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Determinants of Health Care Utilization – Visits and Referrals

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This study explores determinants of I) general practitioner (GP) visits and II) referrals (outpatient and hospitalization). The analyses were performed with regression models on a set of data from a comprehensive population study of 3533 men and 3578 women aged 40–42 in a county in Northern Norway. Among the various health status dimensions included, self-rated health was found to be the most important determinant, regardless of type of service. Factors, other than health status aspects affecting GP visits, were preoccupation with health and help seeking attitude. Volume of resources (GP per population), socio-demographic characteristics and social networks did not appear as important. Several inequitable effects were revealed on referrals: First, higher rate of referral of patients with higher educational achievement indicates a bias towards higher social status groups. Second, high GP/population ratio and residence in municipalities with referral care facilities were both found to be associated with higher probability of referral.

Key words: Illness behaviour, health status, health care utilization.

INTRODUCTION

The issue of cost containment continues to dominate the debate regarding strategies for organizing and financing health care services. An issue of particular concern in this regard has been the continuing increase in the consumption of first line services. The concern applies both to the seemingly strong provider influence on utilization, and to an increasing tendency to seek professional help (1). Regarding the latter phenomenon, reports indicate dramatic changes in the population's illness behaviour (2) within few decades. First, observers have noted a historical trend toward broadening of the range of problems and social phenomena that are conceptualized in terms of health and illness (3–4). Second, the threshold for seeking medical care has been lowered (1). A third possible contributing factor, although less firmly documented, is the growing occupation with personal health and healthy lifestyle (3). With reference to the issue of cost containment, these changing patterns of help-seeking behaviour highlight the role of general practitioners as gatekeepers to control the distribution of resources to the various health care sectors.

The literature on the utilization of health services is extensive. According to several reviews, once "illness" measures have been taken into account, organizational, social structural, social networks and attitudinal variables have been inconsistently related to health care utilization (5–8). Contributing factors of some of the observed contradictions are the varying conceptual and methodological approaches, differing medical care systems and different time periods. Mechanic (7) has reported major discrepancies between the qualitative and the large-scale multivariate studies. The complexity involved in help seeking behaviour and its relation to the various sectors of health care, however, call for a variation in analytical approaches (5).

When studying health care utilization in Norway, some particular characteristics of the health care delivery system have to be considered. First, the system is relatively uniform with established rules of referral. Second, financial barriers, with regard to the use of those services considered in present analyses, are not expected to exist. A study of Norwegian data (9), based on the model developed by Andersen et al. (10–11), showed that factors other than those introduced as "need indicators" were of minor importance in explaining variation in visits to the general practitioner during one year. Another study, considering physician visits (both GP and specialists) registered in a 2-week period, indicated a variation by social status and geographical distribution of services, the latter exclusively with regard to second visits to the GP and contacts with specialists (12). In a study of a primarily urban population in Northern

Table I. *Independent variables in the model*

Variables and descriptions
Health personnel and distance:
– Population/GP ratio: Based on records on the number of GP labour years in 1988 and 1989 in each municipality, coded <1000, 1000–1499, 1500+ (1–3)
– Walking distance to GP office (0,1)
– Municipality with hospital: The seven municipalities with hospital = 1 (0,1)
Socio-demographic characteristics:
– Gender (men = 1, women = 2)
– Educational attainment: years of schooling: <8, 8–9, 10–12, 13–15, >15 (1–5)
– Urban: The three town municipalities (0,1)
– Employment status: Full-time paid employment (0,1)
Social networks and family characteristics:
– Household size (1–6)
– Cohabitation/marriage (0,1)
– Factor 2: Social networks (Ref. Table 2)
Health promoting lifestyle indicators:
– Leisure physical activity: Sedentary, moderate, keep fit exercise, athletes (1–4)
– Daily smoking: (0,1)
– Total serum cholesterol
Preoccupation with health and health attitudes:
– Preoccupation with health: Talked to family members (0,1) or friends (0,1) about health matters the last two weeks (0–2)
– Own control over health: Index (2–8) based on two items:
1) Believes has high control over own health: Totally disagree = 1, totally agree = 4
2) "If I am getting sick, recovery is mostly dependent of my own behaviour": Totally disagree = 1, totally agree = 4
– Tendency to consult GP: Index (2–6) based on two items:
1) Tendency to consult a GP when experiencing banal infections/influenza with high fever: Action taken last event: Self-care or GP visit to get a certificate of illness = 1, GP visit = 2
2) General tendency to consult a GP: "When I am not feeling well, I need to see a doctor": Totally disagree = 1, totally agree = 4
Health status/disease:
– Self-rated health: In general, how would you say your health is? Poor, fair, good, very good (1–4)
– Physical distress:
– Neck/shoulder and headache: Index (2–8) based on two items: Necl/shoulder pain and headache (both: seldom or never = 1, once or more a month = 2, once or more a week = 3, daily = 4
– Chest pain (0,1) and gastric pain (0,1): Index (0–2)
– Psychological distress: Depressed during the last 14 days: Never or seldom, sometimes, often, most of the time (1–4)
– Chronic disease: Myocardial infarction, Angina pectoris, Diabetes, Psoriasis, Asthma, Bronchitis, Ulcus of stomach or duodenum, Rheumatoid arthritis, Cancer, Migraine, Epilepsy, Bechterew disease, Eczema: all coded (0,1) and added to an index (0–3)
– Infections: Number of events the last 6 months with colds, influenza, inflammation of the throat etc. (0–4)

Norway (13) we analyzed factors influencing the number of GP visits and care initiated by the provider. The results suggest some important access barriers to health care, interpreted to be primarily related to social status and individual resources.

The present analyses explore predictors of health care utilization in a "middle-aged" population in Northern Norway. Two types of health care utilization models are proposed. One is exclusively assumed to explain visits to the general practitioner, while the other is assumed to explain factors influencing referrals made by general practitioners. An important theoretical consideration, relevant to both models, has been to make distinctions between the various dimensions of health status (14–15). Further, these are indicators of health and illness on the one hand and of socio-demographic, attitudinal and behavioral variation on the other (7). The model on GP visits integrates health status/disease, attitudinal and behavioral, social networks and sociodemographic variables and measures of doctor density/proximity. In addition to health status and disease measures, proximity to referral care services and social structural aspects are assumed to explain decisions involved in referral.

POPULATION

All residents in the County of Nordland born in 1946–48 (aged 40–42) were invited to the first Nordland health study. The screening conducted by the National Health Screening Service started in August 1988 and was finished in June 1989. The screening procedure comprised a questionnaire (questionnaire I) and measurement of blood pressure, weight, height and collection of a non-fasting blood sample. The design and procedures of the screening were similar to the Norwegian county studies and the Tromsø study (16). Questionnaire I, filled in by all attenders, covered own and family history of cardiovascular disease, related symptoms, diabetes, physical activity during leisure and at work, use of salt and type of fat, smoking habits, coffee consumption (type and amount) and social stressors.

All attenders were asked to fill in a second questionnaire (questionnaire II) covering a wide range of topics: various demographic information, chronic diseases (own and family), health and illness, use of health care services during last year, social networks, food and alcohol habits and working environment. Non-responders were given one reminder.

A total number of 4302 men and 4310 women attended the screening, i. e. an attendance rate of 78% and 86% in men and women, respectively. Of all attenders 87% (among both men and women) responded to Questionnaire II. Further details about the design, procedures, description of the population, attendance and response to questionnaire II are given else where (17).

VARIABLES AND THEORETICAL CONSIDERATIONS

Health care utilization

Present measures are based on self-reported number of visits to the general practitioners (primary care providers) and referral services (specialist contacts, hospitalizations) the year preceding the interview. According to established referral procedures in Norway, it is assumed that individuals who are users of referral level care are restricted to those consulting a GP, and thus the use of these services are principally provider influenced. A reported high rate of turnover among GP's clearly reduces the possibility of having a particular doctor as a regular source of care. Moreover, it is not feasible, for this reason, to link self-reports of referral care use to particular GPs.

The following dependent variables were used: 1) Number of GP visits. 2) Any kind of referral services use, coded 1, and nil referral and one or more GP visits coded 0. 3) Hospitalization coded 1, nil hospitalizations and one or more GP visits or specialist consultations coded 0.

Table I contains the definitions of the independent variables. We expect the model explaining GP visits to be different from the model of provider-initiated referral services use. The former includes all variables listed in Table I except for referral care resources (municipality with hospital). The referral model includes the various dimensions of health status/disease (except for frequency of infections), gender, educational attainment, the population/GP ratio and two measures on geographical distribution of referral care facilities (urban, municipality with hospital). The "ideal" referral system should reveal the health status measures as the dominant effect variables.

Health personnel and socio-demographic characteristics

Nordland County, with a total population of 240000 inhabitants, is situated in the northern part of Norway with about half of the area north of the Arctic circle. The organization of the primary health care services is primarily public, with the municipality as the administrative unit. About half of the 45 municipalities of Nordland County have a population of less than 3000 inhabitants, three of them are towns with a total population of 80000. The average population/GP ratio for the county as a whole is (in 1988) 1363. The intermunicipality variation, however, is rather great. In our material 11.7% of the individuals lived in municipalities with a population/GP ratio of less than 1000, and another 12.6% in municipalities with a ratio of more than 2000. Some of the municipalities had problems recruiting doctors, and thus the population/GP ratio might not be a valid measure of volume of resources. The measure used in present study was therefore based on information on the number of GP labour years in each municipality in 1988/89 (Table I and III).

The referral care services are geographically located in the 7 municipalities with a hospital, with the highest volume of consultants in the towns. Thus the inclusion of the two geographical variables, "urban" and "municipality with hospital" is assumed to be measures of the geographical distribution of the referral services. In the model explaining number of GP visits, however, urban is primarily assumed to be an indicator of sociocultural characteristics.

In Norway the employment status per se is assumed to influence the use of GP services. If an employee is absent due to illness more than 3 days, a certificate of sickness must be submitted to the employee's company. Reasons for not being employed are many and often related to disease and illness, however, indicating that the interpretation of our variable is not quite unequivocal. The variable 'years of schooling' is by most researchers studying utilization behaviour assumed to basically measure variation in attitude or inclination to seek help. In a system with minor patient charges, but with queues as an important regulating mechanism, low education might as well act as an important access barrier. Years of schooling is further seen as one of the most important factors "producing" differences in status attainment.

Table II. *Results of factor analyses of social networks. Principal component(s) extracted, factor loadings (standardized multiple regression coefficients) and percent of common variance (3533 men and 3578 women)*

	Men: Factor	Women: Factor
1. Social networks:		
– Participation (hours per week) in club work/organizations (0–6)	0.576	0.549
– Number of close neighbours (0–6)	0.705	0.720
– The frequency of interaction with friends during leisure time (1–5)	0.791	0.775
Percent of common variance extracted	48.5	47.4

Social networks/family characteristics

A factor analysis of principal components was performed on three items assumed to represent different aspects of social networks other than those related to the family. Table II reveals the first component (factor) to extract about 50% of the common variance in the set of items. Factor scores computed on the basis of the one-dimensional principal components analyses will be used in the statistical analyses. Household size and cohabitation/marriage are assumed to represent important measures of family networks.

Preoccupation/health attitudes

The three health attitude measures included in the model explaining GP visits are assumed to represent dimensions of particular interest related to illness behaviour. The variable preoccupation with health (Table I) measures the tendency toward increased attention to health matters in general.

A factor analysis of principal components was performed on four items assumed to capture other aspects of health attitudes. Two principal factors were identified. The first factor was defined by the two items representing control over own health, and the second factor was defined by the two items on tendency to seek GP. Table I shows the additive indices employed in the present analyses, based on the two items for each of the aspects.

Health promoting lifestyle

In a previous study we found health promoting lifestyle indicators to be associated with an increased health care consumption (13). The theoretical considerations was based on the idea of a continuum of care, from pure self-care to pure professional care. Self-care, defined as "the range of behaviour undertaken by individuals to promote or restore their health" (18), includes both lay responses to illness and health promoting behaviour as distinct dimensions. Our postulate that a positive lifestyle would reduce professional help seeking, based on an assumption of a positive link between the two dimensions of self-care, was thus not supported by the empirical findings (13). A relationship of particular interest in the present model of GP visits is the simultaneous examination of a health promoting lifestyle and health attitudinal aspects.

Dimensions of health status and disease

Our central premise is that health is a multidimensional concept. The various chronic diseases included are to be seen as reports on given medical diagnoses. Physical distress is found to be one of the most important factors reducing people's self-rated health (19, 20). Two different aspects of physical distress are included (Table I): physical symptoms as neck/shoulder pain and headache on the one hand, and chest pain and stomachache on the other. The measure of less serious transitory morbidities, infections and influenza with high fever, represents an important supplement to the other standard health status variables (21).

STATISTICAL ANALYSES

Multiple regression analyses of number of GP visits were performed separately for each sex. The distribution of number of visits is made less skewed by means of a logarithmic transformation, log (number of visits + 1), and the log-distribution conforms better with the assumption necessary for multiple regression analysis. Standardized values of parameters were estimated, i.e. estimates of the magnitude of the gender effects were not made. Before estimating the effect of all independent variables on the number of GP visits (the full model), three "reduced form" regression analyses were performed in order to reveal the "total" effect of the various independent variables. In the first analysis only health personnel/distance (convenience) and socio-demographic characteristics were included. The second step added social network variables, and the third one health promoting lifestyle and health attitudes/preoccupa-

Table III. *Use of general practitioners and referral according to sex, population/GP ratio and geographical distribution of referral facilities. The Nordland health study*

	n	Type of sevices				
		GP visits:			Referral services:	
		One or more (%)	Mean	(sd)	Any referral (%)	Hospitalization (%)
All	7113	62.7	1.70	(2.59)	32.9	12.8
Gender:						
Men	3534	54.8	1.38	(2.48)	30.9	11.4
Women	3579	70.7	2.02	(2.66)	34.4	14.0
Residential:						
Urban	2352	59.2	1.63	(2.57)	35.1	12.3
Other	4761	64.4	1.74	(2.60)	31.8	13.2
Municipality with hospital:						
No hospital	3526	64.4	1.75	(2.52)	30.3	12.2
Hospital	3587	61.0	1.65	(2.66)	35.4	13.6
Population/GP ratio:						
<1000	1039	66.0	1.82	(2.44)	32.3	14.0
1000–1499	3656	63.1	1.70	(2.52)	33.0	12.5
1500–	2418	60.6	1.65	(2.74)	32.8	13.0

– One or more referrals (any type) among consumers (at least one GP visit or referral care consultation).
– One or more hospitalizations among consumers.

tion with health. This procedure was based on theoretical considerations regarding the relationship between most of our health status measures and the socio-demographic, attitudinal and behavioral variables. Our "reduced form" estimates thus reveal the effect of these variables before taking into account the influence of the health status variables.

A logistic regression model was used to estimate the probability of 1) referral (of any kind), and 2) hospitalization. A total number of 135 men and 150 women reported referral services use and nil GP visits. This might either be due to a time-lag of more than one year since actual referral or that direct contacts actually happened. When comparing the "direct" users with the other referral care users they were found to differ in various respects. The analyses were therefore repeated after having excluded the "direct" users of referral care services from the effective material.

A supplementary analysis was performed in order to estimate the independent effect of gender on number of GP visits. We assumed an interaction effect between gender and household members. When included in the equation as a multiplicative term no statistically significant effect was revealed, and accordingly the term was excluded from the final analysis.

In the gender specific analyses other assumed interaction effects tested were: 1) psychological distress and chronic disease, 3) psychological distress and social network, 4) self-rated health and chronic disease. All these tests for statistical interaction, when included as multiplicative terms in the equations, failed to reach significance.

RESULTS

Table III gives the distribution of the various types of health care services according to gender, population/GP ratio and geographical distribution of referral facilities. A total of 62.7% reported one or more contacts with a GP. Among consumers (individuals with at least one contact with either a GP or referral care) 32.9% reported referral of any kind, and 12.8% reported one or more hospitalizations. Women reported higher use of all types of services compared to men, in particular regarding number of GP visits. Further, Table III reveals higher referral rates in municipalities hosting referral care facilities.

Table IV. *Correlation coefficients and results of multiple regression analyses[1] of number of GP visits[2] in 3533 men aged 40–42*

	Corr. coeff.	Step 1 Reg. coeff.	Step 2 Reg. coeff.	Step 3 Reg. coeff.	Step 4 Reg. coeff.	t
Health personnel and distance:						
Population/GP ratio (1–3)	–0.043	–0.019	–0.023	–0.012	–0.021	1.1
Walking distance to GP office (0,1)	–0.036	–0.012	–0.013	–0.015	0.001	0.0
Socio-demographic characteristic:						
Educational attainment (1–5)	–0.088	–0.065	–0.064	–0.073	–0.027	1.6
Town (0,1)	–0.044	–0.012	–0.013	–0.021	–0.008	0.4
Employment status (0,1)	–0.121	–0.105	–0.104	–0.103	–0.057	3.6
Social networks/family characteristics:						
Factor: Social networks (ref. Table 2)	–0.001		–0.020	–0.028	–0.008	0.5
Cohabitation/marriage (0,1)	–0.028		–0.001	–0.007	–0.003	0.1
Household size (1–6)	–0.012		–0.007	–0.006	–0.004	0.2
Health promoting lifestyle indicators:						
Leisure physical activity (1–4)	–0.049			–0.038	0.014	0.9
Smoking (0,1)	0.024			–0.001	–0.036	2.3
Serum cholesterol	0.019			0.006	0.009	0.6
Preoccupation/health attitudes:						
Preoccupation with health (0–2)	0.097			0.124	0.080	5.0
Own control over health (2–8)	–0.072			–0.060	–0.000	0.0
Tendency to consult GP (2–6)	0.124			0.112	0.094	6.1
Health status/disease:						
Self-rated health (1–4)	–0.321				–0.185	10.4
Physical distress:						
– Neck/shoulder and headache (2–8)	0.279				0.136	8.1
– Chest pain and stomachache (0–2)	0.228				0.085	5.1
Psychological distress (1–4)	0.190				0.074	4.6
Chronic disease (0–3)	0.205				0.087	5.5
Banal infections	0.173				0.092	5.9
R^2		0.020	0.021	0.054	0.193	

[1] Standardized regression coefficients and explained variance (R^2)
[2] Log-distribution
t: $p < 0.05$ if $t > 1.96$, $p < 0.01$ if $t > 2.576$, $p < 0.001$ if $t > 3.29$

Explaining visits to general practitioners

Table IV and V show the correlation coefficients and the results of the multiple regression analyses in men and women, respectively. The correlation coefficients indicate some effect of most categories of variables except for our measures of social networks/family characteristics, with the health status measures showing the highest correlations. When all independent variables were included in the equation, the influence of the health status variables appeared most powerful. This is clearly indicated by the increase in the explained variance, from 5.4% to 19.3% in men and from 5.6% to 22.8 in women, when the health status measures were introduced as the last block of variables.

Self-rated health appeared as the single variable having the greatest effect on GP visits in either sex. In women none of the health personnel/distance, socio-demographic, social networks and health promoting lifestyle variables were found to have significant effect. The estimates of the same variables in men, Table IV, show a very similar pattern except for a significant negative influence of employment status and smoking. In either sex both preoccupation with health and tendency to consult a GP were found to increase use, and the magnitude of the effect appeared about at the same level as most health status measures.

Table V. *Correlation coefficients and results of multiple regression analyses[1] of number of GP visits[2] in 3578 women aged 40–42*

	Corr. coeff.	Step 1 Reg. coeff.	Step 2 Reg. coeff.	Step 3 Reg. coeff.	Step 4 Reg. coeff.	t
Health personnel and distance:						
Population/GP ratio (1–3)	–0.038	–0.023	–0.026	–0.014	–0.013	0.7
Walking distance to GP office (0,1)	–0.011	–0.001	–0.018	–0.011	0.003	0.2
Socio-demographic characteristic:						
Educational attainment (1–5)	–0.074	–0.065	–0.062	–0.063	–0.019	1.1
Urban (0,1)	–0.036	–0.012	–0.017	–0.030	–0.009	0.5
Employment status (0,1)	–0.042	–0.022	–0.032	–0.030	–0.002	0.1
Social networks/family characteristics:						
Factor: Social networks (ref. Table 2)	–0.004		–0.021	–0.029	–0.011	0.7
Cohabitation/marriage (0,1)	–0.029		–0.021	–0.031	–0.007	0.4
Household size (1–6)	–0.035		–0.038	–0.025	–0.025	1.5
Health promoting lifestyle indicators:						
Leisure physical activity (1–4)	–0.066			–0.044	0.005	0.3
Smoking (0,1)	0.062			–0.048	0.007	0.5
Serum cholesterol	0.024			0.000	–0.004	0.3
Preoccupation/health attitudes:						
Preoccupation with health (0–2)	0.120			0.149	0.097	6.3
Own control over health (2–8)	–0.116			–0.106	–0.023	1.5
Tendency to consult GP (2–6)	0.104			0.097	0.080	5.4
Health status/disease:						
Self-rated health (1–4)	–0.368				–0.193	10.7
Physical distress:						
– Neck/shoulder and headache (2–8)	0.317				0.134	7.9
– Chest pain and stomachache (0–2)	0.282				0.129	8.1
Psychological distress (1–4)	0.218				0.078	4.9
Chronic disease (0–3)	0.231				0.087	5.5
Banal infections	0.192				0.081	5.3
R^2		0.007	0.010	0.056	0.228	

[1] Standardized regression coefficients and explained variance (R^2)
[2] Log-distribution
t: $p < 0.05$ if $t > 1.96$, $p < 0.01$ if $t > 2.576$, $p < 0.001$ if $t > 3.29$

The supplementary analysis performed to test the effect of gender on GP visits revealed a beta coefficient of 0.081 ($t = 6.6$), indicating a significant higher use of general practitioners in women.

Factors affecting referral

Table VI reveals results of the logistic regression analyses of any kind of referral and inpatient, respectively. Regarding the former (both outpatient and inpatient), the estimates indicate some significant inequitable effects. First, increasing referral rates with increasing GP/population ratio. Second, referral rate was influenced by geographical distribution of referral facilities, measured by residence in a municipality with hospital. Third, higher rate of referral was found in patients with higher educational attainment. The estimated odds ratio between the two most extreme levels of educational attainment was 1.33. Further, the model revealed a significant effect of gender. Self-rated health appeared also in this model as the most powerful determinant, with an estimated odds ratio when comparing the two most extreme levels of health (excellent versus poor) of 2.69 (95% CI: 1.96–3.70).

Regarding the model estimates of hospitalization (Table VI), the only variable, except for health status/disease, appearing as a significant determinant was residence in a municipality with hospital. The estimated odds in favour of hospitalization was 1.44

Table VI. *Results of logistic regression analyses of referral services use in 4457 men and women aged 40–42*

	All referral[1]		Hospital[2]	
	Reg. coeff.	t	Reg. coeff.	t
Volume and geographical distribution of resources:				
Population/GP ratio (1–3)	–0.204	3.0	–0.141	1.5
Municipality with hospital (0,1)	0.354	3.5	0.368	2.7
Urban (0,1)	0.096	1.0	–0.178	1.3
Socio-demographic characteristics:				
Gender (men = 1, women = 2)	0.134	2.0	0.170	1.8
Educational attainment (1–5)	0.071	2.4	–0.001	0.3
Health status/disease:				
Self-rated health (1–4)	–0.330	6.1	–0.349	4.8
Physical distress:				
– Neck/shoulder and headache (2–8)	–0.013	0.5	–0.003	0.1
– Chest pain and stomachache (0–2)	0.140	2.2	–0.006	0.1
Psychological distress (1–4)	0.113	2.3	0.176	2.7
Chronic disease (0–3)	0.152	4.3	0.097	2.0

[1] Consumers with nil referral serviceds use versus referral services consumers (0,1)
[2] One or m,ore hospitalizations = 1, consumers with nil hospitalizations = 0
t: $p<0.05$ if $t>1.96$, $p<0.01$ if $t>2.576$, $p<0.001$ if $t>3.29$

times as large as that for individuals living in other municipalities.

The group of "direct" referral care users were found more likely to be men, to be residents of municipalities with a hospital and town residents. When the analyses were repeated after exclusion of "direct" users of referral services, the effect of health status/disease variables increased in both analyses shown in Table VI. In particular the effect of self-rated health, ie. the change in odds ratio between the most extremes values increased from 2.64 to 3.16 (all referral) and from 2.64 to 3.69 (inpatient).

DISCUSSION

In the present study two models have been employed, one assumed to explain number of GP visits and the other to explain number of referrals. The model of GP visits revealed health status/disease, preoccupation with health and help seeking attitude as the main determinants. Further, volume of community resources (doctor density), socio-demographic, social network, locus of control over own health, and health promoting lifestyle variables were shown to have only minor influence. The model on referrals showed that higher educational groups, and those living in municipalities hosting the referral care facilities were more likely to receive referral services. Further, high GP/population ratio was found to increase the probability of referral.

Self-rated health has consistently been found as an important predictor of the use of various types of health care services (11, 13–14, 21–23). These findings are in accordance with present results. The overall judgement made by persons of their own health was the most important determinant of both GP visits and referral services. The strong independent influence on the chance of "breaking through" the referral barrier is worthy of note, in particular since our model includes both measures of chronic disease, physical and psychological distress. This might, however, partly be explained by the way chronic diseases are handled, by counting all diseases equally as apposed to a grading of seriousness.

Although the measure of self-rated health is crude and involves a good deal of measurement error, the relatively strong independent effect on health care use provides further indication that people experience health threats or stressors in a more global manner than traditional medical conceptions would suggest (24). The finding of self-rated health being an independent predictor of survival (25–28) seems to point in the same direction. These results indicate self-rated health to tap dimensions to which other measures or types of appraisals have limited excess, or that health optimism in itself represents a pivotal element both in relation to illness behaviour and

longevity. Subjective health assessments should thus be seen an important tool in health services research trying to penetrate the important issue of health outcomes related to medical care. This suggestion is supported by the finding of an existing gap between conditions reducing self-rated health and our ability to offer effective treatment for these conditions through the health care system (19).

Health status should ideally be measured prior to treatment when used to explain utilization. It is, however, seldom feasible to measure health status independently of medical treatment. Moreover, in our models some of the most widely used health status measures (in terms of utilization studies) have been omitted, like role limitations and restricted activity days. The replacement of chronic diseases, physical distress and infections are assumed to fairly well tap the same dimensions (21) and to be less influenced by treatment. The possibility of introducing bias, however, is more evident when retrospective reports on behaviour is collected at the same time as attitudinal data. The ordering of the relationship can obviously be interpreted either way, and it is just as reasonable to conclude that behaviour causes attitudes as that attitudes cause behaviour.

Family and associated networks are assumed to influence illness behaviour or the way individuals interpret and act upon symptoms and stressors (29). The research on the nature of such influences, however, seems in an early stage (5, 30). Freidson's suggestion regarding the importance of a "lay referral system" in the use of medical and social welfare facilities still represents a useful frame of reference (31). In his study of "underutilizers" versus "utilizers", McKinlay (32) found that the "underutilizers" relied on readily available relatives and friends as lay consultants before using health services, while "utilizers" appeared relatively independent of these sources. It has further been reported that networks with a lot of interpersonal contact inhibit help seeking (33). The hypothesized influence of social networks on GP visits was not supported by the present empirical findings. Although covering both frequency of interaction with friends, interaction with neighbours, participation in various religious or other organizations, and family structure, some important aspects of social networks might have been omitted in our study. In particular geographical proximity to and interaction with relatives, aspects that previously have been found important (31–32). Another explanation of the lacking influence might be that the lay culture and the professional culture is getting more and more alike, paving the way for a more reduced role of lay consultants.

The Norwegian health care system is relatively uniform, with established rules of referral and no financial barriers with regard to use of type of services studied. The ideal situation when trying to penetrate factors affecting referrals would have been to link use to particular doctors. In our situation, with a very high rate of turn-over among GPs, this did not appear feasible. Ideally, our model explaining referral should reveal health status/disease as the dominant determinants. Both reports from Norway and the UK indicate that use of referral services are influenced by the geographic distribution of consultants (12, 34). Present findings revealed higher rates of referral of patients with residence in municipalities with a hospital. Accordingly, our interpretation is that geographical proximity significantly influences decisions of referral made by the GP. Higher rates of referral of patients with higher educational attainment was found in a previous study from a mostly urban Norwegian population (13). Since the less educated who were referred appeared to be more severely ill than the better educated, the finding was suggested to indicate that there is a bias towards higher social status groups, creating substantial inequity. The present study revealed the same kind of pattern, although with a weaker effect of educational attainment.

Strong evidence of reduced costs in health care systems using primary care doctors as gatekeepers seems to be lacking (35). In a health care system with no financial access barriers the role of primary care doctors as gatekeepers to monitor referral care is seen as crucial. Although most referral care users in the present study apparently were "true" referral cases, the findings might indicate some degree of direct access. Our repeated analyses with the "direct" users excluded from the material revealed significant changes in the model estimates, indicating direct access to increase inequity basically related to "need". Thus, as an implication, more effective incentives in carrying out strict rules of referral seems to be needed in order to reduce inequitable effects, and possibly to reduce unnecessary use of referral care.

The inclusion of the variable "preoccupation with health" was primarily exploratory, assuming that a tendency toward increased attention to health mat-

ters in general might influence illness behaviour. References are made to the population's growing occupation and fascination with health, the "healthy lifestyle" movement (1,3). The best determinant of the employed measure appeared to be educational attainment, another being urbanization. The more educated and urbanized, the more a person is occupied with his health, and thus the measure apparently discloses patterns combined with a "healthy lifestyle". Our measure, however, is plagued with biases already mentioned, and the findings should be interpreted with care. The mechanisms involved are complex, and future research should consider the suggested phenomenon together with possibly related predispositions. Mechanic (2) has suggested that introspectiveness (attention to self or a tendency to think about oneself, and one's motivations and feelings) as fundamental to understanding illness behaviour. Our findings that high preoccupation reduces self-rated health (2O) and, in present analyses, increases health care use, comply well with the findings related to introspectiveness (2).

In summary, self-rated health turned out to be the most important determinant regardless of type of servicees. Factors other than health status aspects affecting the rate of GP visits were preoccupation with health and help seeking attitude. Furthermore, the probability of being referred was found to increase with educational attainment, GP/population ratio and residence in municipalities with referral care facilities.

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