

Rethinking the health services insurance system: a new model for Iranian railroad households

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إعادة التفكير في نظام تأمين الخدمات الصحية: نموذج جديد لعائلات العاملين بالسكك الحديدية الإيرانية

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خلاصة: خلال العامين 1995 و1996، تم اختيار عينة عشوائية طبقية نسبتها 10% وعددها 2124 شخصاً يمثلون العاملين الدائمين في السكك الحديدية الإيرانية في اثنتي عشرة محافظة، وذلك لبحث مدى استفادة العاملين وعائلاتهم من الخدمات الصحية. ثم قام المستجوبون بجمع المعطيات (البيانات) من 2107 من العاملين باستعمال استبيان مفصل. وكان هدف هذه الدراسة تعيين الخصائص الديموغرافية والصحية للمستفيدين، ومدى ارتياحهم إلى الخدمات، سعياً إلى تحسين النظام الراهن لتقديم خدمات التأمين الصحي. ونقترح في هذه المقالة خطة جديدة لتطبيق التأمين الصحي تركز على المسؤولية الاجتماعية والتوجه المجتمعي، وتقوم على أساس مهام محدّدة لأطباء وممرضات الأسرة في المراكز الصحية للسكك الحديدية، وهناك تقييم لهذه الخطة.

ABSTRACT During 1995 and 1996, a 10% stratified random sample of 2124 people representing permanent Iranian railroad workers in 12 provinces was selected to survey the use of health services by personnel and their families. Data were collected from 2107 workers through interviews using a structured questionnaire. The objective was to determine demographic and health characteristics and user satisfaction in order to improve the present delivery of the health insurance system. A new plan for the delivery of health insurance, which focuses upon social accountability and community orientation and is based on the roles of family doctors and nurses in railroad health posts, is proposed and evaluated.

Repenser le système d'assurance maladie des services de santé: un nouveau modèle pour les familles d'employés des chemins de fer iraniens

RESUME En 1995 et 1996, un échantillon à 10% d'un sondage stratifié composé de 2124 personnes représentant des employés permanents des chemins de fer iraniens dans 12 provinces a été sélectionné pour examiner l'utilisation des services de santé par le personnel et leurs familles. Des données ont été recueillies auprès de 2107 employés lors d'interviews utilisant un questionnaire structuré. L'objectif était de déterminer les caractéristiques démographiques et sanitaires et la satisfaction des usagers afin d'améliorer les prestations courantes du système d'assurance maladie. Un nouveau plan est proposé et évalué pour les prestations d'assurance maladie, lequel insiste sur la responsabilité sociale et l'orientation communautaire et s'appuie sur les rôles joués par les médecins de famille et les infirmières dans les postes de santé des chemins de fer.

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Introduction

There are two major health insurance organizations in the Islamic Republic of Iran: the Organization of Social Security which covers approximately 15 million people and the Health Services Insurance which covers approximately 6 million. An additional 3 million people are covered by insurance funds. According to the health insurance law (Act number 29), the government is responsible for the health and social security of the people [1]. Of approximately 60 million people, about 40% are covered by insurance organizations or insurance funds that only supply treatment services. An investigation by parliament into the Health Services Insurance under the affiliation of the Ministry of Health reveals that the insured people, most of whom are government personnel, are not satisfied with the delivery of services.

The Railroad Organization Personnel and Welfare Administration has been seeking ways to improve both the health status and the satisfaction of permanent personnel and their families who are covered by the Health Services Insurance. At present, these people receive some preventive care such as vaccinations and family planning from urban health centres. For treatment services, they are referred to doctors, clinics or hospitals under contract to the Health Services Insurance. Both the doctors and the hospitals are less concerned with these clients, so often clients do not receive services in a comfortable or respectful manner [2]. As a result, they are inclined to visit medical centres rather than the contracted services.

Any change in the current system requires a preliminary survey to provide the necessary information for decision-making [3]. Thus, the main objective of this study was to describe demographic characteris-

tics, morbidity, the use of treatment services and the satisfaction with current services in order to propose a new model for the delivery of health care insurance to the railroad population.

Materials and methods

During 1995 and 1996, a 10% stratified random sample of 2124 personnel who represented the population of permanent Iranian Railroad Network workers in 12 provinces was selected to survey their and their families' utilization of the health services. The respondents were interviewed using a structured questionnaire.

Stratification was based on the 12 geographical areas of the railroad divisions. Households were scattered within railroad sites in villages and cities throughout the country. The health-related data of 2107 workers and their households were collected by 14 trained interviewers using the questionnaire.

The data collection period was 4 weeks (three times at 4-month intervals), so that the figures could be generalized to 1 year's utilization of outpatient services.

A household was defined as those family members of workers living together and sharing resources. The recall period for an illness or sickness was 4 weeks. While this length of time proved too long for studies attempting to accurately collect morbidity information, such as frequency of symptoms, it has been used effectively and is suggested for recording health-seeking behaviours [4].

The head of household was considered to be the best person to respond to the study [5]. Three times every 4 months the respondents were asked about outpatient utilization. For hospitalization, the recall period was considered to be 1 year and related

medical records were requested for observation as proof.

Results

The average size of the 2107 households was 5.6 persons; for 51%, household size was 6 or more persons (Table 1). About 45% of the heads of the families had elementary school level education, 96% of wives were between 15 years and 49 years old (which is the fertile age), 52% of the households had more than four children and 36% had at least one child under 5 years of age.

In all, 1290 households (61% of the total) had experienced some illness during the 4 weeks prior to the interview, but only 1095 (52% of the total) had been referred to a centre or doctor to benefit from medical services. Of all visits, 18% were revisits because of ineffective treatments. Parasitic and infectious diseases were the most frequent reasons for visiting outpatient clinics (32% of all visits), followed by paediatric (15%), obstetric and gynaecological (8%) and (7%) articular diseases (Table 2).

Table 1 Frequency distribution of household size in the railroad regions

Household size	Frequency	
	No.	%
1	61	2.9
2	95	4.5
3	155	7.4
4	324	15.4
5	402	19.1
6+	1070	50.8
Total	2107	100.1

Total of household members = 11 736
Average household size = 5.6

Table 2 Frequency distribution of outpatient visits in the regions per month by disease

Disease	Frequency	
	No.	%
Infectious and parasitic	1197	32.2
Pulmonary	198	5.3
Digestive and endocrine	204	5.5
Blood and immunological	47	1.3
Cardiovascular	167	4.5
Obstetric and gynaecological	313	8.4
Genitourinary	104	2.8
Articular	252	6.8
Paediatric	542	14.6
Central nervous system	208	5.6
Dermatological	82	2.2
Oral/dental	125	3.4
Ear, nose and throat	186	5.0
Eye	65	1.7
Poisons	8	0.2
Accidents	18	0.5
Total	3716	100.0

The average frequency of visits per individual per year was 2.33 to general practitioners, 1.37 to specialists and 1.22 to medical diagnostic centres (Tables 3 and 4). The rate of hospitalization per 100 persons per year was 4.86 with an average length of stay of 5.7 days. Considering the coefficient for health services utilization, the average total cost per person per year was:

$$TC = 2.33C_1 + 1.37C_2 + 0.10C_3 + 3.20C_4 + 1.22C_5 + 0.05H$$

where:

TC = total cost of treatment per individual per year;

C_1 = fee for one visit to GP;

C_2 = fee for one visit to specialist;

Table 3 Medical visits made by railroad household members during the 4 weeks prior to interview

Region	Visits			
	General practitioners	Specialists	Dentists	Total
Azerbaijan	336	160	27	523
Arak	111	65	2	178
Isfahan	286	125	14	425
Teheran	414	240	14	668
South	136	102	2	240
South-east	83	45	3	131
Khorasan	83	96	3	182
North	270	182	10	462
North-east	120	86	8	214
North-west	179	59	2	240
Lorestan	229	138	6	373
Hormozgan	31	46	3	80
Total	2278	1344	94	3716
Average per 100 persons per month	19.4	11.5	0.8	
Frequency distribution among all households per month	61.3%	36.2%	2.5%	

Table 4 Demand for diagnostic tests by households during the 4 weeks prior to interview

Diagnostic service	No.	Average per 100 households	Average per 100 persons	Total (%)
Laboratory	584	27.7	5.0	49
X-ray	304	14.4	2.6	26
Cardiography and encephalography	135	6.4	1.2	11
Endoscopy	22	1.0	0.2	2
Sonography	106	5.0	0.9	9
Other	38	1.8	0.3	3
Total	1189	56.4	10.1	100

C_3 = average cost of visit to dentist;

C_4 = average cost of drugs per prescription;

C_5 = average cost per diagnostic order;

H = average case cost of hospitalization from admission to discharge.

Based on 1995 prices, the average total cost per individual amounted to 4500 rials

Table 5 Causes of hospitalization among railroad households in all regions

Cause	Hospitalizations	
	No.	%
Infectious and internal disease	119	20.9
Paediatric disease	34	6.0
Surgery	94	16.5
Obstetric and gynaecological	111	19.5
Ear, nose and throat	41	7.2
Cardiovascular disease	54	9.5
Accidents	32	5.6
Occupational accidents	13	2.3
Emergency	29	5.1
Other	43	7.5
Total	570	100

Average length of stay = 5.7 days *

Average length of stay per 100 persons per year = 27.7 days

Average no. of hospitalizations per 100 persons per year = 4.9

per month (equal to approximately US\$ 1.50 where average exchange rate for 1995-96 was 1 US\$ = 3000 rials). This cost was then used to justify the cost of the new model.

The distribution of hospital utilization rates was as follows: wives, 38.8%; husbands, 27.4%; children, 27.4%; and other household members, 6.4%; 74.2% of hospitalizations were in public hospitals, 22.1% in private and 3.8% in others.

The five most common causes of hospitalization in descending order were: internal and infectious diseases (20.8%); obstetric and gynaecological conditions (19.5%); surgeries (16.5%); cardiovascular diseases (9.4%); ear nose and throat diseases (7.2%); paediatric disorders (6.0%); and accidents (5.6%) (Table 5).

Heads of household were asked about their satisfaction with the current health service system. Only 31.6% were satisfied, 34.2% were dissatisfied and the remainder were neutral. The dissatisfaction rate ranged from 48.2% in the north-west to 6.5% in the south-east of the country ($\chi^2 = 159.9$, $df = 11$, $P < 0.000$).

In the event of illness, the respondents or their relatives preferred the following health care alternatives: private doctors (40.4%), doctors in contract with the Health Services Insurance (34.2%), government clinics (20.9%), private clinics (4.2%) and traditional healers (0.3%). The maximum expected utility associated with each treatment option as per the opinion of the client was conditional upon: appropriateness of the price (45.8%); quality (39.1%); accessibility (9.5%); timely admission (5.0%); and other reasons (0.6%).

There was a positive correlation between the preference of some households to visit public centres (doctor or clinic) and affordable price ($r = +0.83$, $P < 0.000$). There was also a positive correlation between the preference of some households to visit private centres (doctors or clinics) and the quality of care as per the opinion of the client ($r = +0.92$, $P < 0.000$).

Conversely, there was a negative correlation between the inclination of some households to visit private centres and the cost of the services ($r = -0.91$, $P < 0.000$). There was also a negative correlation between the preference of some households to visit public centres and the quality of services ($r = -0.9$, $P < 0.000$).

Throughout all railroad geographic regions, 82% of the personnel agreed with an increase in insurance premiums to improve the quality of the public services.

Discussion

The findings of the survey revealed that the utilization of medical services by households was like that of other developing societies regarding disease patterns, hospitalizations, insufficiencies of health insurance services and the client's lack of satisfaction. Infectious and parasitic diseases account for the most morbidity, the population is young and the majority of women are of childbearing age, while the necessary medical services are still inadequate [6,7]. Although the health care system should meet the needs of the clients satisfactorily, the clients' expectations, needs, desires and inclinations for health services rely on their knowledge and attitudes about "health". However, our findings showed that, while the quality of services provided by the insurance system is not satisfactory, it is affordable while 39% of people consider quality of service to be the first priority when choosing a medical centre.

It is also notable that 82% of the personnel agreed to an increase in premiums for the sake of "quality". Revisits, the lack of a system of follow up with patients, the lack of confidence in the government insurance services, the dissatisfaction of medical staff contractors with the payment method of the insurance system and the perfunctory admittance and treatment of clients, as well as many other reasons, reveal that the current system of insurance does not work efficiently. A large organization like the Iranian railroad should appraise its personnel's satisfaction in order to optimize the effectiveness of its activities. A system of health insurance, furthermore, should meet the following criteria: sufficient funding, efficiency, equity in distribution of benefits and burden, viability (which refers to people, organizations and political acceptability) and, finally, health impact [8].

The proposal for the new system includes in its policy: equity in the distribution of health resources and facilities throughout the geographic areas to support all families' health; social accountability to the railroad households for their health and satisfaction; community partnership in policy-making, setting strategy and health objectives; and coordination with the health policy of the country which is based on primary health care.

The strategy of the new system would be: providing the railroad population with accessible, adequate, appropriate and acceptable health services; regionalization of health services according to the health needs of the people living in a particular geographical area; and providing a health management information system for continuous evaluation and correction of the delivery of the health system.

The operational plan of the new system would be as follows.

- In each railroad station, a health post would be established by the railroad organization. The room for such a post is already present in nearly all stations.
- In each health post a family doctor and a family nurse would be employed.
- The family doctor would be a general practitioner (GP) who participates in a 3-month course on community medicine, management and family practice. The family nurse would attend a 2-month course on community and family nursing before placement. As a rule, a well-trained GP can diagnose and treat up to 90% of common problems seen in the population [9].
- The health post would cover railroad households within a radius of about 50 km.
- The family doctor would be responsible for preventive care, diagnosis, admis-

sion and treatment. The doctor should refer the patient to appropriate specialists and diagnostic centres if needed and should follow the patient's treatment and keep the patient informed.

- The family doctor and the nurse would provide identification of the households and record day-to-day changes.
- They would check the health of families and perform screening tests to detect health problems.
- They would liaise with the health centres in the area for vaccinations, child and mother care, family planning and health education, within the primary health care framework.
- Transportation of the family doctor and the nurse to distant households would be done through the railroad by special express wagons;

- The family doctor would attend to and examine patients in the health post and would refer patients to specialists or medical centres if needed.
- All medical centres as well as specialists would complete the medical records of the patient and get in touch with the family doctor.
- The patient would refer directly to medical centres in case of emergencies and the family doctor would be kept informed by the patient's relatives.
- The family nurse would follow up with home nursing care of the patient in order to increase the effectiveness of the treatment.

Figure 1 shows the current health care cycle in which the client refers to the GP, the specialist or the hospital whenever she or he feels sick, and that proposed. In the

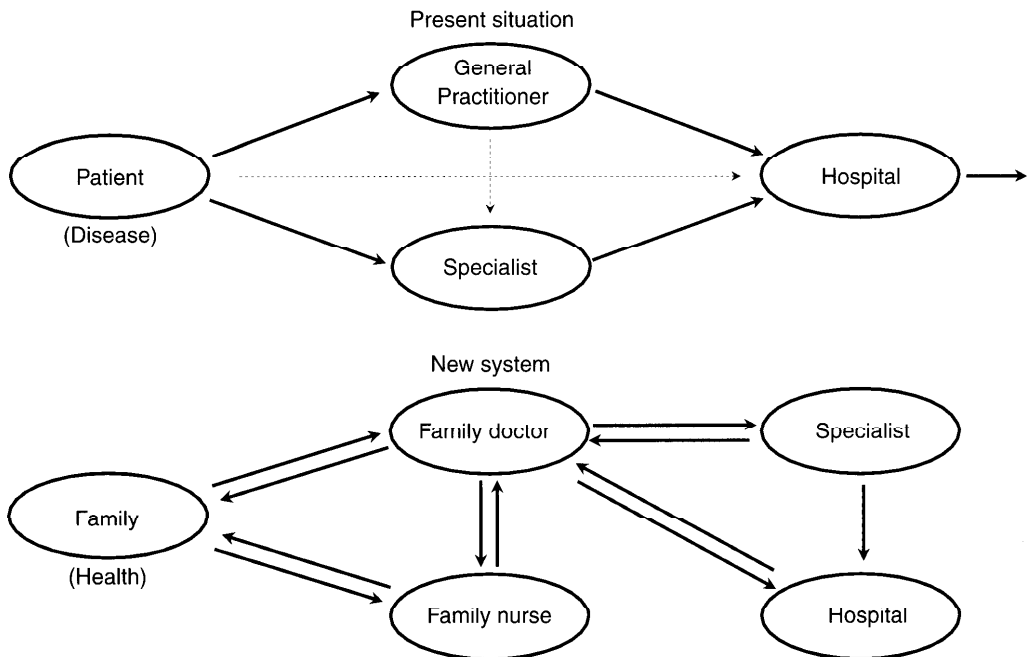


Figure 1 Procedure for the delivery of services (care) in the two systems

present system, the doctor or the hospital usually has no clear previous history of the patient and information is deduced from the patient or relatives. The patient receives the necessary treatment and care from the provider of the services and is discharged. As there is no follow-up of the patient or feedback of results of the treatment, the procedure of care or cure is often left incomplete, and perhaps, ineffective.

In the new system, the health of all household members in the community is considered instead of only the illness of the individual. Systematic referral and mutual communication and relations between family and family doctor, family doctor and specialist as well as family nurse and hospital exist so that the health of every household member is secured. The procedure of care and cure is followed up by both the family doctor and the family nurse in order to provide feedback to the users and the supplier of the service and to improve the effectiveness of the services.

In Table 6 the two systems are compared. Important aspects of the new system include the following.

- The method of payment for the medical services is direct out-of-pocket but the expenses would then be refunded by the railroad health insurance.
- The number of family doctors is calculated considering the number of visits per person per year and the number of people within reach. Thus, 50 family doctors and 60 family nurses could cover the 120 000 people (about 22 000 households) throughout the railroad network.
- The total budget needed for health human resources to develop the new system is about 539 million rials.

Comparing this budget to the 552 million rials estimated payment to general

practitioners per year by the households, the economic profit is about 13.2 million rials.

Operational support is needed to:

- establish a railroad health insurance fund (the premium is 4500 rials per person per month);
- plan an operational programme;
- prepare an operational budget;
- promote community involvement and orientation of the target population toward the new system;
- communicate with the Ministry of Health to gain legal support;
- select and train doctors and nurses;
- seek support to implement a pilot plan.

A Delphi group of health services managers, a personnel manager of the railroad organization, community-oriented medical education directors at medical universities and community nursing educators were asked to consider the new model of health care delivery. They concluded that the proposed system could be effective in improving the health status of the people. They emphasized that the referral system and the roles of family doctors and family nurses are important. The appropriateness of the proposed system is good but coverage and accessibility should be revised after a pilot plan has been implemented.

Conclusion

Change in current systems of health care delivery and health insurance systems is unavoidable [8,10]. Any organization in this era of social and epidemiological transition, and especially where economic pressure overshadows its activities, must seek new alternatives to provide optimal services with minimal use of its resources. Optimal medical practice is responsive to

Table 6 Comparison of present system and proposed system for health care utilization

Present system	Proposed system	Expected advantages of proposed system
GP (insurance or contractor)	FD (responsible for health post)	Supporting family health screening, treatment, counselling, keeping health and medical records for all family members
Specialized doctor (insurance or contractor)	Specialized doctor (private)	Patients are referred by FD; are free to choose the specialist; health data are recorded and reported to FD
Public hospital (insurance or contractor)	Family nurse	Educating families; preventive care; home care nursing; counselling on nursing care and cure; decreasing treatment costs
Groups at risk are not protected directly	Public hospitals as well as private hospitals	Clients are free to choose either public or private hospitals; treatment procedure is reported to FD; direct payment; timely admission
Referrals and treatment are not often well directed	Groups at risk are protected directly	Disease prevention; morbidity reduction; health improvement; satisfaction increases
Social accessibility only to public health; individual cure rather than public care	Referrals and treatments are systematic from lower to upper levels	Shortening the treatment length; increasing the efficiency of the treatment; decreasing costs
Geographic area and accessibility distance is not defined	Social accessibility to preventive medicine and community care	Prevention and treatment of prevalent diseases; providing services according to population's needs; improving community health
Population coverage is not determined	Maximum accessibility distance of 60 km	Accessibility to FD is defined
Evaluation of health information done only at the macrolevel by the Ministry of Health	Population coverage by FD is determined	The services to the population are defined
Without defined strategy	Data collection and evaluation of services continually done	Correction of activities and appropriate decision-making
	Health services strategy based on population needs and health improvement	Accessible and regionalized services; management information system

FD = family doctor

individuals and communities, i.e. it is person-centred, health-oriented and community-based. The systems of medical practice and public health should be closely linked [9].

Well-trained family doctors provide high quality primary care and respond appropriately to the needs of individuals and the community. Given proper training, they should receive appropriate status and reimbursement for their services [9]. However, gaining "maximum feasible participation" [11] facilitates the mutual relations of health insurance and the people.

Finally, it would be worth trying new models which may open new horizons to

optimize health care utilization through insurance.

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Regional health-for-all policy and strategy for the 21st century

In its Forty-fifth session, held in Beirut, Lebanon in October 1998, the Regional Committee for the Eastern Mediterranean called upon Member States, among other things, to:

- Exchange information on country experiences and collaborate with each other in the process of renewal of national health-for-all policy for the 21st century.
- Strengthen national capacity in the areas of health policy formation, strategic planning, health economics and health care financing.
- Sustain political management and financial commitment to ensure the sustainability of an effective health system based on primary health care.

Source: Report of the Regional Committee for the Eastern Mediterranean. Forty-fifth Session, Beirut, Lebanon, page 77. *World Health Organization Regional Office for the Eastern Mediterranean, Alexandria, 1998.*