



Determinants of Hospital Utilization: the Content of Medical Inpatient Care in Israel

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Abstract

Background: The increasing utilization of general internal medicine hospital wards in Israel during the last decade is a source of concern for health policy makers.

Objectives: To report on the distribution of selected main and secondary diagnoses among GIM inpatients, and to estimate the proportion of disorders for which appropriate care in the community will reduce the need for hospital admissions and re-admissions.

Methods: Data from the Health Information and Computer Services of the Israel Ministry of Health (national hospitalization database) for a one year period were analyzed by distribution of diagnostic entities (ICD-9-CM) in GIM and in medical subspecialty wards.

Results: Of the 313,824 discharges from hospital divisions of medicine in 1995, 256,956 (81.9%) were from GIM and 56,868 (18.1%) from specialty wards. Main and secondary discharge diagnoses were available for 188,807 GIM and 35,992 specialty patients. Of all main diagnoses in GIM wards, 27% were coded as "general or systemic symptoms and signs" or as "abnormal laboratory or ill defined manifestations" (ICD-9-CM codes 780–799, 276,277), and heart diseases comprised another 27%. The remaining main diagnoses covered almost all medical conditions. The combined proportion of "ambulatory care sensitive hospital admissions" (bronchial asthma, hypertension, congestive heart failure, chronic obstructive pulmonary disease, diabetes) constituted 12% of all main diagnoses in GIM, and respiratory symptoms or signs comprised another 11%. A by-product of this analysis was an insight into the experience of undergraduate medical students in GIM.

Conclusions: Assuming that 12–75% of admissions for "ambulatory care sensitive disorders" are preventable, an improved review before hospital discharge and a closer

outpatient follow-up may reduce the load on GIM wards by 1–17%. This wide range justifies controlled trials to determine the effect of improved community care on hospital utilization. GIM wards offer valuable learning opportunities, but they cannot be a substitute for primary care clinics. The unexplained high proportion of GIM inpatients who were discharged with an unspecified main diagnosis could be detrimental for the accuracy of hospitalization statistics, and justifies investigation by chart audits into physicians' habits of documentation.

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Between 1990 and 1997, discharges from acute care hospitals in Israel increased from 157.5 to 180.5 per 1,000 population, while hospitalization days declined from 833.7 to 785.0. During the same period, discharges from general internal medicine wards per 1,000 population increased from 40.9 to 51.7 and hospitalization days rose from 210.7 to 224.6. The average length of stay in GIM wards declined from 5.2 to 4.4 days, and bed occupancy increased from 93.4% to 102.6% with seasonal peaks of up to 110% during the winter [1]. Over 90% of all admissions to GIM wards were emergency admissions [2]. The overload on GIM hospital wards has emerged as a major health care problem.

In the USA, poor ambulatory care has been shown to be associated with higher hospitalization rates for bronchial asthma, hypertension, congestive heart failure, chronic obstructive pulmonary disease, and diabetes [35]. Furthermore, there is evidence that 12–75% of the re-admissions of patients with these "ambulatory care sensitive disorders" are preventable by appropriate pre- and post-discharge care [6–12]. The only similar Israeli study we know of found that home-care of elderly patients with severe congestive heart failure reduced hospital admissions by 72% and improved their functional status [13]. It should be noted that the Israeli study evaluated the effect of an intensive home-care surveillance program [13], while the U.S. studies estimated the effect of appropriate pre-discharge evaluation and improved post-discharge care [6–12]. Assuming that similar

to the USA, some of the admissions for the ambulatory care sensitive disorders are preventable also in Israel, an insight into GIM inpatients may provide a rough estimate of the proportion of admissions that may be prevented by improved care.

The overload on GIM wards generates concern not only among policy makers. Because of the rapid turnover, severity of diseases and older age of the patients in today's GIM wards, medical educators are questioning their suitability to provide adequate learning opportunities for medical students [14,15]. In Israel, GIM is regarded to be the most important component of undergraduate clinical training. The distribution of diagnostic entities among GIM inpatients determines the exposure and experience of medical graduates, as well as the expertise of general internists [16].

The present report is a descriptive analysis of the diagnoses in GIM and in medical subspecialty wards in acute care hospitals in Israel during 1995.

Methods

Data on discharges from GIM and medical specialty wards were retrieved from the National Hospitalization Data Base, which is compiled from the hospital reports to the Health Information and Computer Services of the Ministry of Health. We retrieved the number of hospitalizations by main and secondary discharge diagnoses during 1995 from GIM wards and from the following specialty wards: Rheumatology, Cardiology, Endocrinology, Metabolic diseases, Nephrology, Hemato-oncology, Lung diseases, Acute geriatric diseases, Neurology, Oncology (Chemotherapy and Radiotherapy), Dermatology, and Marrow transplantation. To reduce the diagnostic entities to manageable numbers, we grouped together conditions with similar pathophysiological characteristics.

In 1995 there were 313,824 discharges from hospital divisions of Internal Medicine in Israel. Of these, 256,956 (81.9%) were from the 3,199 GIM beds and 56,868 (18.1%) were from the 186 beds in specialty wards [17]. Hospital reports were available on 206,514 (80.4%) of the 256,956 discharges from GIM wards, and in 43,729 (76.9%) of the 56,868 discharges from the specialty wards. The reports of 17,707 (8.6%) of the 206,514 GIM patients and 7,737 (17.7%) of the 43,729 specialty patients were without discharge diagnoses. Table 1 presents a descriptive analysis of the remaining 188,807 GIM patients and 35,992 specialty patients with available main and secondary discharge diagnoses. The data in Table 2 are presented as percentages from the total of these 188,807 GIM patients and 35,992 specialty patients. The cumulative percentage of the main discharge diagnoses is 100 (one main discharge diagnosis for each patient), and exceeds 100% of the secondary discharge diagnoses because most patients had multiple (on average three) co-morbid conditions.

Table 1. Available data on hospital discharges from divisions of medicine used in the present survey

Data	Hospital departments of general internal medicine	Hospital departments of medical subspecialties*
Total discharges, 1995	256,956	56,868
Of these, discharges reported to the Ministry of Health	206,514	43,729
Of these, discharges with available diagnoses	188,807	35,992

* Medical subspecialties include Rheumatology, Cardiology, Endocrinology, Metabolic diseases, Nephrology, Hemato-oncology, Lung diseases, Acute geriatric diseases, Neurology, Oncology, Chemotherapy, Radiotherapy, Dermatology, and Marrow transplantation.

Results

Diseases of the heart were the main diagnosis in 27% of all GIM patients [Table 2]. Almost all of these patients had acute myocardial infarction, stable and unstable angina, coronary insufficiency, dysrhythmias, heart failure or other forms of chronic ischemic heart disease. Hypertension and hypertensive renal disease was the main diagnosis in 1% of all GIM inpatients, and cerebrovascular disorders was the main diagnosis in 4%. Another group of disorders comprising 10% of all main diagnoses included acute respiratory infections, influenza, pneumonia, bronchial asthma and chronic obstructive lung disease [Table 2].

Thus, roughly 42% of all first diagnoses in patients discharged from GIM departments consisted of cardiovascular diseases, respiratory infections and chronic obstructive lung diseases [Table 2]. Malignant neoplasms, comprising 4% and 27% of the discharge from GIM, were coded as "general or systemic symptoms and signs" or as "abnormal laboratory or ill defined manifestations" (ICD-9-CM codes 780-799, 276,277) [Table 2]. Their distribution indicated that most of them were either general (e.g., fever, fatigue) or respiratory. The combined proportion of bronchial asthma, hypertension, congestive heart failure, chronic obstructive lung disease and diabetes was 12% of all main diagnoses in GIM, and respiratory symptoms or signs comprised another 11%. In other words, the proportion of "ambulatory care sensitive disorders" could have been between 12% and 23% of all main discharge diagnoses in GIM patients.

The most common secondary diagnoses among GIM inpatients were heart diseases, which appeared in 85% of all discharges. Hypertension was a secondary diagnosis in 32% and diabetes in 21%. In 7 to 12% of all discharges the secondary diagnoses included one of the following disease entities: neoplasm, cerebrovascular disease, chronic obstructive lung diseases, anemia, acute or chronic renal failure, peptic disorder, lipid disorder, and drug, tobacco or alcohol dependence [Table 2].

Similar to GIM inpatients, the most frequent main diagnoses among inpatients in subspecialty wards were cardiovascular diseases. The proportions of cerebrovascular disorders, epilepsy, malignant neoplasms and rheumatoid

Table 2. Selected first and secondary diagnoses among patients discharged from hospital GIM departments and of medical subspecialties*, Israel, 1995

Diagnosis	ICD-9-CM codes	Discharges (%) by diagnosis from departments			
		Gen Internal Medicine (100%=188,807)		Medical subspecialties (100%=35,992)	
		Main dg	Second dg	Main dg	Second dg
All heart diseases	391–398;402;404;410–416,420–429	26.8	85.2	20.3	44.6
<i>Of these:</i> Heart failure	428	5.4	10.7	1.4	5.6
Other cardiovascular diseases	401;403;405;430–438;440–443	4.8	42.9	10.1	33.5
<i>Of these:</i> Cerebrovascular disorders	430–438	3.8	7.1	9.5	7.0
Hypertension, hypertensive renal disease	401;403;405	0.9	31.6	0.5	23.7
Complaints and findings	780–799;276–277	27.0	20.6	12.1	17.4
<i>Of these:</i> Respiratory	786	11.3	2.3	1.7	0.9
All neoplasms	140–239	3.6	8.8	10.0	13.0
Respiratory disorders	460–466;487;480–486;490–494;496	10.0	12.8	4.2	7.5
<i>Of these:</i> Chronic obstructive lung disease	490–492;494;496	3.2	8.3	1.8	4.9
Bronchial asthma	493	1.3	1.9	1.3	1.8
Anemia all causes	280–285	2.1	12.0	0.6	6.3
GI disorders	555–558;530–536;574–576;570–573	2.9	13.0	0.5	7.0
<i>Of these:</i> Inflammatory bowel disease	555–558	1.5	1.0	0.2	0.5
Liver necrosis, cirrhosis, chronic liver disease	570–573	0.6	2.2	0.1	0.8
Infectious disorders, excluding respiratory	002–009;035;038;590;595;597–599; 681–682;707	6.3	6.6	3.3	5.2
Endocrine & metabolic	233;242;244;250;272;278	1.0	39.9	0.6	29.4
<i>Of these:</i> Diabetes mellitus	250	0.8	21.1	0.3	14.6
Renal disorders	584;585	0.6	8.2	1.2	4.1
Joint and bone diseases	710–719;724	0.7	2.6	2.1	2.9

arthritis among subspecialty ward inpatients exceeded by twofold or more those among GIM inpatients [Table 2].

Discussion

In 1995 "ambulatory care sensitive disorders" comprised between 12 and 23% of the main discharge diagnoses among GIM patients. Assuming that similar to the USA [6–12], 12–75% of the admissions for these disorders were preventable, an improved outpatient care and pre-discharge review may be expected to reduce the load on GIM wards by 1% (0.12 multiplied by 0.12) to 17% (0.75 multiplied by 0.23). This estimate justifies additional controlled studies to determine what proportion of hospital admissions and re-admissions in Israel would be preventable by an effort to improve care in the community or in day-care facilities, by a more careful evaluation before discharge from hospitals, and by better continuity of care for patients with chronic disorders. Beyond the possible reduction in the overload on GIM wards, and regardless of its cost-effectiveness, such an effort may also improve patient care and outcomes [13].

During a 3 month clerkship in a GIM ward of 20 beds with a 5 day average length of stay, a medical student is exposed to about 360 patients. Our analysis indicates that the main diagnosis was heart diseases in 96 of these patients, acute infections in 43, chronic obstructive pulmonary disease in 16, cerebrovascular diseases in 14, malignant neoplasms in 13, anemia in 8, inflammatory bowel diseases in 5, dehydration or electrolyte disorders in 5, hypertension in 3, and diabetes mellitus in 3, with one or two patients having

liver disease, renal failure, rheumatoid arthritis, peptic disease, epilepsy or low back pain (data not shown). We believe therefore that GIM wards still provide medical students with learning opportunities and will continue to be a valuable teaching setting. Similar conclusions were derived from a recent survey of 30,798 admissions into a GIM ward in the UK: although cardiovascular diagnoses were most common, virtually all medical conditions were represented [18]. However, the rapid turnover of GIM inpatients, the severity of their diseases and the paucity of rheumatic, endocrine and renal disorders, indicate that the content of GIM hospital wards is not representative of ambulatory practice. Therefore, the clerkship in GIM cannot be a substitute for the primary care clinics in the community. Furthermore, clinical training necessitates not only exposure to patients, but also discussion with peers and preceptors, self-directed learning and contemplation. All these are likely to be impeded by the rapid patient turnover in GIM wards.

Unexpectedly, we found that the main diagnosis in one of every four GIM inpatients and in one of every 10 subspecialty ward inpatients was coded as "general or systemic symptoms and signs" or as "abnormal laboratory or ill defined manifestations." The absence of a definitive main diagnosis may indicate its deferral because of diagnostic uncertainty. However, the only study of "deferred diagnoses" that we know of detected only 250 (1.8%) out of a total of 14,098 GIM inpatients whose clinical and laboratory picture could not be explained by any known disease entity [19]. It

seems therefore that the high proportion of discharges without a definitive main diagnosis is due to doctors' habits of documentation rather than to diagnostic uncertainty. It is possible that some GIM physicians are in the habit of identifying the main symptom that led to the patient's referral as the main diagnosis, even when this symptom was part of a known diagnostic entity, and then recording this entity as a secondary diagnosis. We believe that the high frequency of main diagnoses coded as "general or systemic symptoms and signs" or as "abnormal laboratory or ill defined manifestations" justifies an investigation by chart audits into its cause, because it could be detrimental to the accuracy of hospitalization statistics.

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A man who is his own lawyer has a fool for a client.

Anonymous

Capsule



Life below the ice

Lake Vostok, located about 3,743 meters below glacial ice near the center of East Antarctica, may be home to a long-isolated microbial ecosystem. This possibility has been investigated by drilling an ice core to within about 120 meters above the lake (to avoid contaminating this environment). Jouzel et al. analyzed the ice below 3,500 meters and determined from the oxygen isotopic concentrations that this ice is probably refrozen lake water rather than glacial ice. Priscu, Karl, and their respective teams analyzed different depth sections of this ice core and confirmed that some of the ice is refrozen lake water. Using different techniques, they found evidence for microorganisms in this ice. Priscu et al. found phylotypes

related to extant members of the alpha- and beta-*Proteobacteria* and the Actinomycetes. Karl et al. determined that the bacteria may be viable based on respiration rates during incubations.

Thus, Lake Vostok may support a low nutrient and low mass microbial population, despite being isolated from the atmosphere for more than 1 million years. It may provide an analog for biogenic conditions during a snowball earth event (complete glaciation of the earth's surface) or the possible ocean beneath Europa, a moon of Jupiter.

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