



ORIGINAL ARTICLE

Importance of healthcare utilization and multimorbidity level in choosing a primary care provider in Sweden

KARIN RANSTAD^{1,2}, PATRIK MIDLÖV¹ & ANDERS HALLING^{1,3}

¹Department of Clinical Sciences in Malmö, Lund University, Sweden, ²Nättraby Primary Health Care Centre, Nättraby, Sweden, and ³Research Unit of General Practice, University of Southern Denmark, Odense, Denmark

Abstract

Objective. To study the associations between active choice of primary care provider and healthcare utilization, multimorbidity, age, and sex, comparing data from primary care and all healthcare in a Swedish population. **Design.** Descriptive cross-sectional study using descriptive analyses including t-test, correlations, and logistic regression modelling in four separate models. **Setting and subjects.** The population (151 731) and all healthcare in Blekinge in 2007. **Main outcome measure.** Actively or passively listed in primary care, registered on 31 December 2007. **Results.** Number of consultations (OR 1.31, 95% CI 1.30–1.32), multimorbidity level (OR 1.69, 95% CI 1.67–1.70), age (OR 1.03, 95% CI 1.03–1.03), and sex (OR for men 0.67, 95% CI 0.65–0.68) were all associated with registered active listing in primary care. Active listing was more strongly associated with number of consultations and multimorbidity level using primary care data (OR 2.11, 95% CI 2.08–2.15 and OR 2.14, 95% CI 2.11–2.17, respectively) than using data from all healthcare. Number of consultations and multimorbidity level were correlated and had similar associations with active listing in primary care. Modelling number of consultations, multimorbidity level, age, and sex gave four separate models with about 70% explanatory power for active listing in primary care. Combining number of consultations and multimorbidity did not improve the models. **Conclusions.** Number of consultations and multimorbidity level were associated with active listing in primary care. These factors were also associated with each other differently in primary care than in all healthcare. More complex models including non-health-related individual characteristics and healthcare-related factors are needed to increase explanatory power.

Key Words: *Choice behaviour, general practice, health-related characteristics, healthcare utilization, multimorbidity, primary care, Sweden*

Introduction

The importance of primary care increases when the focus in healthcare changes from patients with single illnesses to persons with complex health problems. Within populations good relations between patients and primary care contribute to more adequate care, trust, and better health [1,2]. It has been shown that strategies to encourage patient–doctor relations increase availability of care and also the risk of individuals not feeling the need for continuous relations in primary care receiving insufficient care. Continuity is particularly valued for more serious and psychological problems [3–6]. When asked, a majority of participants in Swedish surveys wanted to choose their primary care provider [7].

Choices in healthcare are affected by a variety of factors related to both individuals and healthcare [8].

How patients relate to primary care is linked to choice of primary care provider [9–14]. Differences in individual preferences and options can be explained using trust and other constructs related to theories on social capital [15]. According to theories on decision-making, choice behaviour in healthcare is complex, due to either not using all information available or not having enough information [16].

In Sweden, healthcare is managed by county councils, financed by taxation, and with low co-payment for health services. Primary care is organized in group practices with general practitioners (GP) and multidisciplinary teams. Choice of primary care provider (listing) was introduced as a concept of patient empowerment, mandatory since 2010 [17]. In Blekinge, a county in south-eastern Sweden, listing was introduced in primary care in 2004. Passive

Correspondence: Karin Ranstad, Department of Clinical Sciences in Malmö, Lund University, Sweden. E-mail: karin.ranstad@ltblekinge.se

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Active listing in primary care has implications for individual health as well as healthcare systems.

- Frequent attenders, patients with a high multimorbidity level, women, and the elderly choose the primary care provider more often than expected.
- The association of number of consultations and multimorbidity level with active listing in primary care is stronger when using only primary care data.
- Number of consultations and multimorbidity level has about 70% explanatory power for active listing in primary care.

listing with a nearby clinic was registered, until active listing was registered by the individual.

Listing is part of the structure that affects processes and outcomes of primary care systems. Primary care providers work with patient lists formed by repeated individual choices. Robust knowledge regarding these choices is needed to improve primary care systems. Most previous studies are based on reported data, not focusing on choice behaviour. We use patient records from primary care and all healthcare in a population, comparing the explanatory power of number of consultations and multimorbidity level in four models. This study contributes by linking choice behaviour and individual characteristics, comparing primary care with all healthcare. The aim is to explore the associations of healthcare utilization, multimorbidity level, age, and sex with active listing in primary care, comparing data from primary care with data from all healthcare.

Material and Methods

Study Population and Design

In 2007, Blekinge had 151 731 inhabitants. The average age was slightly higher (42.7 years) and there were more males (50.5%) compared with all of Sweden (41 years and 49.7%) [18]. All healthcare, including two hospitals and five psychiatric clinics, was funded by the county council. Primary care (90 GPs) comprised 12 public and 13 private clinics. Listing in primary care was introduced in 2004. Funding, allocated at clinic level, favoured listing with clinic rather than GP. Passive listing was registered with a nearby clinic, until changed to active by the individual. Active listing could be changed monthly, and children followed their mother's choice.

Data on healthcare utilization and morbidity were collected from electronic patient records, not available from all private providers. This study was approved by the Regional Ethical Review Board at Lund University (application no. 2010/314). The alternative of not participating was possible, but was not used by any in the study population.

Outcome and Explanatory Factors

Outcome was registered active or passive listing in primary care on 31 December 2007. Listing with individual GP was not analysed.

Healthcare utilization was measured as number of consultations with a physician (categorized into 0–1, 2–3, 4–5, 6–7, 8–9 and >9) during 2007. Multimorbidity level was measured from patient records for 2007 using the Johns Hopkins Adjusted Clinical Groups Case Mix System (ACG), a summary measure of morbidity burden. All individuals were assigned to one of six levels called resource utilization bands (RUBs), ranging from 0 (no need of healthcare services) to 5 (very strong need of healthcare services) [19–22]. Number of consultations and multimorbidity level were analysed separately for primary care and all healthcare, including primary care as well as secondary somatic and psychiatric care. Due to different electronic patient record systems, individual data on number of consultations and morbidity in private primary care were not reliable, hence not used to compare primary care and all healthcare. Age and sex were used as complementary factors in all models, age in 20-year strata.

Statistical Analysis

Descriptive analyses including t-test, correlations, and logistic regression modelling using Akaike's Information Criterion (AIC) for model comparison were performed with STATA version 13.0 (Stata Corporation, Texas, USA). The population of Blekinge (151 731) was used when complete data were available. Private and public primary care was compared using available data on age and sex. Four separate models for number of consultations and multimorbidity level were used, when data from primary care were compared with all healthcare. Two models with number of consultations, multimorbidity level including interaction, age, and sex were then used to explore interaction.

Results

Blekinge county had 151 731 inhabitants on 31 December 2007. All were passively or actively listed

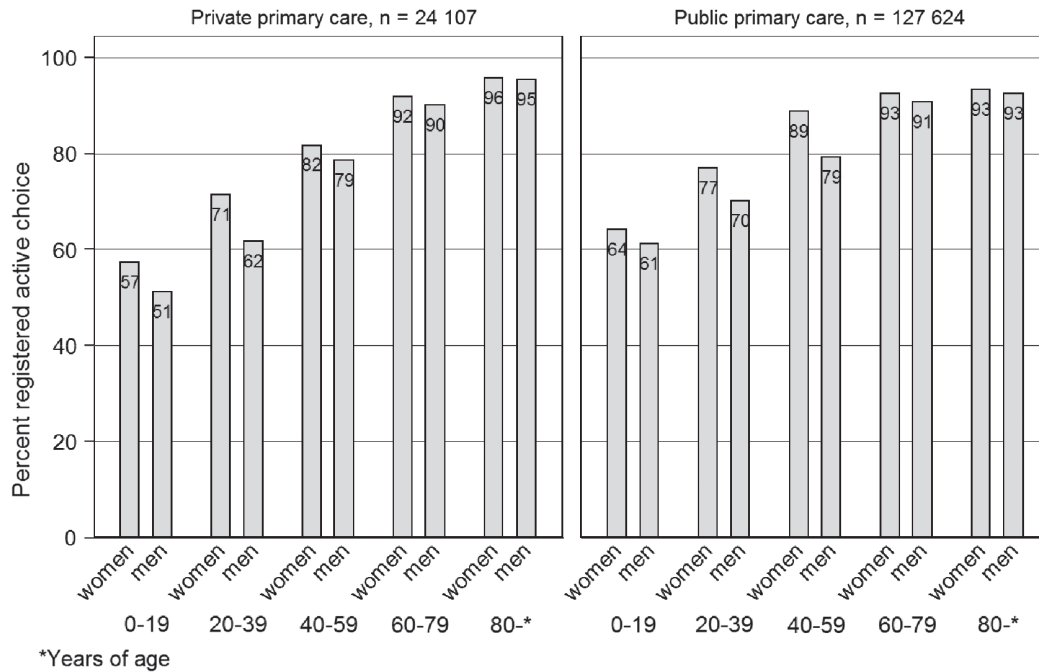
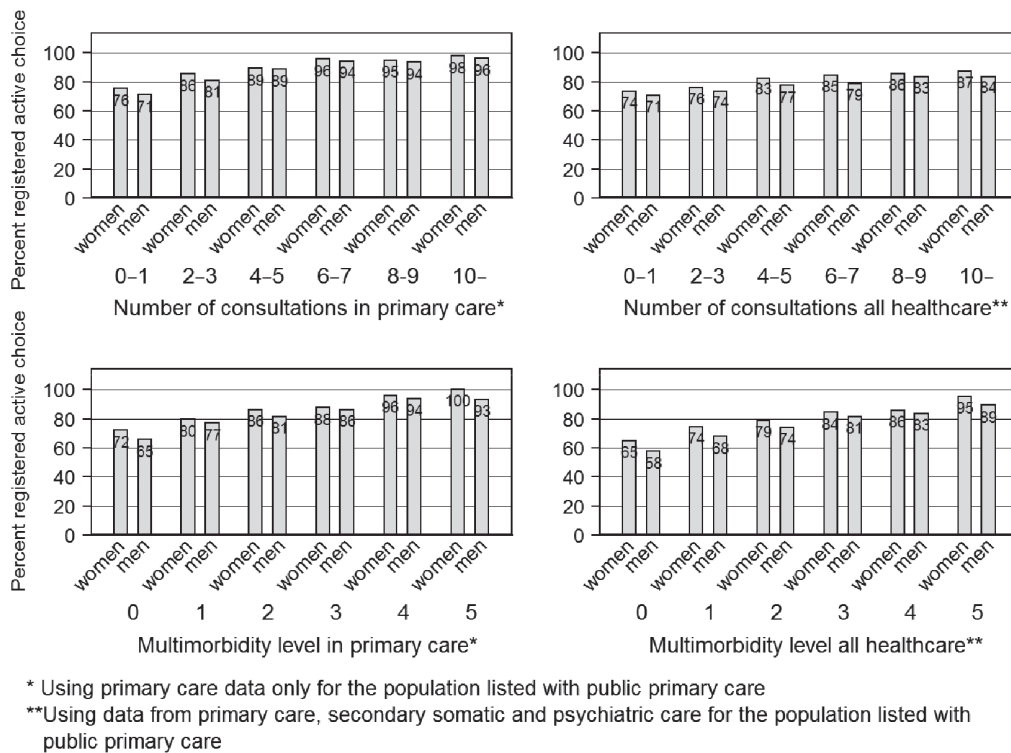


Figure 1. Percentage of the population in Blekinge (n = 151 731) with a registered active choice of primary care provider in 2007 for individuals listed with private or public primary care.

in primary care, 127 624 with public and 24 107 with private primary care. A total of 98 600 (53% women, 47% men) were actively listed with a primary care clinic and 60 921 of them also chose a personal GP.

A total of 63.2% of those listed with public primary care and 74.5% of those listed with private primary care were actively listed. Elderly patients were more frequently actively listed than younger patients



* Using primary care data only for the population listed with public primary care

**Using data from primary care, secondary somatic and psychiatric care for the population listed with public primary care

Figure 2. Percentage of the population with a registered active choice of primary care provider in 2007 according to number of consultations and multimorbidity level, comparing primary care and all healthcare for the population listed with public primary care in Blekinge (n = 127 624).

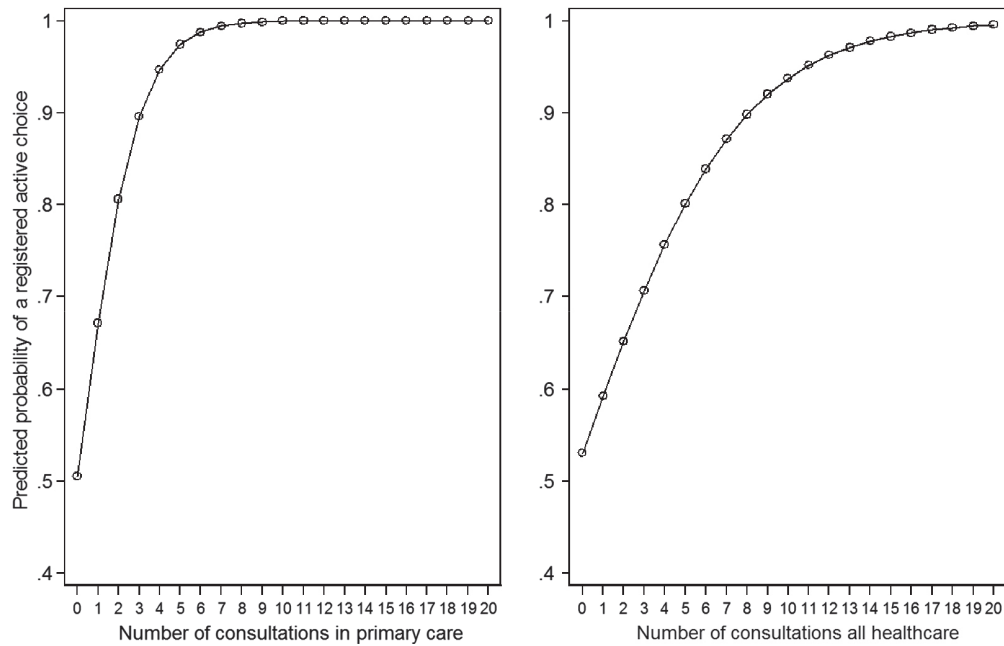


Figure 3. Predicted probability of a registered active choice of primary care provider according to number of consultations in primary care and all healthcare, controlling for age and sex, in the population listed with public primary care (n = 127 624) in Blekinge 2007.

(OR 1.03, 95% CI 1.03–1.03), in both public and private primary care (Figure 1). Individuals with many consultations (OR 1.31, 95% CI 1.30–1.32) or a high multimorbidity level (OR 1.69, 95% CI 1.67–1.70) in all healthcare were more likely to be actively listed (Figure 2). Individuals actively listed were on average 14 years older, had 40 % more consultations and 30% higher multimorbidity level and

were more likely to be female than those passively listed (each difference $p < 0.001$).

For those listed with public primary care, number of consultations had a stronger association in primary care (OR 2.11 for continuous factor, 95% CI 2.08–2.15) with active listing than in all healthcare (OR 1.31, 95% CI 1.30–1.32), adjusting for age and sex. Predicted probability of active listing was increasing

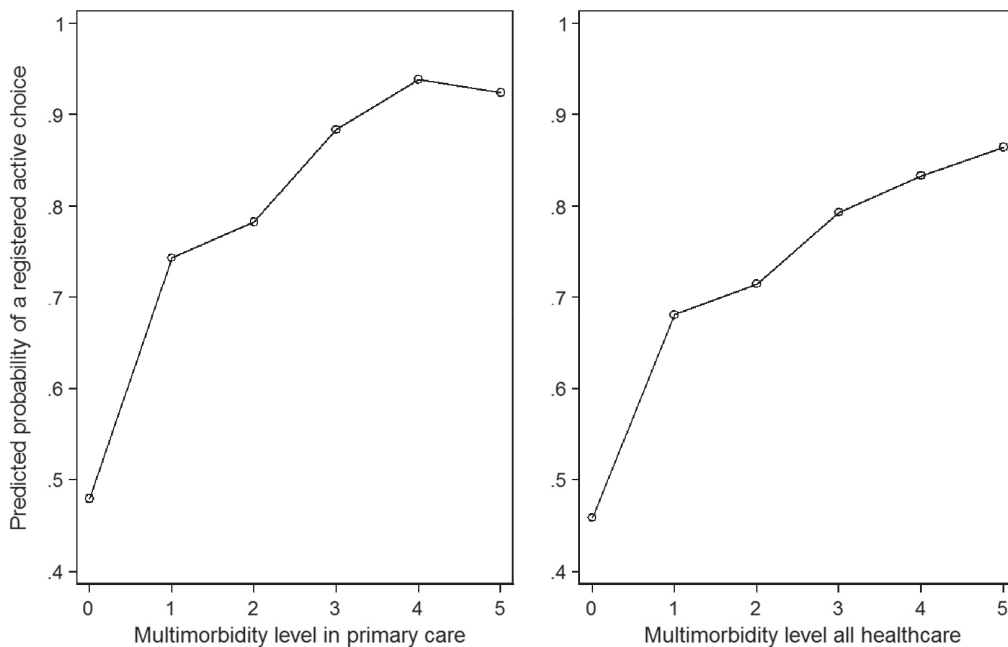


Figure 4. Predicted probability of a registered active choice of primary care provider according to multimorbidity level measured in primary care and all healthcare, controlling for age and sex, in the population listed with public primary care (n = 127 624) in Blekinge 2007.

Table I. Modelling multimorbidity and number of consultations, controlling for age and sex, on active listing with public primary care in Blekinge 2007 (n = 127 624), comparing data from primary care and all healthcare.

Model description	Model estimates			Model classification		
	Pseudo R-squared	Log likelihood	Model comparison AIC	Correctly classified %	Predictive values %	
		Chi ² test			Pos.	Neg.
1: Number of consultations, primary care	0.1298	-73069.26 p < 0.001	146160.5	67.55	74.39	55.90
2: Number of consultations, all healthcare	0.1196	-73925.95 p < 0.001	147873.9	67.88	72.01	57.98
3: Multimorbidity, primary care	0.1599	-70544.43 p < 0.001	141110.9	71.16	75.85	61.88
4: Multimorbidity, all healthcare	0.1345	-72669.77 p < 0.001	145361.5	69.92	73.49	61.41
5: 1(continuous) + 3 with interaction, primary care	0.1665	-69986.82 p < 0.001	140007.6	71.16	75.85	61.88
6: 2(continuous)+ 4 with interaction, all healthcare	0.1392	-72280.87 p < 0.001	144595.7	70.01	72.34	63.29

most for the first 10 consultations then tapered off, in primary care as well as all healthcare (Figure 3).

For being listed with public primary care the overall association of multimorbidity in primary care (OR 2.14, 95% CI 2.11–2.17) had a stronger association with active listing than multimorbidity in all healthcare (OR 1.70, 95% CI 1.69–1.72), adjusting for age and sex. Multimorbidity level predicted active listing, significantly ($p < 0.001$) increasing for RUB 0–4, both in primary care and all healthcare (Figure 4).

The correlation between multimorbidity level and number of consultations, in six categories, was 62% in primary care and 68% in all healthcare. Comparing primary care and all healthcare, categorized consultations had a 72% correlation and multimorbidity level a 77% correlation.

The four separate models, including number of consultations, and multimorbidity level using data from primary care and all healthcare, gave similar predictive power of about 70% to correct classification of listing in primary care. Models including both number of consultations and multimorbidity level did not improve the results (Table I).

Discussion

Our aim was to explore the associations of healthcare utilization, multimorbidity, and active listing in primary care. We found that both number of consultations and multimorbidity level predicted registered listing in primary care, which had not been shown in a Swedish population before. Number of consultations and multimorbidity level were related and their predictions were similar.

It was confirmed that individual factors, such as healthcare utilization, multimorbidity level, age, and sex not only influenced patient attitudes towards

continuity, but also predicted choice of primary care [23,24]. Number of consultations and multimorbidity level had a similar association with listing in primary care, stronger when only using primary care data. As expected, the correlations between number of consultations and multimorbidity level indicated common latent factors. In primary care those correlations were weaker, indicating that the latent factors worked differently in primary care than in all healthcare.

Modelling the associations of number of consultations, multimorbidity level, and listing in primary care, adjusting for age and sex, gave four separate models with similar explanatory power. Considering that active listing in primary care is a complex choice affected by both individual factors and healthcare system factors, it is expected that these models need to include more individual characteristics and factors related to healthcare in order to increase their explanatory power and precision.

In Sweden, data from health registers could be used to link choice behaviour and individual characteristics. Reliable data and an understandable listing system were available for the population of Blekinge. The listing system was almost the same as the mandatory listing system legislated in 2010 and allowed generalization within a Swedish context [25]. Some bias in registered listing remained since 2004. In public primary care established patient–doctor continuity was protected by assigning an active listing with that GP, including clinic. Patients (6581) with the same choice in 2007 were treated as actively listed. Some private primary care clinics (8498 listed) were allowed to list all patients with previous consultations as actively listed, regardless of established patient continuity, which was noticed when healthcare was needed. All patients registered in private

primary care were excluded when comparing primary care with all healthcare due to missing data.

Recent Swedish surveys have investigated reported choice of primary care provider. Glenngård et al. reported (response rate 50%, bias towards high educational level and high self-rated health) choice of primary care clinics as 61% with proportions differing with regard to age, municipality, and occupation, but not with regard to self-reported health status, sex, living conditions, county, or education [23]. In a discrete choice experiment, with response rate 58%, Hjelmgren and Anell found that older individuals and individuals in poor health preferred a GP, and individuals working or living at a greater distance from a hospital preferred a primary care team [24]. We confirmed that individual health-related factors were related to active listing in primary care.

Zielinski et al. studied the passively listed population, when a clinic was established in Blekinge in 2005. One year later, older individuals and those with a higher multimorbidity level were more likely to be registered as actively listed [26]. We confirmed that frequent attenders, people with high multimorbidity level, the elderly, and women more often were actively listed.

Both number of consultations and multimorbidity level are related to morbidity burden and the wider concept of patient complexity [27]. We showed that they are related constructs, working differently in primary care than in all healthcare, similarly affecting listing in primary care.

Conclusions and Perspectives

Number of consultations, multimorbidity level, age, and sex were associated with active choice of primary care provider, as expected from surveys.

Listing in primary care had a stronger association with number of consultations and multimorbidity level using primary care data than using data from all healthcare. Number of consultations and multimorbidity level were correlated. Their different relations in primary care and all healthcare remain to be investigated.

Modelling number of consultations and multimorbidity level gave four separate models with similar explanatory power for active listing in primary care. More complex models are needed to increase the explanatory power and precision.

Including individual characteristics such as socio-economics, geography, and social capital in the models should be explored. The latent factors underlying the observed correlation between number of consultations and multimorbidity level should also be explored using structural equation modelling, and the different correlations in primary care and all

healthcare fully investigated. Choices of primary care provider ought to be studied according to theories on complex choices and with constructs like patient satisfaction, trust, and attachment. The influence of characteristics of different primary care clinics also needs to be further investigated.

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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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