

Reducing health care costs by rationalizing staffing in primary care settings

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تقليل تكاليف الرعاية الصحية بتزويد تعيين الموظفين في مواقع الرعاية الصحية الأولية
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الخلاصة: ينفق الأردن ما يقرب من 9٪ من الناتج المحلي الإجمالي على خدمات الرعاية الصحية، وهو رقم مرتفع إذا ما قورن ببلدان نامية مماثلة. وتقيم هذه الدراسة الوقت الذي يستغرقه العاملون باعتباره من النفقات التي تنفقها وزارة الصحة في عينة ممثلة على الصعيد الوطني شملت 97 من مراكز الرعاية الصحية الأولية. إن التكاليف الاقتصادية لمرافق الرعاية الصحية الأولية وصلت إلى 42.3 مليون دينار أردني، وتشكل التكاليف على العاملين 53.8٪ من مجمل التكاليف التي تنفق حالياً، فيما تقدر تكاليف الوقت المهدور إذا ما عبر عنها بالمعايير الاقتصادية بـ 9.7 مليون دينار أردني (وهذا يعادل 13.7 مليون دولار أمريكي). وعلى الوزارة أن تأخذ بالحسبان التغيير في أداء وظائف مرافق الرعاية الصحية الأولية مثل اعتمادها لنظم المواعيد لتحسين تدفق المرضى ووقت التماس مع الناس.

ABSTRACT Jordan spends around 9% of its GDP on health care services, a high figure compared with similar developing countries. This study assessed staffing patterns in relation to Ministry of Health expenditures in a nationally representative sample of 97 primary care facilities. The economic costs of primary care facilities amounted to Jordanian dinar (JD) 42.3 million. Personnel costs consumed 53.8% of recurrent costs and in monetary terms the amount of down time (time not being used effectively) amounted to JD 9.7 million (about US\$ 13.7 million). The Ministry should consider changing the functioning of its primary care facilities to obtain a more cost-effective use of staff time.

La réduction des coûts des soins de santé par la rationalisation des effectifs dans les établissements de soins de santé primaires

RESUME La Jordanie consacre environ 9 % de son PIB aux services de soins de santé, un chiffre élevé par rapport à d'autres pays en développement similaires. On a étudié la dotation en personnel en rapport avec les dépenses du ministère de la Santé dans un échantillon national représentatif de 97 établissements de soins de santé primaires. Les coûts économiques des établissements de soins de santé primaires s'élevaient à JOD 42,3 millions. Les dépenses de personnel ont absorbé 53,8 % des coûts de fonctionnement et le montant correspondant au temps d'inactivité (temps qui n'est pas utilisé effectivement) en termes monétaires s'élevait à JOD 9,7 millions (environ USD 13,7 millions). Le ministère devrait envisager de modifier le fonctionnement de ses établissements de soins de santé primaires pour une utilisation plus efficace du temps du personnel.

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Introduction

In the light of continuing pressure, particularly external, to reduce the size of government budgets in low- and middle-income countries around the world, ministries of health are examining ways to increase efficiency and generate cost savings. Personnel costs typically consume the largest share of health ministry budgets, and consequently become a primary area of analysis.

Jordan, and its Ministry of Health (MOH), is no exception to such pressure. According to the National Health Accounts estimates of 2000, Jordan spent approximately 454 million Jordanian dinar (JD) (US\$ 647 million) on health care services [1]. This amount represents 9.12% of the country's gross domestic product (GDP). Per capita health care expenditure amounted to approximately JD 94 (US\$ 132).

The breakdown of health expenditures by source of funds shows that 47% comes from private sources and 45% from public funds, with the remaining 8% contributed by international donors and other sources. Further breakdown of public health expenditure shows that preventive health services provided by primary care have a smaller proportion of the total health care budget (25%) compared with the curative services (61%); 5% of costs are administrative, 3% training and 6% miscellaneous.

There are several reasons why Jordan needs to re-examine its return in investment on the health of its citizens:

- Expenditure on health is already high when compared with other countries at the same level of socioeconomic development.
- There is a mismatch between population growth and economic growth, which has been declining over the past

5 years, thus leading to falling per capita incomes and lower standards of living.

- There is an increase in the proportion of elderly people in the total population, which is expected to put more pressure on the health care system.
- The country lacks a 'cost containment culture'. Ministries providing services plan their budgets based on historical experience where past budgets and expenditures tend to guide future plans. There is also an incentive to spend allocated budgets because unspent funds are reimbursed to the Ministry of Finance at the end of the fiscal year and not back to the MOH.
- There is a wide variation in the quality of services provided by an overloaded public sector and mainly unregulated private health care [2].

The ministries of health in developing countries share many common problems, notably the presence of excess service capacity at various levels of care. This excess service capacity translates into a significant proportion of ministry of health budgets being allocated to personnel.

Health sector reform has been occurring in countries throughout the world for many years and is constantly undergoing change [3]. However, the central goals remain focused on improving access, equity, quality, efficiency, and/or sustainability. In order to achieve these health sector reform attributes, the need for development of national strategies for human resources becomes more important than ever [4].

A national study in Jordan aimed to study staffing patterns and utilization of time by health care providers and relate these to the cost of providing health services. We have already reported an analysis of staff performance in primary health care services [5]. This paper examines staffing

patterns and estimates the cost savings of providing primary health care services in a more efficient manner.

Methods

Sample

The study was carried out in 2001. A complete list of primary health care facilities was obtained from the MOH, which also included the type of facilities and the numbers and types of staff (physicians, nurses and midwives) as well as the total number of patients seen in a year at each facility. The study sample was selected from 631 facilities of different types throughout Jordan: 42 comprehensive (CHCs), 336 primary health care centres (PHCs) and 253 village health centres (VHCs).

Facilities were categorized into low, medium and high volume groups, based on the 33rd and 66th percentiles of the number of annual visits. Since the study had several components, the variance of which is unknown in the study population, it was judged that a proportion of 0.5 would yield the largest sample size. The study sample was selected in a simple random fashion using *SPSS* version 7.5. Selection of the sample was proportional to size within each selection category (type of facility and volume). A confidence limit of 95% and a precision of 10% were used. The number of facilities selected in this manner was 99. Facilities were excluded from the study if they were being closed down or served a special population group, such as prisoners. The final sample at the end of fieldwork was 97 facilities comprising 8 CHCs, 50 PHCs and 39 VHCs.

Data collection

An exhaustive list of study instruments was prepared that recorded relevant facets of health services delivery at the primary

health care level. These facets included, the type and quantity of personnel per facility, room dimensions, medical equipment, furniture, drugs, clinical supplies, non-clinical supplies, dental equipment, dental supplies, laboratory equipment, laboratory supplies, X-ray equipment, X-ray supplies, number of patient visits by type of facility, utilities and prices of data items collected in the field. Data were collected using doctors, nurses, midwives, accountants and pharmacists.

Data analysis

In this study, economic cost was calculated so that all costs incurred in providing the service were considered, regardless of whether they were paid with government resources, subsidized or donated by local or international agencies. Moreover, opportunity cost was considered when estimating the annual cost of capital expenses.

Personnel costs were obtained from the personnel and accounting databases of the MOH. For estimates of clinical supplies, consumption data was collected from the health facilities themselves and prices of items were obtained from the Central Purchasing Department.

For estimates of non-clinical supplies, data were obtained from the study health facilities. Allocation of items to the respective department was complicated since some of the items were used by some departments and not others, while some items were shared. Items were allocated to a particular department when it was clear which they belonged to (e.g. costs of X-ray envelopes were allocated to the X-ray department). Items such as detergents and cleaning materials were allocated to all service departments based on space shared in square metres.

Data about drug consumption were obtained from the study health facilities since

pharmacies are required by law to keep copies of prescriptions. Prescriptions were reviewed in order to obtain quantities used over a period. Tender prices were obtained from the central purchasing department.

We have reported in an earlier paper how activity sampling was used to measure providers' use of time and classify it into clinical time (activities when the provider was with a patient), non-clinical time (work-related, non-clinical activities) and down time (non-clinical, non-work related activities) [5]. To arrive at cost savings, the overall down time was multiplied by the cost of personnel. The respective down times for different types of facility and volume category were calculated.

Results

Staffing patterns

Out of the 8616 employees in MOH primary health care facilities, 1622 (18.8%) were physicians, 2975 (34.5%) nurses, 362 (4.2%) midwives, 863 (10.0%) support staff, and 2794 (32.4%) administrative and others (Table 1).

PHCs employed the largest proportion (63.3%) of health care professionals, followed by CHCs (28.1%) and VHCs (8.6%). On average, a CHC facility had 58 employees, while a PHC had 16 employees and a VHC had about 3 employees. The ratio of staff varied by facility. For example in CHC facilities, there were 517 physicians and 706 nurses (a nurse:physician ratio of 1.37:1) compared with a nurse:physician ratio of 2.14:1 in PHCs.

During 1999, the total cost of providing primary health care services was JD 42.3 million. Recurrent costs represented 89%, and the remaining 11% were capital costs. Personnel, as expected, represented the largest segment of the overall recurrent costs, where it amounted to JD 20.2 million, representing more than half (53.8%) of recurrent costs (Table 2). The proportion of personnel costs out of total recurrent costs showed a wide variation by type of service. The lowest proportion was in dental services (37.5%), and the highest in emergency services (91.6%). The contribution of personnel costs to recurrent costs varied little by type of facility and volume of clients (Table 2).

Table 1 Distribution of staff by type of health facility and volume of clients

Variable	No. of staff					Total	%
	Physicians	Nurses	Midwives	Support	Others		
<i>Type of health care facility</i>							
Comprehensive	517	706	76	334	788	2421	28.1
Primary care	887	1896	286	506	1882	5457	63.3
Village	218	373	0	23	124	738	8.6
<i>Volume of clients</i>							
Low	330	851	104	160	616	2061	23.9
Medium	554	988	139	270	893	2844	33.0
High	738	1136	119	433	1285	3711	43.1
<i>Total</i>	1622	2975	362	863	2794	8616	100.0

Cost savings

Based on data from our earlier paper [5] that down time among health providers was almost half their working time (48.7%), estimates were made of the cost savings if down time was completely elim-

inated (Table 3). The overall annual savings to the MOH in personnel cost was about JD 9.7 million and recurrent costs would go down from JD 37.6 million to JD 27.9 million (26%). The change in cost savings ranged from 43.5% in specialty care to

Table 2 Distribution of personnel costs as a percentage of recurrent costs in different type of service by type of facility and volume of clients

Variable	General	Specialty	Dental	Emergency	MCH	Total
<i>Type of health care facility</i>						
Comprehensive						
Recurrent costs (JD)	3 694 226	2 208 970	2 942 096	1 379 687	1 146 078	11 371 058
Personnel costs (JD)	1 693 240	1 433 646	1 191 069	1 174 981	869 140	6 362 077
Personnel costs (%)	45.8	64.9	40.5	84.9	75.8	55.9
Primary care						
Recurrent costs (JD)	12 277 705	22 235	5 765 793	2 346 435	3 633 151	24 045 318
Personnel costs (JD)	5 244 697	4 893	2 078 424	2 218 398	3 134 518	12 680 930
Personnel costs (%)	42.7	22.0	36.0	94.5	86.3	52.7
Village ^a						
Recurrent costs (JD)	1 853 374	–	–	296 265	57 888	2 207 527
Personnel costs (JD)	868 707	–	–	289 842	35 963	1 194 512
Personnel costs (%)	46.9	–	–	97.8	62.1	54.1
<i>Volume of clients</i>						
Low						
Recurrent costs (JD)	3 335 728	81 006	1 602 779	1 114 281	1 126 531	7 260 326
Personnel costs (JD)	1 471 648	28 561	706 721	1 039 336	934 651	4 180 917
Personnel costs (%)	44.1	35.3	44.1	93.3	83.0	57.6
Medium						
Recurrent costs (JD)	5 582 546	605 611	2 798 517	1 407 999	1 504 205	11 898 878
Personnel costs (JD)	2 483 528	333 852	910 064	1 237 277	1 233 253	6 197 975
Personnel costs (%)	44.5	55.1	32.5	87.9	82.0	52.1
High						
Recurrent costs (JD)	8 907 031	1 544 587	4 306 593	1 500 107	2 206 380	18 464 698
Personnel costs (JD)	3 851 467	1 076 126	1 652 708	1 406 609	1 871 716	9 858 627
Personnel costs (%)	43.2	69.7	38.4	93.8	84.8	53.4
Total						
Recurrent costs (JD)	17 825 305	2 231 204	8 707 889	4 022 387	4 837 117	37 623 902
Personnel costs (JD)	7 806 643	1 438 539	3 269 493	3 683 222	4 039 621	20 237 518
Personnel costs (%)	43.8	64.5	37.5	91.6	83.5	53.8

JD = Jordanian dinar.

MCH = maternal and child health.

^aSome services not provided in village HCs.

48.7% in maternal and child health (MCH) services. The largest annual cost saving (JD 3.8 million) was in general practice services, and the lowest (JD 626 087) was in specialty care.

Discussion

The Jordanian primary care system is reasonably robust and widespread. People who need care can access some basic care; more than 95% of Jordanians live within 10 km of a health facility. However, given the macro-economic trends and population growth rate, the ability to sustain even the existing level of quality and amount of services in the future may be a challenge.

In Jordan, the overall expenditure on primary health care is not very high, but there is room to improve how resources are allocated and the efficiency of their use. More than half of recurrent costs are accounted for by personnel in the form of salaries, incentives and allowances. This leaves service provision with relatively small amounts of money.

As reported earlier by Khoury and Mawajdeh [5] almost half of service providers' time in Jordanian primary care facilities is 'down time', i.e. waiting for patients, breaks and non-work related activities. The present paper attempted to examine from a purely economic point of view the hypothetical savings if systems were put in place to eliminate this down time. The results showed that financially such a move would save the MOH more than US\$ 13 700 000 each year. This excess money could be used to provide improved quality of care. Efficiency improvements could be made by, for example, closing underutilized facilities or reducing the size of the MOH payroll. However, a number of factors are expected to militate against this, the major obstacle being the current unemployment rate in the country of 15%.

This paper also argues that the MOH ought to consider improving the functioning of its primary health care facilities. One of the first steps towards enhancing the quality of care would be to utilize the pro-

Table 3 Total recurrent costs, personnel cost and cost savings for different types of service before and after elimination of down time

Service	Recurrent costs (JD)		Personnel costs (JD)		Savings in personnel costs (JD)	% change
	Before	After	Before	After		
General	17 825 305	14 038 092	7 806 643	4 019 431	3 787 212	-48.5
Specialty	2 231 204	1 605 118	1 438 539	812 452	626 087	-43.5
Dental	8 707 889	7 148 484	3 269 493	1 710 088	1 559 405	-47.7
Emergency	4 022 387	2 258 700	3 683 222	1 919 534	1 763 688	-47.9
MCH	4 837 117	2 871 134	4 039 621	2 073 638	1 965 983	-48.7
Total	37 623 902	27 921 526	20 237 518	10 535 142	9 702 376	-47.9

JD = Jordanian dinar.

MCH = maternal and child health.

viders' time more effectively. This can be achieved by implementing a system that involves defining a suitable case-mix, and that requires firm control or incentives for service providers to be more detailed in their assessment and dispensing of care. At present patients of all types can be seen in the 3 types of HC and some form of referral centre should be adopted to channel patients to the appropriate level of health facility. Thus the case-mix in CHCs should be different from the less complex PHCs and the least complex VHCs.

Adoption of an appointment system in facilities where services are non-urgent (e.g. general practice, MCH, family planning, dental and specialty clinics) could assist in better managing the patient flow by spreading clients throughout the day. Spreading the client load over a few extra hours could also lead to more time spent per client and therefore resolve to some extent the problem of excessive down time, and ensure higher quality care.

However, interventions would be needed to ensure that providers of care adapt their practice style to the increase in time allocated per client. Introducing standardized protocols and training for these, coupled with a simple management information system, would help to ensure that providers' time was used effectively. Computer simulations have been employed to improve outpatient clinic staffing, scheduling [6] and clinic efficiency [7]. Creative ideas are needed to keep primary health care services accessible and at the same time minimize daily fluctuations in utilization levels. Reilly et al. [8] used a delay-scheduling model for patients using walk-in clinics and a simulation model that was validated using actual data and was able to reduce manpower needs by 10% and reduce waiting time.

In summary, this study calls for a system-wide approach to improving efficiency and quality of care in the Jordanian primary health care system since many of the factors presented are interlinked.

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