Research

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Continuity of GP care is related to reduced specialist healthcare use:

a cross-sectional survey

Abstract

Background
Continuity of GP care is associated with reduced hospitalisations, but solid documentation of its relationship to use of outpatient specialist services is lacking.

Aim
To test the association between continuity of GP care and use of inpatient and outpatient specialist services.

Design and setting
A cross-sectional population-based study with questionnaire data from the sixth Tromsø Study (2007–2008).

Method
Descriptive statistics and two sample *t*-test were used to estimate specialist healthcare use according to duration of the GP–patient relationship. Logistic regression analysis was used to assess associations between duration and intensity of the GP–patient relationship and use of specialist care. Analyses were adjusted for sex, age, marital status, income, education, and self-rated health, and also stratified by self-rated health and age.

Results
Of 10 624 eligible GP users, 85% had seen the same GP for >2 years. The probability of visiting outpatient specialist services was significantly lower among these participants compared to those with a shorter GP relationship (odds ratio [OR] = 0.81, 95% confidence interval [95% CI] = 0.71 to 0.92). Similar findings were found for hospitalisations (OR = 0.76, 95% CI = 0.64 to 0.90). Stratified analyses revealed that these associations were not dependent on self-rated health or age. The probability of specialist use increased for the frequent GP users.

Conclusion
Continuity of GP care is associated with reduced use of outpatient specialist services and hospitalisations. Healthcare providers and policymakers who wish to limit use of specialist health care may do well to perform and organise health services in ways that support continuity in general practice.

Keywords
continuity of patient care; cross-sectional study; general practitioner; hospitalisation; primary health care, Norway.

INTRODUCTION

Continuity of care is a core value of general practice, and is often viewed as the relationship between a single practitioner and a patient that extends beyond specific episodes of illness or disease. Three different aspects of continuity have been identified: information continuity, management continuity, and personal or relational continuity.[1] This article is concerned with personal continuity and its two central dimensions: longitudinality and intensity of care. Longitudinality, meaning care given by one practitioner over a defined time, is often measured as the duration of the doctor–patient relationship, while intensity is often measured as the number of visits over a defined period.[2]

Continuity of GP care is highly valued by patients.[3] It is suggested to increase compliance,[4] patient and doctor satisfaction,[2,5] and comprehensiveness of care.[6] Continuity is thought to reduce long-term mortality in older people,[7] enhance receipt of preventive services, decrease duplication of services and use of emergency departments,[8] and reduce hospitalisations and expenditures in hospital care.[9–12] Continuity is believed to have few negative consequences,[5,11] but reduced rapid access to care, delayed diagnosis, and a loyalty that may harm the patient have been mentioned.[12,13] Solid evidence about how continuity of GP care may impact the use of outpatient specialist services is lacking.

Continuity is threatened by changes in society at large, such as increased migration, teamwork, professional development, information technology, demands for accessibility and plurality of provision,[14] and doctors' reduced willingness to be continuously available to their patients.[12] In rural areas a shortage of doctors may also hamper continuity.[15] Future changes in health services organisation will most likely continue to have an impact on continuity of patient care.[16]

Norwegian health care is based on universal insurance. The list system was implemented in 2001, aiming to improve quality, accessibility, and continuity in general practice. Average list size is 1176 in Norway as a whole and 1230 in Tromsø.[17] All lists in Tromsø are personal. Practices consist of four to six GPs with a common electronic patient record. GPs are well regarded,[18] and only 0.4% of the population has chosen to remain outside GPs' lists.[19] The list system gives strong incentives to personal continuity of care. In the Norwegian Survey of Living Conditions 2008, 92% of participants reported having a current GP that they usually consulted.[20] Tromsø hosts the University Hospital of Northern Norway. Access to specialist care is considered good and is usually achieved by referral from the

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How this fits in

There is wide agreement in the literature that personal continuity of GP care is associated with reduced hospitalisations. However, there is little evidence on whether continuity may be associated with use of outpatient specialist services. This study found that the probability of visiting outpatient specialist services was consistently lower for participants with a longer GP–patient relationship (>2 years). GPs, specialist healthcare providers, health administrators and policymakers who wish to limit use of specialist health care may do well to perform and organise health services in ways that support continuity of GP care.

GP (the gatekeeper role).

In the context of this study, the term continuity is used as longitudinal care for residents with at least one GP visit the previous year, thus also including an element of intensity of care.

Starfield *et al* emphasised the crucial role that primary care, with continuity as an important hallmark, may have in reducing unnecessary or inappropriate use of specialist care.[21] GPs have reported that they pay less attention to the gatekeeper role after implementation of the list system,[22] and a recent study has suggested that GPs with high referral rates may contribute to unnecessary use of specialist care.[23]

This study explores whether continuity is associated with use of specialist health services. Specifically, it was hypothesised that a longer duration of the GP–patient relationship would be associated with lower use of specialist outpatient visits and hospitalisations.

METHOD

Population-based health surveys have been conducted in Tromsø since 1974. The cross-sectional sixth Tromsø Study (Tromsø 6) was conducted from October 2007 to December 2008, and consisted of two comprehensive self-administered questionnaires, clinical examination, and laboratory tests. Four groups were invited: every resident aged 40–42 years or 60–87 years (*n* = 12 578); a 10% random sample of individuals aged 30–39 years (*n* = 1056); a 40% random sample of people aged 43–59 years (*n* = 5787); and all subjects who had attended the second visit of the fourth Tromsø Study, if not already included in the other three groups (*n* = 341). Both questionnaires and further details are available at the Tromsø Study website[24] and elsewhere.[25]

Participants were asked if they had visited different healthcare services during the previous year, and if so, how many times. To ensure there was an ongoing therapeutic relationship, participants who reported no GP visits (*n* = 2226) or who failed to answer this question (*n* = 132) were excluded. The final sample consisted of 10 624 participants. For those 948 participants (8.9%) who reported use of GP but not the number of visits, missing values were substituted with the average number of visits (given at least one) within each sex and 10-year age group. Analyses excluding these responders were also performed.

Four dependent dichotomous variables were included in the main analyses, representing use of somatic outpatient specialist, psychiatric outpatient specialist, outpatient specialist services merged, and hospitalisation at least once during the previous year. The key independent variable for measuring continuity of care was duration of the GP–patient relationship (GP duration), obtained from the question 'For how long have you had your current GP/other doctor?' The response options were dichotomised into ≤2 years and >2 years (the longest response alternative). Intensity of GP care was measured by the variable frequency of GP visits the previous year (GP frequency). Responses were dichotomised by median split. Those with ≥3 visits were grouped as frequent users.

Response categories for the adjustment variable self-rated health (very bad; bad; fair; good; excellent) were reduced to four by merging the bad and very bad groups due to low numbers. The variable number of chronic diseases was generated by counting the conditions: angina pectoris, heart attack, cerebral stroke/brain haemorrhage, atrial fibrillation, high blood pressure, asthma, chronic obstructive pulmonary disease, diabetes, osteoporosis, hypothyroidism, renal disease, psychological problems where help was sought, and chronic pain or musculoskeletal pain and/or stiffness for ≥3 months.

Data were analysed by descriptive statistics, two sample *t*-test, and logistic regressions. For each of the health services two multivariate logistic regression models were constructed, one with GP duration and one with GP frequency as independent variables. All models were adjusted for sex, age, marital status, income, and education, and extended by either self-rated health or number of chronic diseases. Adjustments were made to the GP duration model for GP frequency as an alternative to the health- and disease-related variables. Analyses

Table 1. Sample characteristics

	GP users,[a] %	GP users with bad or fair health, %	GP users with good or excellent health, %
Duration of GP–patient relationship	n = 9814	n = 3628	n = 6111
0–2 years	15.0	16.5	14.2
>2 years	85.0	83.5	85.8
Frequency of GP visits previous year	n = 10 624	n = 4001	n = 6535
<3 visits	49.1	32.1	59.7
≥3 visits	50.9	67.9	40.3
Sex	n = 10 624	n = 4001	n = 6535
Female	55.5	56.1	55.0
Male	44.5	43.9	45.0
Age, years	n = 10 624	n = 4001	n = 6535
30–39	3.8	2.8	4.5
40–49	25.3	18.6	29.5
50–59	18.2	17.4	18.8
60–69	32.4	34.8	30.9
70–79	15.7	19.6	13.2
80–87	4.6	6.8	3.1
Marital status	n = 10 294	n = 3854	n = 6536
Single	25.4	29.1	23.0
Married/cohabiting	74.6	70.9	77.0
Household income	n = 9757	n = 3554	n = 6135
Low (<200 000 kr)	13.3	20.7	8.8
Low middle (201 000–400 000 kr)	28.1	32.8	25.4
High middle (401 000–700 000 kr)	34.8	32.5	36.3
High (>700 000 kr)	23.8	14.0	29.5
Education	n = 10 476	n = 3925	n = 6470
Low (primary/part of secondary school)	30.1	40.5	23.4
Middle (high school)	34.1	34.3	34.1
High (college/university)	35.8	25.2	42.5
Self-rated health	n = 10 536	n = 4001	n = 6535
Bad	6.4	16.9	–
Fair	31.6	83.1	–
Good	49.9	–	80.5
Excellent	12.1	–	19.5
Number of chronic diseases	n = 10 624	n = 4001	n = 6535
0	12.7	2.9	18.7
1	25.1	11.7	33.4
2	27.8	28.7	27.3
3	19.3	27.6	14.3
≥4	15.1	29.1	6.3

[a]≥1 GP visits during the previous 12 months. kr = Norwegian kroner.

were stratified by self-rated health and age. In addition, possible predictors of GP duration and GP frequency were explored.

Throughout the study 95% confidence intervals (CI) were used. All analyses were done in Stata (version 12.0).

RESULTS

In total 12 982 persons aged 30–87 years participated in Tromsø 6, constituting an overall response rate of 65.7%. The participants comprised 33.8% of the total population in the mentioned age group in Tromsø municipality. After excluding those without GP visits in the previous year 10 624

GP users constituted the final sample for analyses.

The mean age of participants who had visited their GP during the previous year was 58.3 years. Females constituted 55.5%; 74.6% were married and/or cohabitants; 41.4% had low/low-middle income; 35.8% had high education; and 62.0% had good/excellent self-rated health. Only 2.9% in the bad/fair health group reported no chronic disease, compared to 18.7% in the good/excellent health group (Table 1).

Duration of the GP–patient relationship was >2 years for 85% of the sample; and among those who rated their health bad/

Table 2. Probability of a GP–patient relationship duration of >2 years, and probability of ≥3 GP visits the previous year (multivariate logistic regressions)[a]

	>2 years duration of the GP–patient relation (*n* = 8717)		≥ 3 GP visits during the previous year (*n* = 9356)	
	OR	95% CI	OR	95% CI
Sex				
Female[b]	1.00		1.00	
Male	1.17	1.04 to 1.33	0.77	0.70 to 0.84
Age, years				
30–39[b]	1.00		1.00	
40–49	1.56	1.20 to 2.02	0.83	0.66 to 1.05
50–59	2.27	1.72 to 3.00	0.92	0.72 to 1.17
60–69	2.73	2.08 to 3.58	0.75	0.59 to 0.94
70–79	4.02	2.91 to 5.55	0.71	0.55 to 0.92
80–87	3.86	2.44 to 6.11	0.79	0.56 to 1.11
Marital status				
Single[b]	1.00		1.00	
Married/cohabiting	1.06	0.90 to 1.25	0.97	0.86 to 1.10
Household income				
Low (<200 000 kr)[b]	1.00		1.00	
Low middle (201 000–400 000 kr)	1.16	0.93 to 1.44	0.90	0.77 to 1.06
High middle (401 000–700 000 kr)	1.47	1.14 to 1.89	0.78	0.65 to 0.94
High (>700 000 kr)	1.53	1.15 to 2.04	0.67	0.54 to 0.83
Education				
Low (primary/part secondary school)[b]	1.00		1.00	
Middle (high school)	0.96	0.81 to 1.13	1.00	0.89 to 1.13
High (college/university)	0.80	0.67 to 0.95	0.91	0.80 to 1.04
Self-rated health				
Bad[b]	1.00		1.00	
Fair	1.18	0.92 to 1.51	0.63	0.50 to 0.78
Good	1.46	1.13 to 1.89	0.38	0.30 to 0.47
Excellent	1.43	1.06 to 1.95	0.23	0.18 to 0.30
Number of chronic diseases				
0[b]	1.00		1.00	
1	1.33	1.08 to 1.63	1.78	1.51 to 2.10
2	1.23	0.99 to 1.51	3.02	2.56 to 3.55
3	1.05	0.84 to 1.31	4.33	3.63 to 5.18
≥4	1.00	0.78 to 1.29	6.00	4.90 to 7.35

[a]Multivariate analyses without number of chronic diseases in the model gave similar results (data not shown).

[b]Reference groups. kr = Norwegian kroner. OR = odds ratio.

fair and good/excellent percentages were 83.5% and 85.8%, respectively (Table 1). A long GP duration was positively associated with male sex, higher age, higher income, lower education, and better self-rated health (Table 2). High frequency of GP visits was associated with female sex, lower income, bad self-rated health, and presence of chronic disease. Participants with four or more chronic diseases had much higher odds for frequent GP visits compared to participants without chronic disease (Table 2).

Among participants with a short GP duration 541 per 1000 had at least one outpatient specialist visit compared to 486 per 1000 among those with a long GP duration (Table 3). For hospitalisations the corresponding figures were 157 per 1000 versus 132 per 1000, respectively. The number of outpatient visits was 1860 per 1000 for those with a short GP duration, compared to 1445 per 1000 for those with a long duration (difference 415 per 1000, CI = 181 to 649). Corresponding figures for hospitalisations were 235 per 1000 versus 186 per 1000 (difference 49 per 1000, CI = 14 to 83).

In logistic regression models the probability of visiting outpatient specialist services was significantly lower among participants with a long GP–patient relationship, after adjustments for self-rated health (Table 4), number of chronic

Table 3. Specialist healthcare use according to duration of the GP relationship

	Outpatient specialist services (n = 9194)		Hospitalisations (n = 9665)	
	Probability of use n/1000[a] (95% CI)	Frequency of use n/1000[a] (95% CI)	Probability of use n/1000[a] (95% CI)	Frequency of use n/1000[a] (95% CI)
GP duration				
0–2 years	541 (515 to 568)	1860 (1606 to 2114)	157 (138 to 176)	235 (200 to 271)
>2 years	486 (475 to 497)	1445 (1357 to 1532)	132 (124 to 139)	186 (173 to 199)
Difference[b]	55 (26 to 84)	415 (181 to 649)	25 (6 to 45)	49 (14 to 83)

[a]n/1000 GP users (one or more GP visits during the previous year). [b]CI estimated by two sample t-test.

Table 4. Probability of GP users'[a] use of specialist services, according to duration of the GP–patient relationship and frequency of GP visits

	Outpatient specialist services, OR (95% CI)	Somatic outpatient specialist services, OR (95% CI)	Psychiatric outpatient specialist services, OR (95% CI)	Hospitalisation, OR (95% CI)
Duration of the GP–patient relationship (GP duration)[b,c]	n = 8270	n = 8278	n = 7466	n = 8611
0–2 years	1.00	1.00	1.00	1.00
>2 years	0.81 (0.71 to 0.92)	0.84 (0.74 to 0.95)	0.83 (0.62 to 1.09)	0.76 (0.64 to 0.90)
Frequency of GP visits during previous year (GP frequency)[c,d]	n = 8857	n = 8863	n = 7996	n = 9235
<3 visits	1.00	1.00	1.00	1.00
≥3 visits	2.43 (2.22 to 2.66)	2.31 (2.11 to 2.53)	2.61 (2.04 to 3.33)	2.64 (2.30 to 3.03)

[a]≥1 GP visits during the previous year. [b]Multivariate analysis with GP duration as main independent variable.
[c]Adjusted for age, sex, marital status, household income, education, and self-rated health. [d]Multivariate analysis with GP frequency as main independent variable. OR = odds ratio.

Table 5. Probability of outpatient specialist services use and hospitalisation for GP users[a] according to self-rated health, duration of the GP–patient relationship, and frequency of GP visits

	Bad or fair health		Good or excellent health	
	Outpatient specialist services, OR (95% CI)	Hospitalisation, OR (95% CI)	Outpatient specialist services, OR (95% CI)	Hospitalisation, OR (95% CI)
Duration of the GP–patient relationship (GP duration)[b,c]	n = 3016	n = 3142	n = 5356	n = 5587
0–2 years	1.00	1.00	1.00	1.00
>2 years	0.75 (0.61 to 0.92)	0.75 (0.59 to 0.95)	0.87 (0.74 to 1.02)	0.79 (0.63 to 1.00)
Frequency of GP visits during previous year (GP frequency)[c,d]	n = 3270	n = 3414	n = 5699	n = 5949
<3 visits	1.00	1.00	1.00	1.00
≥3 visits	2.38 (2.05 to 2.77)	2.45 (1.97 to 3.04)	2.62 (2.34 to 2.93)	2.96 (2.49 to 3.52)

[a]≥1 GP visits during the previous year. [b]Multivariate analysis with GP duration as main independent variable.
[c]Adjusted for age, sex, marital status, household income, and education. [d]Multivariate analysis with GP frequency as main independent variable.

diseases (OR = 0.81, CI = 0.71 to 0.92), and GP frequency (OR = 0.84, CI = 0.74 to 0.95) . Similar associations were found for hospitalisations, in models adjusted for self-rated health (Table 4), number of chronic diseases (OR = 0.76, CI = 0.65 to 0.90) and GP frequency (OR = 0.80, CI = 0.67 to 0.94). Stratification into somatic and psychiatric outpatient specialist services revealed only minor changes in the odds ratios (Table 4). The probability of specialist services use increased two to three times for the more frequent GP users in all models (Table 4).

Stratification by self-rated health and age showed that the associations between a long GP–patient relationship and reduced specialist use did not depend on health status or age (Table 5 and 6).

Analyses excluding participants who reported use of GP but failed to report the number of visits (n = 948) did not alter the results (data not shown).

DISCUSSION
Summary
The probability of visiting outpatient specialist services was shown to be consistently lower for participants with a longer GP–patient relationship, independent of health and age. Similar findings were made for hospitalisations. Frequent GP visits were associated with increased probability of using inpatient and outpatient specialist services.

Strengths and limitations
Particular strengths of this study were the large sample size, the high response rate, and the comprehensive coverage of information about health, disease, and socioeconomic status in the questionnaires. The geographic location and availability of health services, universal insurance, and personal lists in a gatekeeper system made Norway and Tromsø particularly suitable for this study.

The study had some limitations. Despite a high response rate, the sample may not be entirely representative of the general population, as it is well known that women, married individuals and/or cohabitants, healthier persons, and higher socioeconomic groups are more likely to participate in population surveys.[26] In Tromsø 6, attendees were older, and the proportions of married individuals and/or cohabitants and women were higher than in non-attendees.[24,25] Regarding the question 'For how long have you had your current GP/other doctor?' some participants may have thought of a specialist physician as their current doctor. Some may have reported visits to other GPs than their current one, for instance due to various kinds of doctor's absence. However, a recent Norwegian study of continuity reported that 78% of consultations were with the usual GP, and that continuity

Table 6. Probability of outpatient specialist services use and hospitalisation for GP users[a] according to age, duration of the GP–patient relationship (GP duration)[b,c], and frequency of GP visits (GP frequency)[c,d]

	Outpatient specialist services			Hospitalisations		
	30–49 years, OR (95% CI)	50–69 years, OR (95% CI)	70–87 years, OR (95% CI)	30–49 years, OR (95% CI)	50–69 years, OR (95% CI)	70–87 years, OR (95% CI)
GP duration	*n* = 2615	*n* = 4298	*n* = 1357	*n* = 2698	*n* = 4460	*n* = 1453
0–2 years	1.00	1.00	1.00	1.00	1.00	1.00
>2 years	0.80 (0.66 to 0.98)	0.82 (0.69 to 0.99)	0.80 (0.55 to 1.15)	0.81 (0.61 to 1.08)	0.78 (0.61 to 1.00)	0.65 (0.44 to 0.97)
GP frequency	*n* = 2804	*n* = 4573	*n* = 1480	*n* = 2894	*n* = 4751	*n* = 1590
<3 visits	1.00	1.00	1.00	1.00	1.00	1.00
≥3 visits	2.91 (2.47 to 3.43)	2.35 (2.07 to 2.67)	1.83 (1.47 to 2.29)	3.41 (2.61 to 4.46)	2.45 (2.02 to 2.97)	2.25 (1.69 to 3.00)

[a] ≥1 GP visits the previous year. [b] Multivariate analysis with GP duration as main independent variable. [c] Adjusted for sex, marital status, household income, education, and self-rated health. [d] Multivariate analysis with GP frequency as main independent variable. OR = odds ratio.

increased by increasing list size, patient age, and municipality population size.[27] Since list size and number of residents in Tromsø municipality are well above the national average, and the mean age in the sample was high, the proportion of consultations with the usual GP were probably even higher in the sample, making it unlikely that doctor's absence has influenced the results.[17,20,27] There is a potential for recall bias and underreporting, and the validity of self-reported data may be questioned, although agreement between self-reported and registered healthcare use is generally high.[28] Finally, the possibility of unmeasured confounders of the reported associations cannot be excluded.

Comparisons with existing literature

The term continuity has multiple meanings in the literature, and has been measured in different ways.[29,30] The validity of duration measures has been questioned since it does not capture the intensity of the GP–patient relationship.[31] Starfield noted that continuity should be distinguished from longitudinality.[32] Still, most of the literature uses these terms interchangeably.[31] This study found that GP duration (longitudinality) and GP frequency (intensity) had opposite effects on the use of specialist health care. Moreover, a longer GP duration was predicted by male sex, higher income, and better self-rated health, whereas a higher GP frequency was predicted by female sex, lower income, and worse self-rated health. In the Norwegian setting with universal insurance and universal registration with one individual GP, the variable GP frequency seems related to need for care more than continuity of care. Personal continuity can be sustained with relatively few or even no contacts for a long time,[21] and GP duration was considered a good proxy for continuity

in the sample of GP users.

There is wide agreement that personal continuity of care is associated with reduced hospitalisations,[9–12,33] but little evidence on whether continuity of GP care may affect use of outpatient specialist services. Finnvold and Svalund found that referrals of patients with chronic conditions were reduced with increasing continuity,[34] whereas a British study showed that patients with continuity were less likely to attend other open access clinics.[35] Iversen and Kopperud reported that a personal GP increased the probability of hospital outpatient visits, but reduced the probability of private specialist visits.[36] Hjortdahl and Borchgrevink found that patients with a doctor who knew their medical history had a twofold increased chance of being referred.[37] In a Belgian study, responders without provider continuity generated higher healthcare costs.[38] The current study's findings add an important contribution to the small and equivocal body of research in this field.

Patients in poorer self-rated health were more likely to have a shorter GP relationship, and a patient syndrome of discontinuity has been described.[35,39] These patients are found to assess their regular GP and continuity of care more negatively, and they are more likely to visit other GPs.[35,40–42] Their illnesses may not fit into specific diagnoses, possibly generating dissatisfaction and a search for a more understanding doctor. However, doctors' and patients' relocating has been the most frequent reason for doctor changes in Norway; 46% of the changes in 2011 occurred because the doctor relocated or discontinued the practice.[43,44]

Previous studies have found that poorer health and increasing age are associated with higher probability and frequency of visits to primary and specialist outpatient

services.[45,46] This should be expected to apply regardless of GP duration. These analyses indicated that continuity of GP care may be important to all health categories (Table 5) and ages (Table 6) as far as avoiding specialist care is concerned. It is suggested here, as in other research, that trust may be an important factor to explain these findings.[47]

Implications for research and practice
In conclusion continuity of care, as measured by self-reported duration of the relationship to a named GP, was associated with reduced use of outpatient specialist services and hospitalisations. Even if these associations are not proof of causality, GPs, specialist healthcare providers, health administrators, and policymakers who wish to limit use of specialist care may do well to perform and organise health services in ways that support continuity in general practice. More research is needed to better understand the reasons and dynamics behind the association of continuity and specialist healthcare use.

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