is consistent with the patient satisfaction study, which found a perception of more comprehensive care at the RIC.¹⁵ This would mean the physicians at the RTC were only aiming to provide a limited service, which would therefore only require the limited resources they had at their disposal. Or perhaps, their limited resources encouraged a more restricted service and higher level of shared care.

Although no budgetary figures are available, based on the difference in resources available, the RIC appears substantially more expensive per patient encounter. In particular, the RIC employed more qualified nursing, medical, quality assurance and management staff, who receive higher salaries than their less qualified colleagues. The provision of quality assurance and continuing education programs required a significant budget to be run professionally and effectively. The high level of telecommunication services at the RIC, including the provision of networked computers required a considerable investment in both physical resources and the human resources to develop and maintain the system.

Medications at the RIC were dispensed for 1 month, while only for 2 weeks at the RTC. Hence, patients with chronic diseases requiring daily medication over a long period of time would need to visit the RTC twice as often as the RIC. However, the attendance rates of the two clinics were not statistically significantly different. This result may have been due to: (i) those attending the RTC obtaining part of their medication elsewhere, either from other doctors or directly from a pharmacy without prescription; (ii)

RTC patients have poor compliance and have periods when they are medication free; and (iii) RTC patients had less severe illness and had appropriate medication free periods.

The RIC consultation time was longer. This may have been due to each clinic providing a different style of consultation. For example, the RIC patients had a higher degree of comorbidity and may have required more complex and therefore time consuming care each visit. As the RIC doctors were mostly vocationally trained, they may have chosen to provide more comprehensive care. However, further studies would be required to clarify this issue.

A cost benefit analysis would assist in deciding the management implications of the findings of the present study. However, there is an absence of usable data recorded in the medical files concerning the degree of shared care, use of investigations and medications prescribed. In particular, was there a difference in the use of hospital-based services for patients attending the two clinics? Hence, the answer to this important question will require further studies of a different design.

Limitations

As health outcomes are multifactorial, no single methodology of quality assessment is able to provide the complete picture. In particular, there is little evidence that the results for individual diseases can be generalized to reflect overall patient care provided by the clinic.²⁰ As the present study only reviewed the medical record for limited clinical material, the impact of concurrent psychosocial issues or multisystem disease remains unknown. The study protocol allowed for data that was recorded up to 24 months prior to the study date. This was to maximize the number of patients with usable pathology data at the RTC, where elderly attendances were few in number. However, the resultant loss of recency may have affected the relevance of the results to the patient's current health status.

In conclusion, the quality of health outcomes for hypertension and diabetes appeared significantly higher at the RIC, when compared with the RTC. However, further studies, which address confounding factors, especially selection bias, are needed to confirm these findings and to determine if the RIC provides a more cost effective health care service than the RTC.

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