

ORIGINAL ARTICLE

Personal continuity of care in Norwegian general practice: A national cross-sectional study

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Abstract

Objective. Personal continuity is regarded as a core value in general practice. The aim of this study was to determine the level of personal continuity in Norwegian general practice. An investigation was made of the associations between high levels of personal continuity and patient, general practitioner (GP), and list characteristics. **Design.** Cross-sectional register-based study **Setting.** Norwegian general practice in 2009. **Subjects.** 3220 GPs and 3 725 998 patients on the GP lists. **Main outcome measures.** The Usual Provider Continuity Index (UPC), which measures the proportion of consultations made by the usual GP, was estimated for patients and aggregated to the GP list level. GPs were grouped into quartiles based on the UPC. Being a GP with a UPC in the two highest quartiles ($UPC \geq 0.80$) was the outcome in the statistical analyses. **Statistics.** Poisson regression models were used to estimate relative risks (RR). **Results.** The overall UPC was 0.78, increasing gradually from 0.68 in patients < 15 years of age to 0.86 for patients ≥ 60 years of age, and from 0.75 to 0.83 for patients with < 3 annual consultations compared with patients with > 10 consultations. A $UPC > 0.80$ was associated with longer patient lists and high GP consultation rates. Working in municipalities with < 10 000 residents was negatively associated with a high UPC. The UPC level for GPs was associated with total utilization of GP consultations in the list populations. **Conclusion.** Overall, the Norwegian goal of a personal GP has been achieved; however, there are substantial variations between GPs and lower UPCs among young patients and in smaller municipalities.

Key Words: Clinical practice variation, continuity of care, cross-sectional analysis, general practice, health service research, Norway

Introduction

Personal continuity is regarded as important in the provision of high-quality health care by general practitioners (GPs) [1–6] and contributes to trust in the patient–doctor relationship [7–9]. Personal continuity is especially valued among patients with chronic diseases, psychological problems, and among elderly patients [10,11]. Health services with personal continuity are probably less time-consuming and might improve efficiency [12,13], the quality of care for chronic diseases [14–16], and awareness of mental health problems by the GP [6,17].

Although arguments for personal continuity remain valid, the personal aspect of general practice has lost priority in new health-care policies emphasizing rapid access, and with more GPs working in group practices sharing responsibility for patients [18–20].

Patient preferences diverge regarding the value of personal continuity, with patient satisfaction more dependent on the extent to which expectations and preferences are met [11,21,22]. GPs still seem to value personal continuity more than rapid access, whereas patients weigh their preference for continuity against waiting time [23].

With increased complexity of health services, a greater responsibility for patients with chronic conditions, and a stronger focus on quick access in general practice, providers need to improve the exchange of medical information (*informational continuity*). Improved coordination and collaboration (*management continuity*) are also necessary to ensure the best possible treatment [24,25].

A list patient system was introduced in Norway in 2001, thus giving all inhabitants the right to choose a personal GP (see Box I), with personal

Personal continuity in the relationship between a patient and a GP is regarded as a core value in general practice and is a motivation for the Norwegian patient list system.

- In 2009, 78% of consultations in Norwegian general practice were with the usual or chosen GP of the patient.
- The level of personal continuity was highest among the elderly and patients who see their GP most frequently and was lowest among young patients and in municipalities with less than 10 000 residents.
- A high level of personal continuity in a GP list was associated with a high GP consultation rate, but inversely associated with the GP rates of multidisciplinary meetings.

continuity a main aim [26]; however, little is known about whether or not the goal of personal continuity has been achieved in different patient and GP groups.

Aims

The aims of this study were as follows: (i) to assess patients' use of their usual or chosen GP versus consultations with other GPs overall, and by patient, GP, and list characteristics; (ii) to estimate to what extent the level of personal continuity is predicted by the GP, list, and list-population characteristics; and (iii) to assess the impact of GP personal continuity on the utilization of GP consultations by the list populations.

Box I. Some facts about the Norwegian Regular GP Scheme.

- The Norwegian GP services system was reorganized in 2001 with the introduction of a patient list system.
- The Norwegian health authorities emphasized the importance of a continuous and personal GP-patient relationship when the new system was designed: "The object of the regular GP reform is to improve the quality of the services provided by general practitioners by making it possible for everyone who so wishes to have their own regular GP.... The reform will aim for continuity in doctor-patient relationships. This is particularly important in the case of people suffering from chronic diseases and mental illnesses, as well as the disabled and patients undergoing rehabilitation...."
- The GPs are allowed to set a limit to their list size, normally within the range of 500–2500. In 2009 the mean list size was 1181.
- When the GP list limit is reached, the list is closed for new patients, except for the children of list members.
- The patients have a free choice of GPs and are allowed to change to another GP list with free capacity twice a year.
- The "typical GP" works in the practice four days per week and in the municipal child health services or in nursing homes one day per week as a part of the GP contract. GPs with shorter lists normally work fewer days in their practices, often with larger part-time jobs within public health or universities.
- The GPs are given personal responsibility for the health services to the list patients within normal working hours on the agreed practice days by giving priority to the persons on the patient list before others. When absent, the GPs are obliged to have an agreement with other GPs to take care of the patients. Because 85% of GPs work in group practices, the colleagues in the same practice normally take this responsibility; alternatively, colleagues in the neighbourhood for GPs in single-handed practices. GPs have an extra fee for consultations with patients from other lists not included in this collegial collaborative agreement.
- The GPs also have the role of patient coordinators, including an expectation to participate in multidisciplinary cooperation
- The municipalities have the obligation to arrange after-hours health services, in which GPs normally take part.

Material and methods

The study was based on nationwide cross-sectional register data from 2009.

Participants and study population

At the end of 2009, a total of 4063 regular GPs were registered in the National GP Database. Only GPs with normal practice during 2009 were included in the study. Thus, the following groups were excluded: GPs with a list size below the normal limit of 500 ($n = 198$); GPs without a registered list at the start of 2009 ($n = 133$); GPs with less than 10 months of practice activity ($n = 476$); and GPs with < 500 consultations ($n = 36$).

The analyses of GP continuity were restricted to patients with one or more consultations in 2009, excluding consultations with after-hour services. Patients who changed GP during 2009 were excluded because the usual GP could not be identified at the time of each consultation.

Thus, the study comprised 3220 regular GPs and 3 725 998 patients.

Data and confidentiality

Data on all GP contacts in 2009 were obtained from the National Health Insurance (HELFO) invoice database. GPs send an invoice to HELFO for each patient contact, including the patient's personal identity number and an ICPC diagnosis code. In the current study, we have used only data on consultations and multidisciplinary meetings. Consultations with patients from outside the group practice of the GP are specified (see Box 1).

Consultation data were linked to population data from the National GP Database, which contains information on the age and gender of patients on each list and data on the GP age, gender, size of patient list, and practice municipality.

Data on the educational status of patient list populations and the number of residents in the practice municipalities were obtained from Statistics Norway and merged with the GP database.

The linkage procedures were approved by the Data Inspectorate and the owners of the registers, and were carried out by Statistics Norway. The data are encrypted and personal identification is not possible.

Measure of personal continuity

The Usual Provider Continuity Index (UPC) is a common measure of personal continuity [27]. In the current study, the UPC measures the proportion of all GP consultations with the usual, chosen GP.

The UPC of the patients was aggregated, giving an average UPC for each list population. To study how personal continuity varied with GP, list, and population characteristics, the GPs were grouped into quartiles based on the UPC in their list.

Regression analysis

Two separate regression analyses were carried out. First, being a GP in the upper half of the UPC ($UPC \geq 0.80$) was used as the outcome variable in the first regression analysis using the following explanatory variables: the GP age and gender, and whether or not the GP was a specialist in family medicine; the GP consultation rate and rate of multidisciplinary meetings; the proportions of patients in the lists > 60 years of age, male patients, patients between 25 and 60 years of age with ≥ 12 years of education; and the number of residents in the practice municipalities.

Second, the GP lists were grouped into quartiles based on the mean annual consultation rates for the list populations. Belonging to the quartiles with the highest or lowest consultation rate was used as outcome in two regression models. The UPC among GPs was the explanatory variable, adjusted for the population and aforementioned municipality variables.

Statistics

We used the statistical software, STATA 11. When comparing GP groups and making population trend analyses, nptrend was used.

Poisson regression was used to estimate relative risks (RRs) because common outcomes make odds ratios less intuitive to interpret [28].

Results

Within the total study population, the annual consultation rate was 2.52 and the mean UPC was 0.78. The UPC increased gradually with patient age, from 0.68 among patients < 15 years of age to 0.86 for patients ≥ 60 years of age (Table I). The UPC increased significantly with increased list size and greater number of residents in the practice municipality.

GP lists grouped by UPC

The quartiles of GP lists with the highest UPC had a higher mean age, higher proportion of male GPs, larger list size, and a lower proportion in small municipalities (Table II). There was also a significant increase in the GP consultation rate and the rate of multidisciplinary meetings across the GP quartiles from low-to-high UPC.

Predictors of high UPC

With a GP consultation rate > 2.55 , there was a 2.8 times higher risk for a $UPC \geq 0.80$ compared with GPs with a consultation rate < 2.07 (Table III). A rate of interdisciplinary meetings > 25 per 1000 patients was inversely associated with a high UPC.

Population consultation rates and UPC

There was a spread in population consultation rates from < 2.10 in the lowest quartile to > 2.82 in the highest. A significant association existed between the lowest consultation rates and belonging to a GP list within the lowest quartile, and between the highest consultation rates and the highest quartile of UPC (Table IV). In all quartiles of the UPC, patients from outside the usual GP group practice comprised $< 2\%$ of consultations (see Table II).

Discussion

In this study of utilization of GP consultations in the Norwegian list patient system, 78% of all consultations were with the usual GP. The highest UPC was found for elderly patients and for patients frequently using GP services, indicating a chronic condition. $UPC \geq 0.80$ was predicted by a high GP consultation rate and longer lists.

Table I. Number of consultations with regular GPs in 2009, GP consultation rates, and the proportion of consultations with the usual (chosen) GP, measured by the Usual Provider Continuity Index (UPC) related to groups of patients, groups of GPs, and their list characteristics.¹

	Number of persons with ≥ 1 consultation with a regular GP (% of population groups)	Consultation rates (annual number of consultations per person in population groups ²)	UPC (SD) and p-values ³
Patient characteristics:			
All	2 520 910 (67.7)	2.52	0.78 (0.35)
Gender:			
Female	1 371 543 (73.9)	2.94	0.79 (0.35)
Male	1 149 367 (61.5)	2.10	0.77 (0.36)
			p < 0.001
Age (years):			
0–14	371 013 (55.9)	1.26	0.68 (0.41)
15–24	414 609 (59.1)	1.59	0.69 (0.40)
25–59	1 069 077 (68.1)	2.57	0.79 (0.34)
60–	666 211 (81.2)	3.95	0.86 (0.27)
			p-trend < 0.001
Consultations:			
1–2	1 265 197 (34.0)	1.41	0.75 (0.40)
3–5	758 776 (20.4)	3.77	0.79 (0.30)
6–10	360 970 (9.7)	7.44	0.82 (0.25)
11–	135 967 (3.7)	15.10	0.83 (0.23)
			p-trend < 0.001
<i>Characteristics of the usual GP</i>			
Gender:			
Female	724 665 (68.0)	2.42	0.75 (0.36)
Male	1 796 245 (67.5)	2.45	0.79 (0.34)
			p < 0.001
Age (years):			
< 40	398 663 (66.7)	2.50	0.72 (0.37)
40–49	653 840 (67.3)	2.50	0.77 (0.35)
50–59	1 042 053 (68.3)	2.52	0.80 (0.34)
60+	426 354 (67.6)	2.54	0.79 (0.34)
			p-trend < 0.001
Specialist in general practice:			
No	660 914 (65.6)	2.44	0.75 (0.37)
Yes	1 859 996 (68.4)	2.54	0.79 (0.34)
			p < 0.001
<i>List characteristics of the usual GP</i>			
List size:			
< 1000	405 827 (67.3)	2.55	0.69 (0.39)
1000–1249	639 893 (68.0)	2.55	0.75 (0.36)
1250–1499	757 946 (67.7)	2.48	0.80 (0.33)
1500–1749	380 165 (68.0)	2.52	0.82 (0.32)
1750+	337 079 (67.0)	2.49	0.83 (0.31)
			p-trend < 0.001
Practice organization:			
Solo practice	332 759 (66.4)	2.61	0.83 (0.32)
Group practice	2 188 151 (67.9)	2.50	0.77 (0.35)
			p < 0.001
Residents in practice municipality:			
< 10 000	555 139 (67.9)	2.59	0.68 (0.39)
10 000–20 000	406 603 (68.8)	2.60	0.79 (0.34)
20 000–50 000	618 553 (68.3)	2.49	0.81 (0.32)
> 50 000	940 615 (66.6)	2.46	0.81 (0.33)
			p-trend < 0.001

Notes: ¹n = 3220 GPs with list size ≥ 500, in practice at least 10 months in 2009. ²Estimated for the total population having the same usual GP (n = 3 725 998 persons with 9 374 348 consultations in 2009). ³One-way analyses of variance, or trend analyses if more than two categories.

Table II. Comparisons of GP, practice, and list characteristics between GPs* grouped in quartiles based on Usual Provider Continuity index (UPC) in the list populations (unadjusted trend analyses).

	Lowest UPC < 0.68	Medium-low UPC 0.68–0.80	Medium-high UPC 0.80–0.88	Highest UPC > 0.88	p-trend nptrend
Mean UPC within group (SD)	0.53 (0.13)	0.75 (0.04)	0.85 (0.02)	0.93 (0.03)	
GP characteristics					
GP age, mean (SD)	48.0 (10.4)	49.1 (9.3)	49.7 (8.9)	52.5 (8.9)	< 0.001
GP gender, % male	61.2	66.2	69.9	77.5	< 0.001
GP approved speciality in family practice, %	57.3	71.9	73.4	73.4	< 0.001
GP practice characteristics					
GP consultation rate, mean (SD) ¹	1.87 (0.69)	2.33 (0.59)	2.49 (0.58)	2.74 (0.78)	< 0.001
GP rate of multidisciplinary meetings/1000 patients, mean (SD) ²	36.9 (43.1)	31.8 (44.6)	23.5 (27.7)	19.0 (24.5)	< 0.001
Proportion of GPs in group practices, %	88.9	92.2	93.3	73.0	< 0.001
List and population characteristics					
List size, mean (SD)	1095 (321)	1217 (342)	1312 (337)	1397 (347)	< 0.001
Proportion of men on the list, %	50.3	50.8	50.2	49.2	0.003
Proportion of list population aged 60+ years, %	20.3	19.1	18.7	21.8	0.003
Proportion of list population aged 25–60 years with higher education, %	29.2	33.2	34.8	31.4	< 0.001
Population annual consultation rate (usual and other GPs), mean (SD) ³	2.48 (3.57)	2.49 (3.56)	2.46 (2.45)	2.62 (3.68)	< 0.001
Proportion of consultation with a GP outside the local group practice, %	1.4	1.3	1.3	1.3	0.0015
Practice municipality					
Proportion working in municipalities with > 50 000 residents, %	20.6	34.4	43.1	42.0	< 0.001
Proportion working in municipalities with < 10 000 residents, %	51.4	27.0	15.1	9.3	< 0.001

Notes: *GPs with list size ≥ 500 , ≥ 500 consultations, and working in their practice throughout 2009. ¹Number of consultations reported by the GP in 2009/list size. ²Number of multidisciplinary meetings reported by the GP in 2009/list size (*1000). ³Including consultations with usual GP and all other GPs in 2009.

Strengths and limitations

A main strength of the current study was the use of complete and recent (2009) register data, thus avoiding selection bias from skewed recruiting of GPs or patients interested in participating. Data from invoices were regarded as valid in respect of consultation rates.

The study was based on complete information about 3220 GPs working in the list patient system throughout 2009, giving valid information about utilization of GP consultations in list populations served by a GP in normal practice. The study revealed an interruption in GP practices in 16% of the lists due to sickness, paternity leave, further education, or transfer of the practice. The available data were not sufficiently detailed to describe continuity in these lists, and this leaves uncertainty about how well the continuity in the total population was predicted by the UPC in the study population.

Further, we had no information on the reason for choosing to consult another GP, the relational component of the continuity, and outcomes indicating patient satisfaction or health gain.

Using a UPC > 0.80 as the outcome variable in the regression models was arbitrary, but indicates a reasonable level of personal continuity, taking into

account that Norwegian GPs are obliged to work one day per week in other PHC services and also have absences for continuing education, collaboration, and vacation.

Comparisons with the literature

Personal continuity, as measured by the UPC, was higher than in comparable studies [29], which is in agreement with the higher continuity found with a personal patient list system [30]. However, we found that Norwegian patients can balance preferences for continuity against waiting time and other values by seeing another GP; this may contribute to patient satisfaction [21].

In the present study, the level of personal continuity was highest for elderly patients and patients with chronic conditions. According to earlier studies these groups seem to value continuity highly [10,11]. The increased probability for not seeing their usual GP among young people may indicate that the list patient system is not sufficiently adapted to the needs of this age group [31].

According to the current study, long lists were associated with a high UPC, indicating that demand

Table III. Predictors for being a GP with high* Usual Provider Continuity Index (UPC; Poisson regression model, n = 3220 GPs¹).

	Number of GPs	Unadjusted			Adjusted		
		RR	95% CI	p	RR	95% CI	p
<i>GP characteristics</i>							
Gender:							
Female	1007	1			1		
Male	2213	1.29	1.14–1.43	<0.001	1.09	(0.91–1.30)	0.37
Age:							
< 40 years	605	1			1		
40–49 years	854	1.31	1.11–1.54	0.001	1.16	(0.98–1.39)	0.086
50–59 years	1231	1.52	1.30–1.76	<0.001	1.23	(1.04–1.45)	0.018
≥ 60 years	530	1.44	1.21–1.71	<0.001	1.19	(0.97–1.44)	0.090
GP specialist:							
No	998	1			1		
Yes	2222	1.24	1.11–1.39	<0.001	0.94	(0.83–1.07)	0.36
<i>Practice and list characteristics</i>							
GP consultation rate: ²							
1: < 2.07	1075	1			1		
2: 2.07–2.55	1072	2.26	1.95–2.62	<0.001	2.13	(1.84–2.47)	<0.001
3: > 2.55	1073	2.94	2.56–3.89	<0.001	2.83	(2.45–3.27)	<0.001
GP rate of multidisciplinary meetings: ³							
1: < 10	1074	1			1		
2: 10–25	1073	0.85	0.76–0.96	0.007	0.93	(0.83–1.05)	0.24
3: > 25	1073	0.63	0.56–0.71	<0.001	0.80	(0.70–0.92)	0.001
Working in group practice:							
No	422	1			1		
Yes	2798	0.75	0.65–0.85	<0.001	0.77	(0.67–0.88)	<0.001
List size:							
< 1000	806	1			1		
1000–1149	895	1.66	1.41–1.95	<0.001	1.47	(1.25–1.73)	<0.001
1250–1499	872	2.22	1.90–2.60	<0.001	1.71	(1.46–2.02)	<0.001
1500–1749	373	2.27	1.89–2.72	<0.001	1.67	(1.37–2.03)	<0.001
1750–	274	2.52	2.08–3.06	<0.001	1.76	(1.44–2.17)	<0.001
<i>List population</i>							
Proportion of men:							
1: < 46%	1074	1			1		
2: 46–52%	1073	0.91	0.81–1.03	0.13	0.96	(0.85–1.08)	0.45
3: > 52%	1073	0.90	0.79–1.01	0.067	1.01	(0.85–1.20)	0.93
Proportion ≥ 60 years:							
1: < 15 %	1074	1			1		
2: 15–24 %	1073	1.02	0.90–1.15	0.79	0.97	(0.85–1.10)	0.58
3: > 24%	1073	1.06	0.94–1.19	0.35	0.99	(0.86–1.15)	0.93
Proportion with a high education (25–60 years):							
1: < 25%	1074	1			1		
2: 25–35%	1073	1.28	1.13–1.4	<0.001	1.03	(0.90–1.18)	0.69
3: > 35%	1073	1.34	1.18–1.51	<0.001	0.99	(0.85–1.15)	0.91
<i>Practice municipality</i>							
Residents in GP practice municipality:							
> 50 000	1128	1			1		
20 000–50 000	744	1.01	0.90–1.13	0.91	1.01	(0.89–1.15)	0.83
10 000–20 000	520	0.87	0.75–1.0	0.042	0.93	(0.80–1.08)	0.34
< 10 000	828	0.39	0.33–0.46	<0.001	0.53	(0.44–0.65)	<0.001

Notes: *“High” defined as being among the upper half of GPs based on UPC (UPC > 0.80). ¹GPs with list size ≥ 500, ≥ 500 consultations, and working in their practice throughout 2009. ²Number of consultations reported by the GP divided by list size. ³Number of interdisciplinary meetings reported by GP per 1000 patients.

for consultations was met to a high degree by the usual GP. This is in keeping with increased patient satisfaction found previously among Norwegian GPs with full lists [32].

The GP consultation rate may indicate priority and time devoted to consulting with patients. Consultation rates showed a positive association with UPC in the present study, supporting an earlier study

Table IV. Association between *low* or *high* annual consultation rates in the list populations¹ and the Usual Provider Continuity Index (UPC) offered in the GP lists (Poisson regression models) adjusted for socio-demographic factors² as proxy for need for health services.

	Model 1: Lowest consultation rates in list populations ³		Model 2: Highest consultation rate in list populations ⁴	
	RR	95% CI	RR	95% CI
UPC in GP list:				
Lowest (UPC,0.68)	Ref		Ref	
Medium low (UPC 0.68–0.80)	0.72**	0.61–0.84	1.05	0.88–1.25
Medium high (UPC 0.80–0.88)	0.73**	0.63–0.86	1.01	0.83–1.21
Highest (UPC >0.88)	0.64**	0.53–0.76	1.26*	1.06–1.51
	p-trend <0.001		p-trend 0.016	

Notes: ¹Average number of consultations per person within a list population in 2009 including consultations with usual GP and all other GPs. ²Adjusted for proportion of patients ≥ 60 years, proportion of male patients, proportion of population 25–60 years of age with ≥ 12 years of education and number of residents in the municipality. ³Outcome: Being in the quartile of list populations with the *lowest* consultation rate per person (annual consultation rates <2.16). ⁴Outcome: Being in the quartile of list populations with the *highest* consultation rate per person (annual consultation rates >2.82). * $p < 0.01$ ** $p < 0.0013$.

that the GP consultation rate predicts patient satisfaction with access [33]. The GP rate for participating in multidisciplinary meetings is a marker of management continuity. An earlier study showed an inverse relationship between rates of meetings and list size [34]. In this study, the rate of meetings was inversely related to UPC. In this balance of different tasks, our findings indicate that GPs with long lists give priority to personal continuity.

Further research

The UPC in the GP list influenced the total utilization of GP consultations, as well as after adjusting for socio-demographic factors as proxies for the need for services. Whether this represents poor access when having a GP with a low UPC or GPs offering high personal continuity induce a higher demand for services requires further study.

GPs outside the group were used in <2% of all consultations, independently of the UPC of the usual GP. This indicates that patients listed with GPs having a low UPC mostly see other GPs in the same group practice when not seeing their own GP; this might ensure *informational and management continuity* [25]. How these different aspects of continuity influence patient treatment requires further research.

Shared responsibility within groups of 3–4 GPs has been advocated as the way forward for general practice [18,35]. In 25% of Norwegian GP lists, <68% of consultations are with the usual GP. In smaller municipalities and for GPs with short lists, shared responsibility could ensure the best combination of personal, informational, and management continuity. Changing economic and legal regulations

to facilitate shared responsibilities should be tried out and evaluated.

Conclusion

The goal of personal continuity in the Norwegian list patient system is achieved overall with a mean UPC of 0.78 and 50% of lists with a UPC >0.80. However, the UPC varies substantially and 25% of lists had a UPC <0.68. Models for shared responsibility are in need of testing.

The personal continuity is lower among young people and in smaller municipalities. Perhaps surprisingly, a high GP consultation rate and longer lists were shown to predict a high UPC.

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Declaration of interest

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the paper.

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