

## Insight

**Computerization in Primary Care: an Insight**Huda I Al-Shaibani<sup>1</sup>, Siham YF Al-AbdulGhafour<sup>2</sup>, Amal H Al-Saqabi<sup>3</sup><sup>1</sup>Al-Shiab Primary Health Care Centre, Hawalli, Kuwait<sup>2</sup>Primary Health Care, Hawalli, Health Area, Kuwait<sup>3</sup>Sabah Al Salim North Primary Care Centre, Kuwait

Kuwait Medical Journal 2006, 38 (4): 311-314

**ABSTRACT**

We present our experience with the first year of computerization in the Primary Health Care (PHC) Centers in Hawalli Health Area. Diagnoses were entered according to the ICD-10 Classification by PHC Physicians. Data could be retrieved from eight centers. The percentage of recording was calculated and diseases were tabulated under different body systems. Out of 1.5 million visits received, only 0.7 million were entered (47%), with considerable variations among different centers (15-84%). The great majority of visits entered (88%) were for acute conditions. Eighty-six thousand visits (12%) were for chronic conditions, of which diabetes (28%) and hypertension (13%) were the

commonest. Difficulties leading to the low percentage of recordings were: insufficient users' training, system closure during holidays, slow response to users or maintenance needs and shortage of supportive personnel. Despite these difficulties, we consider the experience as promising. The PHC Physicians have the impetus to improve. We could develop an idea on the pattern of illnesses dealt with in PHC centres. The potential for improving patient care, research and planning, based on the critical appraisal of retrieved data is discussed. The need to have emphasis laid on organizational issues and users' needs, rather than merely on administrative and financial issues, is highlighted.

KEY WORDS: automated database, database information retrieval, research in general practice.

**INTRODUCTION**

During the 1980s and 1990s, general practices including primary care, have increasingly become computerized<sup>[1]</sup>, might reach over eighty percent before the turn of the century<sup>[2]</sup>. A great potential for this development in boosting epidemiologic research and patient care was lately realized<sup>[2]</sup>.

Databases provide an efficient means of storing and retrieving large amounts of well-structured data<sup>[3]</sup>. Health professionals need to become skilled in the critical appraisal and interpretation of reports based on the collection of these data and their use in policy making<sup>[4]</sup>. Computers were introduced in the primary health care (PHC) centers in Hawalli Health Area in 2003. Physicians started entering patients' information in 2004, following one session of demonstration. Implementing electronic medical records (EMR) requires a substantial start up effort and ongoing training at the practice site<sup>[5]</sup>, with emphasis laid on organizational issues and users' problems rather than merely on devices<sup>[6]</sup>. We herein report our experience with the first year of computerization in our PHC centers. The basic epidemiologic features

of diseases dealt with in those centers are highlighted. Limitations and areas where there is a place for improvement are discussed and the potential for research in PHC setup, based on the retrieval and use of computer based data is emphasized.

**METHODS**

We analyzed the computer-based records from eight of the 13 PHC centers in Hawalli Health Area. Five centers were not included in the study for the following reasons: incomplete information in one, no computerization in two and renovation of other two centers. A permission to conduct such analysis was officially obtained from the Area Director. The unanimity and confidentiality of patients were protected as the analysis was restricted to the diagnoses made without reference to patients' specifications. A computer print was forwarded to the Head of Primary Care (a co-author) from each of the eight PHC centers. It contains the number of patients with specific diagnoses entered according to the ICD-10 diagnostic code and tabulated under various body systems and other headings.

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**Table 1:** Percentage of computer entry in eight primary health care centres in Hawalli Health Area during 2004

PHC Centre	Total no. of visits	No. of visits entered in EMR*	Percentage of computerization
Salwa	317,500	139,729	44
Salmiyah West	291,426	146,535	50
Sabah Al-Salim South	209,606	118,754	57
Jabriyah	196,210	37,957	19
Rumithiyah	196,183	29,801	15
Bayan	154,689	113,710	74
Meshrif	115,543	93,813	81
Al-Shiab	37,933	31,944	84
Total	1519,090	712,243	47

\* EMR: Electronic medical records

The percentage of computer entry in individual PHC centers was calculated as the ratio of the number of visits entered to the actual number of visits received by the centers. The actual numbers of visits were obtained from the annual report of Hawalli Health Area<sup>[7]</sup>. The quality of recording has not been examined. The obstacles leading to incomplete entry of patients' data have been periodically reported to one of the authors.

The total number of cases entered under various body systems was calculated, and only the leading five systems were presented for the sake of simplicity. For the same reason we presented the leading ten diagnoses, out of about 500 listed. An attempt was made to identify chronic conditions generally known to be associated with morbidity and/or mortality, from acute and trivial conditions, as well as conditions listed under communicable disease. Only univariate analysis was performed using numbers and percentages to show the frequency of various entities, as we do not have a comparative set of data on which we can apply multivariate analysis.

## RESULTS

The total number of visits seen in the area was approximately 2.3 million, of which 1.52 million were seen in the eight PHC centres where the study took place<sup>[7]</sup>. Of these, 712,243 visits were actually entered in the computer by 103 PHC physicians (47%). This low rate of entry can be attributed to several factors: frequent breakdowns and delay of maintenance, the lack of follow-up demonstrations, the shutting down of the system during weekends and public holidays, and the very short consultation time during rush hours.

Individual PHC centers varied considerably in the percentage of computer entry (Table 1), between 15 and 84 percent. Centers with the lowest rate of

**Table 2:** The leading ten diagnoses in primary health care centers in Hawalli Health Area during 2004

Order	Diagnosis	Number entered	Percent from total
1	Upper respiratory infections	241,269	33.9
2	Bronchial asthma	34,499	4.8
3	Bronchitis	26,618	3.5
4	Hypertension	23,894	3.4
5	Gastroenteritis	21,934	3.1
6	Allergic rhinitis	18,488	2.6
7	Muscle spasms and cramps	14,477	2.0
8	Conjunctivitis	12,884	1.8
9	Diabetes	11,662	1.6
10	Backache	11,091	1.6
	Subtotal	416,816	58.3

entry are those open on weekends and public holidays, each serving 3-4 residential areas. Computers could not be used as the PHC centers were not interconnected during 2004. This problem was solved in 2005.

The leading ten diagnoses are depicted in Table 2, and they constituted 58 percent of the entered workload. Four of these, first to third and sixth were respiratory illnesses. Eight of these illnesses are trivial and only two (diabetes and hypertension) are associated with mortality or morbidity.

The total number of cases entered in the computer under the leading five body systems is shown in Table 3. Respiratory system disorders were responsible for 46 percent of the total workload, followed by the digestive system (8%). Non-morbid conditions (examinations for school entry, for joining sports, vaccination, *etc*) accounted for 15 percent of cases, leaving 15 percent for all other systems.

Thirty diagnoses, chosen because they are associated with mortality and/or morbidity and need chronic care, were responsible for a total of 86,494 entered visits (12%). The leading diagnoses are depicted in Table 4. The remaining 88% of cases entered were acute, mostly trivial conditions, and consumed over 80 percent of time available for primary care practitioners to practice acute, preventive and chronic care.

Only 3,715 incidents of communicable diseases were recorded (Table 5), and 90 percent of these were due to chickenpox. There were only three cases of whooping cough and 17 cases of tuberculosis. Of particular interest is the finding of 194 records of gonococcal infections.

The incomplete patient information and the low percentage of computer entry (47%), both precluded the estimation of prevalence and incidence rates as well as the reporting on mortality or morbidity statistics.

**Table 3:** The leading five body systems under which diagnoses were entered in the computer records of eight primary health care centres in Hawalli Health Area in 2004

	No. of Cases	Percent
Respiratory system	325,593	46
Digestive system	56,199	8
Skin	44,741	6
Musculo-skeletal system	44,522	6
Cardiovascular system	28,180	4
Subtotal	499,235	70

**Table 5:** Visits due to communicable diseases in eight primary health care centres during 2004

Disease	Number
Chickenpox	3,352
Gonococcal infections	194
Mumps	75
Rubella	50
Measles	24
Tuberculosis	17
Whooping cough	3
Total	3,715

## DISCUSSION

The low recording rate of 47 percent (Table 1) was not unexpected in view of difficulties encountered during the initial implementation. Users' training was limited to a single session of demonstration, the system used to be shut down during holidays, and the responses to maintenance and user requests were not prompt. In three centers however, the rate of recording exceeded 70 percent (Table 1), an evidence that PHC physicians have the impetus to improve on this issue. These difficulties have long been recognized<sup>[5]</sup>, as initial implementation had laid emphasis on devices rather than organizational issues<sup>[6]</sup>. Financial and administrative restraints compromised optimal utilization of the system<sup>[6]</sup>, which must be primarily targeted at the user, as the time needed to adequately train him is substantial<sup>[8]</sup>. He should be supported by the introduction of clinical decision support systems, which provide him with useful information regarding diagnosis, therapy and prognosis<sup>[8, 9]</sup>.

Computers have great potential for epidemiologic research<sup>[2]</sup> and promote more effective patient care by reliably and effectively storing and retrieving patient data<sup>[3,4,8,9]</sup>. We were able to develop an idea on the pattern of health problems in our PHC centers (Tables 2-5), and the opportunities for research in PHC centers should be enhanced. The physician is an information manager, who processes,

**Table 4:** Morbid conditions that need chronic care and carry mortality and morbidity risks

Morbid condition(s)	Number
Hypertension	23,839
Diabetes	11,662
Chronic arthritis	4,893
Hypercholesterolemia and obesity	2,570
Migraine	2,421
Heart disease	1,041
Other 24 diagnoses	40,068
Total	86,494

retrieves and applies information related to all aspects of patient management<sup>[10]</sup>. Hence, his information needs must be met<sup>[8,11]</sup>. This may entail finding the relevant resources, mastering new and multiple applications and ensuring ongoing education<sup>[8]</sup>.

Family practice has been slowly but steadily dominating primary care in Kuwait<sup>[13]</sup>. Acute problems were responsible for 88 percent of visits to our PHC centers (Tables 2, 3), compared to 58 percent reported elsewhere<sup>[14]</sup>. It is well known that acute care cannot be deferred<sup>[12]</sup>, hence, time available for chronic care is compromised<sup>[8,12]</sup>. It is less than 10 minutes in our PHC centers<sup>[7]</sup> and compares poorly with an average of 20 minutes recommended to complete a chronic care visit<sup>[12]</sup>, of which 86 thousand cases were entered. This may reflect negatively on the quality of care as well as on the efficiency of data recording.

We have so far, not encountered issues related to the inherent threat to patients' privacy and confidentiality, usually due to unauthorized access to patient information<sup>[15]</sup>. This is particularly relevant to sexually-transmitted diseases like gonococcal infections (Table 5), and epilepsy, to mention examples. This important issue needs to be considered, as lack of confidentiality could lead to a breakdown of doctor-patient relationship<sup>[1,15]</sup>.

We believe the introduction of computerization is a leap forward and the first year of implementation was a success despite limitations. Physicians in PHC centers are encouraged to retrieve, collect and use stored data for improvement of care as well as for research. Policy makers need to develop a critical appraisal of retrieved data and reports based on this retrieval and use this in planning. We recommend that health authorities lay more emphasis on users' needs. This includes ongoing training at the practice site, provision of expert advice and meeting his information needs, particularly, clinical decision support systems.

## ACKNOWLEDGMENT

The authors wish to thank Dr Muhammed Al-Ayyad, Director, Hawalli Health Area for his encouragement and support and the 103 primary health care physicians who painstakingly managed to enter patient data. Our thanks to Dr Faisal AF El-Khuffash, consultant paediatrician, Mubarak Al-Kabeer Hospital for his continued help and support during the preparation of the manuscript.

## REFERENCES

1. Ridsdale L, Hudd S. Computers in the consultation: the patient's view. *Br J Gen Practice* 1994; 44:367-369.
2. Walton R, Randall T. Communication in the year 2000. *Br J Gen Practice* 1994; 44:434-435.
3. Wyatt J. Computer-based Knowledge Systems. *Lancet* 1991; 338:1431-1436.
4. Heller RF, Page I. A population perspective to evidence-based medicine: evidence for population health. *J Epidemiol Community Health* 2002; 56:45-47.
5. Ariza AJ, Binns HJ, Christoffer KK. Evaluating computer capabilities in a primary health care practice-based research networks. *Ann Fam Med* 2004; 2:418-420.
6. Wyatt JC. Hospital information management: The need for critical leadership. *Br Med J* 1995; 311:175-180.
7. Al-Abdulghafour SYF. Annual Report, 2004. Hawalli Health Area.
8. Westberg EE, Miller RA. The basis for using the internet to support the information needs of primary care. *J Am Med Assoc* 1999; 6:6-25.
9. Weisman F, Hasman A, van den Herik HJ. Information retrieval: State of the art. *Int J Med Inform* 1997; 47:5-26.
10. Levinson DJ. Information, computers and clinical practice (commentary). *Am J Med Assoc* 1983; 5: 607-609.
11. Covell DG, Uman GC, Manning PR. Information needs in office practice: are they being met? *Ann Int Med* 1985; 103:596-599.
12. Ostbye T, Yarnall KSH, Krayse KM, Pollak KI, Gradison M, Michener JL. Is there time for management of patients with chronic disease in primary care? *Ann Fam Med* 2005; 3: 209-214.
13. Fraser RG. Developing family practice in Kuwait. *Br J Gen Practice* 1995; 45: 102-105.
14. Stange KC, Zyzanski SJ, Jean CR, *et al.* Illuminating the 'black box'. A description of 4454 visits to 138 family physicians. *J Fam Practice* 1998; 46:377-389.
15. Carman D, Britten N. Confidentiality of medical records: the patients perspective. *Br J Med Practice* 1995; 45:485-488.