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Relationship Between Use of Increased Primary Health Care and Other Out-patient Care in a Swedish Urban Area

II. Utilisation of Out-patient Hospital Services

by
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ABSTRACT. The expansion of the primary care services and its effect on utilization of the out-patient services in hospitals by the public have been analysed by a number of authors. Evaluation of the links vary: some studies state that an expansion of primary care goes together with an increase or an unchanged utilization of hospital visits — out-patient clinics, while others say that a decrease occurs. The present study analyses this problem in Stockholm city.

This study has a longitudinal design and it covers a study district and a control district. The results support the hypothesis that the expansion of primary care in the study area results in a significant decrease in hospital visits in this area. The decrease occurred in most age groups among men as well as women, regardless of the type of visit (emergency or by appointment); it also occurred in the usual speciality areas in the general practitioner's everyday work.

KEY WORDS: Primary care. Utilization. Out-patient hospital services.

INTRODUCTION

The development of hospital care services in Sweden in the 1950's and 60s brought an increased concentration and expansion of the health- and medical- care in hospitals. However, the locally decentralised care services have not developed correspondingly. The publication *Principprogram för öppen vård* (Guideline Programme for Out-Patient Care (1)), issued by the National Board of Health and Welfare in 1973, laid the foundations for a restructuring of the Swedish health- and medical care services.

The programme contained four main points:

1. It is possible and desirable to transfer diagnostic work and therapy from in-patient to out-patient care services.
2. The out-patient services in hospital clinics should be limited and reserved for patients who need highly specialised technical and personnel resources.

3. The specialised out-patient services can to a large extent be decentralised and detached from hospital care.
4. Cooperation and coordination between the health- and medical care and social welfare services must be strengthened.

Stockholm County Council intended to follow these guidelines but developments were not as planned. Primary care was expanded, but not to the extent that had been prescribed and the workload in the hospital in-patient services was not lessened correspondingly.

The hypothesis which *Shain and Roemer* (2) advanced in 1959 that "an increase in medical resources leads to an increase in the use of the system" has been "confirmed" by other international studies (3-5). However, economic, cultural and organisational differences between various countries make comparisons difficult or impossible. Furthermore the variety of results and conclusions can be explained by important factors as age, sex, race, socio-economic status, distance to the medical centre and the cost of the treatment — which have not always been taken into consideration and weighted accordingly in the final analysis. These factors either separately or together can explain differences in the utilization of those medical care resources which are independent of health services.

However, other studies have failed to support *Shain and Roemer's* theory and thus claimed that an expansion and decentralisation of out-patient care leads to a reduction in the population's use of hospital services (6-9). *Kekki*, in a cross sectional Finnish study in 1979, reported that the large number of general practitioners in Finland was related to a low number of visits and patientdays in hospital (10). Of the international studies reported, *Kekki's* is probably the most relevant to conditions concerned in this project but a direct comparison is not possible. Some

Swedish studies confirm the "no workload-reduction" (11–13), i.e., increased decentralized out-patient services do not reduce the population's visits at hospital clinics, and other studies confirm the "workload-reduction" theory (14–17).

In a pilot study I showed that an expansion of primary care in Matteus Parish, Stockholm, was related to a decrease in visits to hospital clinics – i.e., to both the emergency and the out-patient departments (17). The Swedish studies of the populations' use of out-patient care and the changes noted there, in the rural areas of Skara, Dalby and Tierp (11, 14, 19) are difficult to translate into urban terms. The differences in utilisation of the services may, namely, at least partially be explained by different distance to local medical centres (15, 18–20). To evaluate the "workload reduction" theory there is a need for studies, where the factor "distance to medical care" is controlled and does not affect the results.

For Matteus Parish (21 843 inhabitants 31.XII.78) Matteus Primary Health Care Centre (MPHCC) was established. The primary care personnel was increased during 1979 from two general practitioners and four district nurses to 7.5 general practitioners and 15 district nurses at MPHCC. Thus the staff was expanded to one general practitioner and two district nurses per 3000 inhabitants. The general practitioners were all specialists in general medical practice. Child welfare is included in the general practitioner's work. The distance to the out-patient clinics at hospitals or the primary health care centre did not change. The study responds to the criteria set for an evaluation of the relation between primary care services and other out-patient care. The population is known, the distance to the medical centre is known and neither the practitioners nor the population were encouraged to alter their routines or habits.

To establish data on the function of primary care in view of the lack of knowledge, Stockholm County Council decided on 22 May, 1979 to make three stu-

dies with well-developed primary care services in Storvreten (Botkyrka municipality), Sollentuna municipality and Matteus Parish in Stockholm (22).

AIMS AND HYPOTHESIS

The aim of this paper was to determine how the population's utilization of the public health care services in the emergency and out-patient departments change when primary care was expanded in the Matteus Parish.

The following main hypothesis was proposed: "After the expansion of public primary care services at Matteus Primary Health Care Centre the people in the area served will make fewer visits to the emergency and the out-patient departments at the county council hospitals".

The hypothesis is supported if the decrease occurs in all age groups, if the decrease occurs among both men and women, and if the decrease occurs in all the usual medical specialties mentioned below.

MATERIAL AND METHOD

In the study district, Matteus Parish with the MPHCC, two sampled groups were investigated; one before (*period I*: 1.III.77 to 1.IX.78) and one after (*period II*: 1.III.80 to 1.IX.81) the expansion of the primary care services. By choosing these periods an observation time of 18 months was obtained before the start of the study and 18 months during the study. With such a long observation time the size of the selection can be limited. Analysis in 1979 was excluded because the services of the MPHCC were established that year. The visits at hospital out-patient clinics were studied for emergencies, other and total number of visits. Two random samples were achieved by choosing all subjects born on the first and second days of each month, who were registered inhabitants of Matteus Parish 31.XII–77 and 31.XII.80. Its distributions according to age and sex is given in table I, and shows, that there are no signifi-

Table I. A random sample and the population in the study district reported in number and percent and broken down by age, sex and period.

Age	Sample I (n=1 441) number	%	Population 31.XII.77 (n=22 132)	Sample II (1 379) number	%	Population 31.XII.81 (22 334)
≤14	87	6.0	6.7	93	6.8	7.4
15–44	598	41.5	41.4	618	44.8	46.4
45–64	263	18.3	20.7	244	17.7	18.6
65≥	493	34.2	31.2	424	30.7	27.6
Men	635	44.1	43.9	617	44.7	44.8
Women	806	55.9	56.1	762	55.3	55.2

Table II. All visits to out-patient departments in the entire district broken down by speciality, periods, number and percental change.

Speciality	Period I number	Period II number	Change number	Percental change
Internal medicine	512 647	502 012	- 10 635	- 2.0
Surgery & Orthopaedics	872 748	817 327	- 55 421	- 6.7
Ophtalmology	179 287	183 218	+ 3 931	+ 2.2
Oto-rhino-laryngology	256 952	244 777	- 12 175	- 4.7
Dermatology	171 302	155 671	- 15 631	- 9.1
Gynaecology	246 512	231 458	- 15 054	- 6.1
Paediatrics & surgery	245 066	213 331	- 31 735	- 12.9
Plastic surgery	60 963	57 920	- 3 043	- 5.0
Total	2 545 477	2 405 714	- 139 763	- 5.4
Inhabitants	31.XII.77 1 512 000	31.XII.80 1 528 000		
Visits/1 000 inhabitants	1 683	1 574	- 109	- 6.5

cant differences between the population studied and the sample.

The entire Stockholm County Council district was selected as the control district. The number of visits to the departments of the usual medical specialities: internal medical, surgery, orthopaedic, ophtalmology, ear-nose-throat, dermatology, gynaecology, paediatric and paediatric surgery were studied during the two periods. To calculate the number of visits/1 000 inhabitants in the control district, the population in Stockholm County Council 31.XII.77 and 31.XII.80 has been taken (Table II).

Statistical method

The material was computerized by L-computers and by Department of Social Medicine at Karolinska Institute, Kronan District Health Centre during the Spring-Autumn period in 1982. Tests for significance

are T-test. Standard errors for differencies were calculated, using formulas for difference between two correlated ratios. We have standardized for age and sex, recalculating the figures for period II by using the age-sex distribution of period I (23).

Non-participation and other possible sources of error have been commented upon in an earlier publication (24).

RESULTS

The samples number of visits made to out-patient departments decreased significantly by 25 % ($p < 0.001$) from period I to period II (Table III). The whole district shows a decrease by 6.5 % (Table II). This difference is not significant. The decrease in the study district was greatest for the emergency visits (40 %) ($p < 0.001$). The decrease in other out-patient visits was 15 % ($p < 0.05$). (Table III). The decrease

Table III. Hospital out-patient visits by the sample in absolute numbers per 1 000 inhabitants and changes in the study district, broken down by period and type of visit.

Type of visit	Period I (n=1 441)		Period II (n=1 379)		Decrease			Significans (weighted)
	number	number /1 000 inhabitants	number	number /1 000 inhabitants	number	number /1 000 inhabitants	percent weighted	
Emergency	1 036	718	584	423	452	295	-40	$p < 0.001$
Other	1 543	1 071	1 237	897	306	174	-15	$p < 0.05$
Total	2 579	1 789	1 821	1 320	758	469	-25	$p < 0.001$

Table IV. Number of individuals and visits to hospital by the sample and visits per 1 000 inhabitants in the study area, broken down by medical speciality and period.

Speciality	Period I (n=1 441)			Period II (n=1 379)			Change		Significans weighted
	N	number of visits	number/ 1 000 inhabitants	N	number of visits	number/ 1 000 inhabitants	number/ 1 000 inhabitants	percent weighted	
Internal medicine	1 354	483	357	1 286	357	279	- 78	-22	p<0.05
Orthopaedics & surgery	1 354	1 091	806	1 286	737	573	-233	-29	p<0.001
Other surgery	1 441	71	49	1 379	72	52	+ 3	+ 6	NS
Ophtalmology	1 441	256	178	1 379	154	112	- 66	-37	p<0.01
Oto-rhini- laryngology	1 441	279	194	1 379	209	152	- 42	-22	NS
Emergencies otology	1 441	131	91	1 379	83	60	- 31	-34	p<0.001
Gynecology	806	115	143	762	85	112	- 31	-22	NS
Dermatology	1 441	215	149	1 379	128	93	- 56	-38	p<0.05
Paediatrics & surgery	87	63	724	93	70	752	+ 28	+3.9	NS

in visits to the above mentioned specialised departments (Table IV) were significant in most the departments investigated: internal medicine by 22 %, surgery and orthopaedics by 29 %, in ophtalmology by 37 % and dermatology by 38 %. Concerning visits to departments in paediatric medicine and paediatric surgery figures were too small to permit statistical analyse. The decrease by 22 % at the oto-rhino-laryngological department is not significant. If the visits are divided into emergency and non-emergencies the decrease of the emergency visits is 34 %, which is significant ($p < 0.01$). The visits to gynaecological departments have decreased by 22 %, which is not found significant and can only be regarded as a

tendency ($t = 1.23$).

In the control area a non-significant decrease of 6.5 % occurred in the specialities mentioned (Table II).

An increase of four percent at the paediatric and paediatric surgery clinics (Table IV) is explained by one child who came for 23 of the 70 recorded visits in period II. The non-significant increase of visits to hospital out-patient care in the age group <14 years is related to this child's 23 visits (Table V). The table shows that in all other age groups there are significant decreases ($p < 0.01$). The decrease occurs in both sexes ($p < 0.001$) (Table V).

Table V. Number of visits by the sample and studied inhabitants and visits per 1 000 inhabitants, broken down by age, sex and period.

Age	Period I			Period II			Change		Significans weighted
	N	number of visits	number of visits/ 1 000 inhabitants	N	number of visits	number of visits/ 1 000 inhabitants	number/ 1 000 inhabitants	weighted	
≤14	87	98	1 126	93	100	1 075	- 51	+ 4	N.S.
15-44	598	804	1 344	618	631	1 021	-323	-25	p<0.01
45-64	263	506	1 940	244	310	1 271	-669	-31	p<0.01
65≥	493	1 171	2 375	424	780	1 840	-535	-25	p<0.01
Total	1 441			1 379					
Men	635	1 090	1 765	617	803	1 301	-464	-24	p<0.01
Women	806	1 489	1 847	762	1 018	1 331	-516	-26	p<0.001
Total	1 441			1 379					p<0.001

Table VI. Individuals in the study sample area in absolute numbers and per 1 000 inhabitants, broken down by period and number of visits to hospital out-patient clinics.

	Period I (n=1 441)			Period II (n=1 379)			Change	Change	
Individuals number of visits	number of individuals	%	number of visits/1 000 inhabitants	number of individuals	%	number of visits/1 000 inhabitants	number /1 000 inhabitants	percent weighted	Significans weighted
0	767	53	532	845	61	613	+81	+ 14	p <0.001
1-3	411	29	285	366	27	265	-20	- 6	NS
>3	263	18	183	168	12	122	-61	-32	p<0.001
Total	1 441			1 379					

An analysis of the number of visits per individual shows noteworthy differences between the two periods studied. Subjects with no visits ("non-visitors") increased by 14 % to 61 % in period II, which is significant ($p < 0.001$) (Table VI). The number of subjects who made one to three visits did not change (-7 %), while the amount of patients making more than three visits decreased by 32 % ($p < 0.001$).

DISCUSSION

The results show that, after the MPHCC expansion there was a 25 % total decrease in the number of visits to the hospital departments studied. This differs significantly to the control population where no significant change was found.

As this significant difference concerns most age groups, both sexes and all medical specialities with exception of paediatrics, gynaecology and oto-rhino-laryngology it supports the main hypothesis: "With the expansion of public primary health care services at Matteus Primary Health Care Centre the people in the area served made fewer visits to the emergency and the out-patient departments at the county council hospitals".

Another possible explanation of this development could be that the subjects in the study district made more visits to clinics outside the public care services. However, an analysis in the study district shows that the population have also decreased their visits since 1981 to non-public practitioners, i.e., private physicians, occupational health physicians, school doctors (25).

One other cause of the decrease in the study district might be that it has the special characteristics of a city-centre area with an older population, having a large volume of out-patient services available in the vicinity. A varying tendency in the city centre can be covered in general terms when referring to the entire district. However, an analysis of the visits at St Erik's Hospital in Stockholm city, which operates under the same conditions as the study district i.e., population distribution and medical services available, with regard to visits to the internal medicine and surgery departments shows no significant difference from the development in the Stockholm County Council area as a whole (26).

Another cause of the decrease in the study district might be that the study district has a different distribution of ages from the entire district. The study

Table VII. Visits to hospital out-patient clinics per 1 000 inhabitants, broken down by district and period.

	Period I number of visits/1 000 inhabitants	Period II	Change decrease	Significans
Entire district (total population)	1 680	1 570	100	N.S.
Study district (sample population)	1 790	1 320	470	p <0.001
Weighted fig.	1 570	1 180	390	p <0.01

district has an older population than the entire district. Weighted figures shows that the decrease is smaller when the sample is standardized for ages and sexes (390 visits/inhabitants), but still significant ($p < 0.01$). (Table VII).

In the second observation period of 18 months the percentage of "non-visitors" to hospitals increased significantly by 14 % to 61 % of the population. The subjects who made three or more visits in period I account for the big difference and decrease in visits to hospitals out-patient services. These changes are principally of great importance, as well as quantitatively.

Most of the decrease recorded in the study at the hospital out-patient departments occurred because the number of persons who made many visits – more than three – declined by as much as 1/3.

The conclusions drawn from this study confirm the "workload reduction theory". In comparison with other studies (10, 12, 13, 15), this study has the advantage of being longitudinal and controlled. Furthermore we can present a decisive factor in the use of medical care: the distance to the medical centres was taken into account and it did not affect the end result. Therefore, the results of the study might be of even more general relevance than earlier attempts and could be of major importance in the continual structural development of health service and medical care.

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