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Various Contract Settings and their Impact on the Cost of Medical Services

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Abstract

Objectives This study analyzes the effect of outsourcing healthcare on career soldiers in the Israel Defense Forces (IDF) in different settings, so as to develop a model for predicting per capita medical costs

Methods Demographic information and data on healthcare utilization and costs were gathered from three computerized billing database systems: The IDF Medical Corps; a civilian hospital; and a healthcare fund, providing services to 3,746; 3,971; and 6,400 career soldiers, respectively. Visits to primary care physicians and specialists, laboratory and imaging exams, number of sick-leave days, and hospitalization days, were totaled for men and women separately for each type of clinic. A uniform cost was assigned to each type of treatment to create an average annual per capita cost for medical services of career soldiers.

Results Significantly more visits were recorded to primary care physician and to specialists, as well as imaging examinations by Leumit Healthcare Services (LHS), than visits and tests in hospitals or in military clinics ($p < 0.001$). The number of referrals to emergency rooms and sick-leave days were lowest in the LHS as compared to the hospital and military clinics ($p < 0.001$). The medical cost per capita/year was lowest in LHS as well.

Conclusions Outsourcing primary care for career soldiers to a civilian healthcare fund represents a major cost effective change, lowest consumption and lower cost of medical care. Co-payment should be integrated into every agreement with the medical corps.

Introduction

The increasing costs of healthcare services limit the ability of healthcare funds to respond adequately to public needs. Increased costs result mainly from the aging of the population, biotechnological developments, increased awareness of biotechnological advantages, and better access to health information. Cost-containment without harming the quality of medical care (1) might be achieved by outsourcing administrative and medical services (2-4) to a public or private organization. This could, at the same time, reduce costs (5), increase expertise, infrastructure, and managerial abilities (2, 4, 6).

Since 1995, Israel has enacted an obligatory, National Health Insurance Law, which defines a basket of health services that covers all residents of Israel. Four civilian healthcare funds and the Medical Corps of the Israel Defense Forces (IDF) currently provide all medical care. In contrast to civilians, career soldiers in the IDF are exempt from co-payments for medical services and supplementary services, and pay a fixed, non-progressive health tax, slightly more than half the amount specified for a civilian.

The Medical Corps supplies all medical care for career soldiers in military clinics or by purchasing services from civilian

hospitals, imaging institutes, laboratories, and consulting experts. The Corps has access to an insufficient number of experienced military physicians necessary for quality health service equivalent to that provided to civilians. In an attempt to contain costs and provide quality care, a pilot study was performed during 1998-2002, outsourcing services for career soldiers who served in one of the large bases in the center of the country. First, in 1999, primary healthcare services were provided by physicians in a nearby hospital. The first payment to the hospital covered initial visits to physicians, laboratory tests, and imaging services. All subsequent visits and services were charged by additional fees-for-service. This contract resulted in unexpectedly high costs; therefore, in 2000, the services were transferred to the Leumit Healthcare Services (LHS). Career soldiers were entitled to receive medical services in any clinic of the LHS. However, in contrast to their civilian counterparts, they were not required to participate in the costs of these services (co-payment).

The goals of this study were to compare the effect of outsourcing on healthcare utilization by career soldiers in ambulatory clinics in a hospital, in a civilian healthcare fund, and in military clinics. In addition, we developed a model to predict per capita medical costs in each setting.

Methods

The study had a cross-over design. Healthcare utilization of the same two groups of career soldiers (visiting an ambulatory hospital clinic and a military clinic on the base) was compared

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with the outsourcing group of career soldiers who received services in clinics of the LHS.

The study included career soldiers aged 22–50 of all ranks up to General, who received services from the military clinic from December 1998 to May 1999. This group, serving in bases throughout the home front, represented about 70% of all career soldiers in the IDF in terms of age groups, gender, education, and income. During the study period, this group visited the three clinics with a turnover of only 4.7%.

Independent variables included gender, marital status, location of medical services, health profile, number of children, and country of birth. We used age as an indicator of rank and level of education, since a direct significant positive correlation was found between the three variables in an earlier study (7). Dependent variables were number of visits to a primary physician, specialist, or emergency room, number of tests (laboratory or imaging), number of hospitalization days, and number of absent days due to sickness.

We collected data during six months of each year. To minimize the first effect of healthcare utilization due to change of provider (hospital or LHS), this period was started three months after the beginning of each contract. Data were collected from: (a) the management and accounting department databases of the LHS; (b) the database of the Medical Corps that consolidates soldiers' demographic data,

medical histories, and accounts kept by the budget department (8); and (c) the management and accounting department databases from the hospital. Dissimilar codes for medical services in each location were assigned a common code to homogeneously enter data into an Excel spreadsheet. The databases from the management and accounting systems have a 95% reliability factor.

To develop a model for predicting healthcare costs per capita, we used total primary care visits per soldier in all three clinics studied, multiplied by cost per visit, corrected for all expected visits of soldiers for the same year. Costs for specialist visits were calculated according to actual expenditures in civilian and army clinics. Since the army's database on drug costs did not have a 95% reliability factor, we estimated the cost of drugs at 13.3% of per capita expenditure (9), similar to costs in a civilian healthcare fund.

The following costs (based on costs in NIS published in September 2004 by the Ministry of Health, converted to dollars at the rate of 4.3 NIS per US\$1) were used: \$97.67 for an emergency room visit; \$373.49 per hospitalization day; \$34.88 for visits to a primary physician per quarter year; and \$23.26 per visit to a specialist. Costs of laboratory tests and imaging were minimal, representing 3–5% of overall expenses, and were therefore not taken into consideration.

The per capita cost prediction model was based on GLM

	Military clinics (control; n=3746)		Hospital clinics (n=3971)		Health Fund clinics (n=6400)	
	Men (n=2870)	Women (n=876)	Men (n=3056)	Women (n=915)	Men (n=4580)	Women (n=1820)
Age (avg±SD)	7.0±36.3	7.2±32.6	7.2±35.2	7.4±31.2	7.7±31.9	27.3±7.2
Marital status (%)						
Widowed/divorced	0.0	0.0	0.0	0.0	1.5	2.2
Married	70.8	53.9	74.2	60.7	53.7	33.4
Single	29.2	46.1	25.8	39.3	44.8	64.4
Military medical profile (%)*						
Low	23.5	12.6	23.4	12.7	26.7	16.7
Medium	6.1	3.4	5.7	3.4	4.2	2.7
High	70.4	84.0	70.9	83.9	69.1	80.6
Educational level (%)						
High school	14.3	35.7	13.2	31.9	23.2	49.9
Post-high school	16.3	12.3	13.0	8.3	13.8	8.4
One university degree	46.1	38.6	47.3	40.7	43.4	28.9
Two or more university degrees	23.2	13.4	26.5	19.1	19.5	12.8
Rank						
Non-commissioned officer	15.8	17.7	15.3	15.4	21.5	25.7
Lieutenant	7.4	13.6	8.9	18.9	18.2	34.5
Captain	16.7	20.0	18.5	20.2	19.7	14.2
Major	32.9	36.0	31.0	34.0	23.8	19.9
Lieutenant Colonel +	27.2	12.8	26.3	11.5	16.8	5.8

Table 1. Demographic characteristics of soldiers receiving medical services in three types of clinics.

All factors for both genders differed significantly ($p < 0.05$) among the three clinics except for the military medical profile of women ($p = 0.087$). Results were adjusted by regression factors to neutralize these differences.

* Military medical profile: Low = chronic impairment that limits functioning, high = sound health, no limits, medium = between these two extremes

	Military clinics (control; n=2225)		Hospital clinics (n=2967)		Health fund clinics (n=4386)	
	Men (n=1556)	Women (n=669)	Men (n=2178)	Women (n=789)	Men (n=2947)	Women (n=1439)
Age (avg±SD)	36.5±7.1	32.4±7.0	35.3±7.2	30.9±7.2	32.1±7.7	27.7±7.2
Primary visit	7.4	6.9	8.2	7.7	9.1	8.8
Laboratory referral	1.0	1.8	3.1	5.2	2.9	4.4
Visit to specialist	5.3	5.9	4.6	6.9	10.1	10.2
Imaging examination	1.5	2.5	1.0	2.9	1.6	3.1
Sick days	1.9	2.8	1.9	2.7	1.4	1.7
Emergency room visits	1.7	2.1	2.0	3.0	0.1	0.4

Table 2. Visits to primary care clinics and resulting referrals according to type of clinic (per 100 career soldiers).

There were significant differences for both genders ($p<0.001$) among the three clinics. Values were adjusted to neutralize demographic differences among clinic populations (age group and medical profile).

(General Linear Models) procedures (10), where the dependent variables were the costs of the services. Independent variables included demographic characteristics. The model produces costs for each location according to demographic profiles. Some individuals did not use any services, resulting in a cost of zero, which does not fit a normal distribution. This problem was dealt with by regression, which increased averages in the first stage. Such representation of the data does not link receivers of healthcare services and types of services provided, because data are related to each service separately.

Per capita costs were adjusted by a factor representing the number of individuals in each demographic sub-group and the frequency distribution of individuals who received services in the same sub-group. Thus, values represent all the soldiers, and the model permits the forecast of services according to demographic group by multiplying values by the index for that group. Results were statistically analyzed by SAS (11). Continuous variables for medical services were analyzed by GLM procedures, using ANOVA (Analysis of Variance between groups) on unbalanced data and linear regression equations for predicting use of services (12). Differences were considered significant when $p<0.05$ except in analyses of groups by gender, where significance was $\alpha=0.025$, according to the Bonferroni conferring principle that divides the significance level by the number of groups. Demographic factors were subjected to the Chi-square test. To neutralize the influence of demographic factors before and after the beginning of outsourcing, and to concentrate on population sectors with unusual consumption patterns, use of services was subjected to GLM procedure.

Results

Table 1 presents data on demographic characteristics for soldiers. The number of members in each studied group changed significantly during the third phase of the study (outsourcing to LHS), since new soldiers from a similar, nearby base were added to the original study groups.

Table 2 presents data on the number of actual visits to primary care clinics and the number of referrals resulting from these visits according to type of clinic (per 100 career soldiers). Significantly more ($p<0.001$) visits were recorded to primary care physicians of LHS than to hospital or military clinics. More ($p<0.001$) soldiers

receiving care in LHS clinics were referred to specialists and for imaging examinations ($p<0.001$). Referrals for laboratory tests and emergency room visits were highest ($p<0.001$) from the hospital clinic compared to military and LHS clinics. The number of referrals to emergency rooms and sick-leave days were lowest ($p<0.001$) in the LHS compared to hospital and military clinics.

Figure 1 presents the medical costs per capita/year for career soldiers in each setting. Costs per capita were \$354, \$550 and \$665 in the LHS, military clinics, and hospital clinics, respectively ($p<0.001$). The main factor affecting differences ($p<0.001$) in costs was cost of hospitalization (\$213, \$132 and \$80 in the hospital setting, military clinics and LHS, respectively).

Additional, simulated healthcare utilization and costs for all career soldiers were similar to the actual use and cost of medical services in military and civilian hospitals.



Figure 1. Predicted annual costs per career soldier in three types of clinics

Significant differences found in total costs ($p<0.0001$), primary medical services ($p<0.0001$), specialist and emergency room visits ($p<0.0001$), and medications ($p=0.0272$). Borderline difference in other services ($p=0.0462$). Costs do not include manpower expenditure.

Discussion

Outsourcing healthcare services to contain costs is a relatively new concept in Israel. We describe the saving of scarce resources when the Medical Corps of the Israel Defense Forces outsourced primary care of career soldiers to a civilian healthcare fund.

This is a population-descriptive study, with different health providers over time.

Groups of career soldiers in the three described settings were similar regarding age, gender, rank, and education. Therefore, the effect of adding population to the study group in a healthcare fund during the last period is insignificant.

The financial arrangements with the healthcare fund were based on capitation costs, and with the hospital on a fee-for-service agreement. The hospital arrangement was the most expensive of the three studied alternatives, although it generated the highest satisfaction level (7). Capitation or fee-per-service agreements were indifferent to both physicians and clients, not prohibiting or motivating physicians or patients in the use of medical services. However, in contrast to a civilian HMO specializing in primary care services and cost containment, hospital visits resulted in more prescriptions and unlimited laboratory tests (negative incentive) (13,14).

Career soldiers are exempt from co-payment for medical services included in the supplementary insurance. As a result, the use of services provided mainly by supplementary insurance was significantly higher than for civilians in both male and female soldiers. Thus, we can safely assume that null co-payment per se did influence the high use of healthcare utilization. (15-17).

Medical services in military clinics are provided by a small group of young and inexperienced physicians recruited to the IDF immediately after graduation from medical school, and by a very large group of civilian physicians from the reserve forces. Doctors in the army clinics act as "case managers" to career soldiers during the short time they spend in military clinics (up to one month)(18). This is probably the source of the excess laboratory and imaging examinations and referrals to specialists in military clinics. Primary care physicians in a healthcare fund, acting as "gate keepers", provide cost-effective community services. In fact, the number of visits to specialists and laboratory and imaging tests were lower than in the hospital setting. Absentee days were fewer and, in a survey of career soldier satisfaction, the health fund clinics received higher scores in all parameters studied (7).

Use of services in the military clinics was significantly lower (60%) than in other clinics, whereas visits to specialist clinics and to emergency rooms were high. It is possible that soldiers avoided seeking primary services in military clinics due to inappropriate environment, an impersonal relationship with the medical staff, or the lack of a permanently-employed physician (7). The lack of experience and professionalism of the primary military physician in the home-front military clinic leads to extended treatment and excess referrals.

The per capita system has been adopted as a more efficient and justifiable system (19), as it contains costs (20), and divides risk-sharing between the consumer and the service provider. Per capita cost is based on characterization of the insured population (21). The cost model described here was found to be very similar (95%) to estimated costs per capita of current expenditure and use of medical services. This model is currently

used whenever financial contracts are needed, based on our estimated use of medical services, and as long as the co-payment policy for services by career soldiers does not change.

Conclusions

Outsourcing primary healthcare to a civilian health fund represents a major positive change in the concept of how the Medical Corps provides healthcare to career soldiers in the IDF, enabling the Medical Corps to concentrate on its primary goals and to respond adequately to continuous changes in the healthcare arena.

Most medical corps worldwide facing similar problems (shortage of experienced physicians, high costs, and low satisfaction level) may benefit from outsourcing.

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