They call it stormy Monday — reasons for referral from primary to secondary care according to the days of the week

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SUMMARY

Previous studies of specialist care have shown that the onset of acute myocardial infarction occurs most frequently on Mondays; however, the septadian pattern in the reasons for referrals from primary care to secondary care has not been examined previously. We examined daily variations in rates of referral from primary to secondary care in central and northern Finland, using International Classification of Primary Care codes, during two weeks (30 November to 6 December 1992, and 28 November to 4 December 1994) before and after the introduction of a reform in the system of financing health care. Monday peaks were observed in the occurrence of angina pectoris, fractures of the tibia/fibula, lumbar disc lesions, and infections of the eye. Tuesday peaks were found in the occurrence of headache. Two peaks (on Tuesday and Thursday) were observed for patients with suspected appendicitis. Many problems of primary health care leading to referral to secondary care are not random events but occur in a weekly pattern. Further investigation is needed within these subgroups of patients to identify the causes of this variation.

Keywords: referral patterns; primary care; secondary care; questionnaire survey.

Introduction

PREVIOUS studies have shown that the onset of acute myocardial infarction occurs most frequently on Mondays,[1] with potentially lethal arrhythmias occurring at the beginning of the week.[2] However, the septadian (day of the week) pattern in the reasons for referral from primary to secondary care has not been examined previously.

We have examined the effects of a reform in the system of financing health care in Finland by examining the situation before (1992) and after (1994) the reform became law.[3] In this part of the study, a comparative analysis was made examining the reasons for referrals from primary to secondary care on separate days of the week.

Method

The study was carried out in the same municipalities during two weeks (30 November to 6 December 1992 and 28 November to 4 December 1994) in central and northern Finland. The study area comprised 72% of the country, with a population of 1.5 million people out of a total Finnish population of 5 million.

A questionnaire was sent to every practising health centre general practitioner (GP) (1020 GPs in 1992 and 1012 GPs in 1994) in the study area. In one part of the questionnaire, GPs were asked to provide details of all referrals during the study week; i.e. date of the referral, type of referral (emergency or normal), and diagnosis (reason) for referral. Diagnoses were coded using the International Classification of Primary Care (ICPC). The data were analysed using the SPSS for Windows statistical program. The chi-squared goodness of fit test was used to test variations of separate days of the week. The variation was tested separately for the five weekdays and for the seven days of the week against the hypothesis that the number of referrals is equal on each day from Monday to Friday and on the days of the weekends respectively. Diagnoses with 28 cases or fewer per week and those with fewer than four cases per day on more than three days of the week were omitted.

Results

Questionnaires were sent to all health centre GPs, and 851 (83%) were returned in 1992 and 810 (79%) in 1994. During both of the two weeks, a total of 6118 patients (3296 in 1992 and 2892 in 1994) were referred.

The rate decreased in a linear fashion from Monday (20.6%, 1273 patients) to Sunday (3.6%, 233 patients): $P<0.05$ Monday/Tuesday; $P<0.01$ Monday/Wednesday, Thursday; and $P<0.001$ Monday/Friday, Saturday, Sunday. Within the ICPC main code of circulatory disorders (K), the most apparent weekly variation was found in patients referred for angina pectoris (Table 1). In the main code group of musculoskeletal disorders (L), Monday peaks were observed for patients who were referred for lumbar disc lesions and fractured tibiae/fibula. Monday peak was also observed in the occurrence of infections of the eye. Patients with headache seemed to be referred mainly on Tuesdays. Two peaks (on Tuesday and Thursday) were observed for patients with suspected appendicitis.

Discussion

Our results suggest that many problems presenting to primary health care that lead to referral to hospital are not random events but occur in a pattern according to the day of the week. Monday peaks of angina pectoris and trauma may be explained partly by Finnish alcohol drinking habits. In university hospitals, the consequences of heavy drinking bouts are most frequently dealt with in psychiatric, trauma, and cardiovascular units.[4] Furthermore, men drinking six or more bottles of beer per session have a more than six-fold elevated risk for fatal myocardial infarction than men consuming fewer than three bottles.[5]

Occasionally, the reason for referral from primary care is not the same as that found in the final diagnosis in the hospital. It has previously been reported that only one in two patients referred for appendicitis actually turned out to have appendicitis.[6] We

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Table 1. Referral rates according to the day of the week for major diagnostic groups.

	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		All		Significance	
	n (%)	Rate[a]	n (%)	Rate[a]	n (%)	Rate[a]	n (%)	Rate[a]	n (%)	Rate[a]	n (%)	Rate[a]	n (%)	Rate[a]	n (%)	Rate[a]	All days	Excluding weekend
Digestive (D)																		
Appendicitis (D88)	13 (14)	29	23 (25)	51	6 (6)	13	24 (26)	53	14 (15)	31	8 (9)	18	5 (5)	11	93 (100)	204	P<0.001	P<0.01
Eye (F)																		
Infections other than herpes (F73)	12 (39)	26	4 (13)	9	9 (29)	20	2 (6)	4	4 (13)	9	0 (0)	0	0 (0)	0	31 (100)	68	P<0.001	P<0.05
Ear (H)																		
Acute otitis media/myringitis (H71)	7 (20)	15	13 (37)	29	3 (9)	7	8 (23)	18	3 (9)	7	1 (3)	2	0 (0)	0	35 (100)	77	NS	NS
Chronic otitis media (H74)	14 (39)	31	2 (6)	4	4 (11)	9	8 (22)	18	8 (22)	18	0 (0)	0	0 (0)	0	36 (100)	79	NS	NS
Circulatory (K)																		
Angina pectoris (K74)	38 (29)	84	24 (18)	53	17 (13)	37	21 (16)	46	20 (15)	44	6 (5)	13	7 (5)	15	133 (100)	292	P<0.001	P<0.05
Musculoskeletal (L)																		
Fracture: tibia/fibula (L73)	15 (28)	33	7 (13)	15	11 (20)	24	6 (11)	13	2 (4)	4	7 (13)	15	6 (11)	13	54 (100)	119	P<0.05	P<0.001
Dislocations (L80)	13 (21)	29	17 (28)	27	12 (20)	26	5 (8)	11	6 (10)	13	4 (7)	9	4 (7)	9	61 (100)	134	P<0.01	P<0.05
Lumbar disc, lesion, radiation (L86)	21 (36)	46	6 (10)	13	8 (14)	18	14 (24)	31	8 (14)	18	1 (2)	2	1 (2)	2	59 (100)	130	P<0.001	P<0.01
Acute meniscus/ligament of knee (L96)	7 (14)	15	12 (24)	26	9 (18)	20	9 (18)	20	11 (22)	24	0 (0)	0	0 (0)	2	49 (100)	108	*P*<0.01	NS
Neurological (N)																		
Headache (N01)	15 (17)	33	25 (29)	55	14 (16)	31	15 (17)	33	10 (12)	22	4 (9)	5	4 (9)	7	86 (100)	189	P<0.001	NS
Vertigo (N17)	13 (25)	29	10 (19)	22	6 (11)	13	4 (8)	9	10 (19)	22	6 (11)	13	6 (11)	9	53 (100)	117	NS	NS
Psychological (P)																		
Depressive disorders (P76)	5 (17)	11	9 (30)	20	4 (13)	9	5 (17)	11	3 (10)	7	1(3)	2	1 (3)	7	30 (100)	66	NS	NS
Respiratory (R)																		
Shortness of breath, dyspnea (R02)	13 (24)	29	7 (13)	15	8 (15)	18	13 (24)	29	8 (15)	18	3 (5)	7	3 (5)	7	55 (100)	121	P<0.05	NS
Skin (S)																		
Localized swelling/lump/mass/skin (S04)	10 (30)	22	10 (30)	22	3 (9)	7	4 (12)	9	5 (15)	11	0 (0)	0	0 (0)	2	33 (100)	73	NS	NS
Urology (U)																		
Blood in the urine (U06)	8 (26)	18	4 (13)	9	3 (10)	7	4 (13)	9	7 (23)	15	2 (6)	4	2 (6)	7	31 (100)	68	NS	NS

[a]Referrals/100 000 inhabitants/year (estimated to 100% response rate).

found that patients having suspected appendicitis were referred five times more often on Tuesdays than on Sundays. It would be interesting to study whether there are any differences between the proportions of correct diagnosis between these 'Tuesday' and 'Sunday' appendicitis cases.

Our findings of daily variation of some problems, and the linear decrease of referral rates from Monday to Sunday, might be a reflection of the daily variation of work in health centres. However, patients with trauma and acute attacks of disease have to be treated, irrespective of the weekly routine of the health centre. Further investigation is needed within those subgroups of patients showing septadian variation in the reasons for referral.

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