




BMJ Open Regional differences in the patient population of general practices in northern Germany: results of a mixed-methods study

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To cite: Hansen H, Schäfer I, Pohontsch NJ, *et al.* Regional differences in the patient population of general practices in northern Germany: results of a mixed-methods study. *BMJ Open* 2020;**10**:e041762. doi:10.1136/bmjopen-2020-041762

► Prepublication history and additional material for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2020-041762>).

Received 17 June 2020
Revised 07 October 2020
Accepted 11 November 2020



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ABSTRACT

Objectives The aim of our study was to explore patient types in general practitioner (GP) practices and to quantify the regional differences of the frequencies of these patient types in northern Germany.

Design and setting We conducted a mixed-methods study based on focus groups and standardised interviews with GPs. All counties and independent cities within a radius of 120 km around Hamburg were assigned one of three regional categories (urban areas, environs, rural areas). The focus groups were analysed using qualitative content analysis. Relative frequencies of consultations by patient types and differences between the regions were calculated. Logistic regression analyses were used to identify differences among regions.

Participants Nine focus groups with 65 GPs (67.7% male). From the 280 initially recruited GPs 211 (65.4% male) could be personally interviewed.

Results Four themes with 27 patient types were derived from the focus groups: patients classified by morbidity, sociodemographic characteristics, special care needs and patient behaviour. Five patient characteristics were significantly more prevalent in urban areas than rural areas: patients with migration background and culturally different disease concepts (OR 1.23; 95% CI 1.06 to 1.42), privately insured patients (OR 1.17; 95% CI 1.05 to 1.31), educationally disadvantaged patients with low health literacy (OR 1.11; 95% CI 1.04 to 1.19), patients with psychiatric disorders (OR 1.07; 95% CI 1.02 to 1.12) and senior citizens living on their own without caregivers (OR 1.05; 95% CI 1.05 to 1.31). Three patient types were significantly less prevalent in urban areas: minors accompanied by their parents (OR 0.71; 95% CI 0.61 to 0.83), patients with poor therapy adherence (OR 0.87, 95% CI 0.80 to 0.95) and patients with dementia (OR 0.90; 95% CI 0.82 to 0.99).

Conclusions GPs could compensate the specific needs of their patients with medical training aligned with the requirements of their region. Urban GPs need skills treating patients with psychiatric, social and cultural problems, rural GPs regarding the care for children or noncompliant patients.

Trial registration number NCT02558322

Strengths and limitations of this study

- General practitioners (GPs) who participated in the focus groups may differ from non-participants due to their motivation, practice experience and special problems from their regions, for example, undersupply of physicians.
- For the qualitative part of the study, in order to maximise the heterogeneity of focus group participants' experience we ensured that both male and female GPs were included, with longer and shorter durations of practice experience, lower and higher age, from smaller and larger practices and different types of practices from all three areas.
- For the quantitative part of the study GP practices were included via a quota sampling.
- The contributions of the GPs in the focus groups and the answers in the interviews might have been influenced by memory gaps, errors or social desirability.
- The GPs were recruited from the regions of northern Germany exclusively. Therefore, the sample may possibly not represent the rest of Germany.

BACKGROUND

The number of general practices per population and the supply of certain services vary greatly between urban and rural areas. Urban areas have a better availability of general practitioners (GPs), while rural areas in Germany struggle with the impending shortage of medical personnel and services.^{1,2} As a result, GPs from rural areas see more patients, have a higher total amount of working hours, a higher workload of home visits and they provide a broader spectrum of services.³⁻⁷ Previously published results from our qualitative analyses indicate that GPs from urban and rural areas perceive their professional role differently. Urban GPs assessed themselves just as a provider of medical services whereas rural GPs described themselves as a medical companion with an intensive doctor-patient relationship.⁸



Doctor–patient relationship and disease management in primary care are influenced by patient characteristics. According to Fenton *et al*, higher rates of requests for tests, prescriptions and referrals in family medicine practices were significantly associated with age, greater bother or worry about symptoms, a more extroverted patient personality, greater life satisfaction and a higher probability of at least one prior encounter with the physician that had been visited.⁹ Ferroni *et al* demonstrated that the management of non-insulin-treated type II diabetes was insufficient in younger patients, immigrants and patients not attending diabetes clinics.¹⁰

Van den Bussche *et al* analysed the overutilisation of ambulatory medical care in the elderly German population. They identified two main patient types with regard to overutilisation of medical services: One type comprised patients belonging to the oldest age group (42% ≥ 75 years), having many practice contacts (1.4 contacts/week), suffering from severe somatic diseases and multimorbidity and needing long-term care. The other type comprised younger elderly (30% ≥ 75 years) suffering from psychiatric or psychosomatic complaints, being less frequently multimorbid and/or nursing care dependent and contacting a large number of different practices.¹¹ Another study examined self-care coping strategies in people with diabetes. They found three patient types: proactive managers who independently monitor and adjust blood glucose and the self-care regime, passive followers who adhere to the prescribed self-care regime without self-adjustment and nonconformists who do not follow most of the prescribed self-care regime.¹²

Some studies took regional differences of the distribution of patient characteristics or patient types into consideration. Mukhtar *et al* analysed factors associated with consultation rates in general practice in England. Consultation rates increased for females, deprived and older patients and varied by ethnicity. They did not find associations between consultation rates and the location of general practices in rural areas.¹³ A study by Carr-Hill *et al*, which was conducted over 25 years ago, identified higher rates of consultations in association with morbidity-specific and sociodemographic determinants such as chronic illness, unemployment, living in partnership and living in urban areas.¹⁴

To the best of our knowledge, there are no studies exploring patient types in primary care and considering their regional differences in Germany. Our definition of patient types is the combination of typical characteristics into patterns of characteristic properties, which, for example, describes the behaviour, needs or morbidity of a group of patients. Therefore, the aim of our study was to explore (1) patient types in GP practices and (2) to quantify the regional differences of the frequencies of these patient types in northern Germany.

METHODS

Study design

The investigation presented here is part of the study ‘Regional variations in primary medical care of northern Germany-Outpatient Healthcare Research North (Ambulante Versorgungsforschung Nord - AVFN)’. This study follows a sequential exploratory design¹⁵ consisting of a qualitative and a quantitative part. The qualitative part includes an exploratory qualitative focus groups study with GPs and patients. The quantitative part builds on the qualitative results and comprises a cross-sectional observational study to quantify regional differences in primary healthcare in northern Germany.¹⁶ This paper presents the results of the GP focus groups from the qualitative part and of the GP interviews from the quantitative part concerning the description of patient types.

Study regions and regional categories

The study regions and regional categories have been described in previous publications.^{3 8 17} In brief, three categories were defined for the regional comparison based on the so-called ‘structural settlement of district types’ of the German Federal Institute for Research on Building, Urban Affairs and Spatial Development.¹⁸ The category ‘urban areas’ included independent large cities constituting districts in their own right (over 100 000 inhabitants), the category ‘environs’ urbanised districts (with a density of over 300 inhabitants/km²) and rural districts with signs of urban agglomeration (with a density of over 150 inhabitants/km²) and the category ‘rural areas’ sparsely populated rural districts (with a density of less than 150 inhabitants/km²).

The areas of the cross-sectional observational study have been described in the study protocol.¹⁶ All administrative districts (counties and independent cities) were included in the study where at least 20% of the land area was located within a radius of 120 km (ca. 75 miles) linear distance around the study centre (University Medical Center Hamburg-Eppendorf). The chosen administrative districts for the study were derived from the German Federal States of Bremen, Hamburg, Mecklenburg-Western Pomerania, Lower Saxony, Saxony-Anhalt and Schleswig-Holstein. The specific districts and cities are shown in detail in previous publications.^{3 16}

Recruitment

GPs were eligible for the study if they had been accredited as statutory health insurance physicians in the respective administrative districts. Therefore, we used the database of the Department of Primary Medical Care at the University Medical Center Hamburg-Eppendorf as well as the databases of the respective regional associations of statutory health insurance physicians.

For the qualitative focus group study, we contacted GPs from 17 districts and cities (n=1910). The GPs were invited by mail to participate in the focus groups. GPs from six cities with populations over 20 000 in the regional category rural areas were excluded in order to

avoid a bias by GPs practising in larger cities within the rural areas focus groups. Detailed information on the participating districts and cities of the focus groups can be found elsewhere.⁸

For the cross-sectional observational study, the GPs were selected by a quota sampling design in order to represent all regionally different healthcare situations in the study. The purpose of this design was to raise the probability of also including underserved regions into the study where usually many GPs were unwilling or unable to participate in a study due to their heavy workload. The goal of the study was to recruit at least 80 GPs per regional category. The sample was stratified into individual administrative districts and the sample size in each district was fixed proportionally to the respective population size. GPs were invited to participate in the study by letter.

Data collection

The focus groups took place between May and November 2014 in six different locations to allow participants from different regions to reach the meeting easily. The focus groups were led by at least two experienced moderators out of four (HH, IS, NJP and MS). A semistructured interview guideline was used and the focus groups lasted approx. 120 min. The guideline referred to the main categories: most common reasons for consultations, patient characteristics, regional differences concerning work of GPs and expectations, needs and treatment requirements. The interview guideline is published elsewhere.¹⁷ The introductory question regarding the patient types was: 'Which kind of patients consult you most often?'. The focus groups were digitally audio recorded, logged and transcribed verbatim following designated transcription rules by trained research assistants. Field notes were made during the focus groups by the moderators. HH checked all transcripts for accuracy. In order to protect participants identities all names were replaced by numbers and details that would have enabled the identification of individuals were deleted.

Recruitment of the cross-sectional observational study started in May 2015 and data were collected between July 2015 and April 2017. The GPs were visited by staff members of the project and interviewed personally. Participants answered by memory recall and were allowed to check their patient documentation if necessary. The standardised interviews obtained information regarding the GPs personal and professional characteristics (age, gender, workload, postgraduate and advanced medical training, place of residence, data on the practice) and the number of weekly contacts with 27 patient types derived from the focus groups. The interviews included information from home visits and referred to average practice weeks (no overcrowded weeks, no below average weeks, no influenza season). The questionnaire is presented in the online supplemental additional file 1. Furthermore, we explored the frequency of 99 different reasons for consultation from 17 areas/organ systems and 38

different procedures of healthcare services. These analyses are published elsewhere.³

Data analysis

The transcripts of the focus groups were analysed using qualitative content analysis¹⁹ following a realistic paradigm.²⁰ We derived inductive categories from the material. HH, NJP and IS analysed the transcripts, discussed and consented all categories, category descriptions and examples. Data were managed using MAXQDA V.11 (Verbi). We used a parsimonious interpretive approach to language translation of the presented statements of the GPs and stayed as close as possible to a literal translation of the quotations.

The quantitative data were prepared and analysed using Stata V.15.1. Relative frequencies of consultations from patient types and differences between the regions urban areas, environs and rural areas were described and regional differences were analysed using the t-test. The results are presented as the proportion of the respective categories of patient types of all patients consulting the respective practice. As it might be that patient types are correlated, that is, patients systematically belong to more than one type, we also analysed in which patient types the biggest regional difference can be found. These variables were identified by logistic regression analyses via stepwise backward selection with $p > 0.05$ as exclusion criterion. The full number (n) of identified patient types were introduced as independent variables (x_i) into the backward selection and the regional category (coded 0/1) was used as dependent variable (y). In the following formula, β_i define the estimated coefficients and α the constant:

$$y = \alpha + \sum_{i=1}^n (\beta_i x_i)$$

We calculated two models comparing (1) urban areas versus rural areas and (2) environs vs rural regions. An alpha level of 5% ($p \leq 0.05$) was defined as statistically significant.

Patient and public involvement

There was no patient and public involvement in the design, conduct, reporting or dissemination of our research.

RESULTS

Sample characteristics

We conducted nine focus groups with 65 GPs. Three focus groups were performed in each area: urban areas $n=24$ GPs, environs $n=19$, rural areas $n=22$. 44 GPs were male. Mean age of the GPs was 54.3 years in urban areas, 50.6 in environs and 55.0 in rural areas. Further descriptions of the focus groups participants can be found in [table 1](#).

In our standardised observational study, we were able to include GPs from 91.9% of the selected administrative districts (34 of 37) into the data set. In three districts of the region environs (Delmenhorst, Diepholz and Osterholz), we could not include GPs into our study. From the

Table 1 Description of participating GPs from the focus groups (n=65)

	Urban areas	Environs	Rural areas
Age (in years)	54.3±7.7	50.6±8.8	55.0±9.7
Sex			
Female	6	5	10
Male	18	14	12
No of patients per month			
Up to 250 patients	42%	5%	9%
251 patients and more	58%	95%	91%
Years of practice experience	17.4±10.0	12.4±9.4	15.4±9.2
Type of medical practice			
Individual practice	25.0%	52.6%	50.0%
Group practice	54.2%	42.1%	36.4%
Joint practice	20.8%	5.3%	13.6%

GP, general practitioner.

280 initially recruited GPs 211 could be personally interviewed. 69 GPs could not participate due to time-related or organisational problems (eg, absence of practice partners, software problems). The description of the recruitment process, the stratification of groups and a map of the regions can be found in Schäfer *et al.*³

The characteristics of the interviewed GPs are shown in table 2. 65.4% of the GPs were male, the mean age was 54.5 years. The GPs reported an average of 344 treated patients per month with a slightly lower number of patients in urban areas than in rural areas. The most common practice type in all areas was the individual practice (rural areas: 59.2%, environs: 51.4%, urban areas:

43.9%). GPs working in medical care centres were only found in urban areas.

Patient types identified from the focus groups

We derived 4 themes with 27 categories of patient types from the GP focus groups. The identified patient types are presented in box 1. Quotes from the GPs are shown in italics in the following text.

Patient types classified by morbidity

Theme 1 included patient types classified by morbidity. A frequent category was patients with chronic illness, which was divided into two subtypes. One type is rather well, dutiful, easy to manage and with well-adjusted medication. The other type has a poor compliance and needs a time-consuming treatment.

I think the most frequent patient is the stable, chronically ill old patient and the second most often the sick old patient with severe complaints. (Section 190, urban GP group)

Another category was patients with multimorbidity. These were characterised by the GPs as presenting regularly with new complaints, having polypharmacy, being in need of patient education and constant treatment adaptations. GPs also described a high expenditure of time for the treatment of patients with multimorbidity.

So [...] really common is the chronically ill old patient, [who] keeps coming up with new symptoms because the joints are damaged, pain occurs again, the medication is not taken properly or is stopped because of some side effects, which are often very, how to say, 'wailing' you cannot say, but are very plaintive. [...] So that's tiring. (Section 206, urban GP group)

Table 2 Description of the interviewed GPs from the cross-sectional observational study (n=211)

	Total	Urban areas	Environs	Rural areas	P value (U/R)	P value (E/R)
Age (in years)	54.5±8.6 (n=207)	53.5±7.8 (n=66)	54.7±8.6 (n=72)	55.4±9.2 (n=69)	0.190	0.630
Sex					0.117	0.479
Female	34.6%	45.5%	27.0%	32.4%		
Male	65.4%	54.6%	73.0%	67.6%		
	(n=211)	(n=66)	(n=74)	(n=71)		
No of patients per month	344±115 (n=207)	314±101 (n=65)	345±96 (n=74)	372±140 (n=68)	0.007	0.172
Type of medical practice					0.004	0.074
Individual practice	51.7%	43.9%	51.4%	59.2%		
Group practice	6.2%	12.1%	6.8%	–		
Joint practice	40.8%	39.4%	41.9%	40.9%		
Medical care centre	1.4%	4.6%	–	–		
	(n=211)	(n=66)	(n=74)	(n=71)		

Statistically significant results ($p \leq 0.05$) are shown in bold.

E/R, comparison "environs" vs "rural areas"; GP, general practitioner; U/R, comparison "urban areas" vs "rural areas".

Box 1 Identified themes and categories of patients types in general practitioner (GP) practices from focus groups

Theme 1: Morbidity

- ▶ Patients with a chronic illness.
- ▶ Patients with multimorbidity (ie, at least two chronic diseases).
- ▶ Patients with psychiatric disorders (eg, depression, burnout, anxiety, borderline disorder).
- ▶ Patients with somatoform disorders.
- ▶ Patients with dementia.
- ▶ Patients with substance abuse disorders.

Theme 2: Sociodemographic characteristics

- ▶ Educationally disadvantaged patients with low health literacy.
- ▶ Privately insured patients (ie, patients who are insured outside of Germany's statutory health insurance system).
- ▶ Patients with social problems due to poverty/low-income.
- ▶ Minors accompanied by their parents.
- ▶ Patients with migration background and culturally different disease concepts.
- ▶ Patients with migration background and communication problems.
- ▶ Minors who come to consultation on their own.

Theme 3: Specific care needs

- ▶ Senior citizens living on their own without caregivers.
- ▶ Patients with other social problems (eg, marital problems, loneliness, workplace bullying).
- ▶ Patients regularly needing home visits.
- ▶ Patients living in a nursing home.
- ▶ Patients who are caregivers.
- ▶ Struggling single parents.

Theme 4: Patient behaviour

- ▶ Regular patients of the practice (as opposed to patients who consulted the GP only once or only if the regular GP practice is closed).
- ▶ Patients, who come with self-diagnoses via media (eg, internet, magazines, television).
- ▶ Patients with poor therapy adherence (eg, regarding medication, lifestyle changes).
- ▶ Demanding patients (eg, patients requesting prolonged sick certificates, inappropriate medication or physiotherapy).
- ▶ Patients who regularly make excessive demands on GP's time.
- ▶ Patients who proactively consult additional specialists for the same problem.
- ▶ Frequent attenders (ie, at least one consultation per week).
- ▶ Patients who proactively consult different GPs because of the same problem.

Another group of patients that many GPs consider to be common in their practice are patients with psychiatric disorders, for example, burnout, depression, anxiety or borderline disorders. According to the GPs, mental disorders often occur as a comorbidity of somatic diseases. The treatment of these psychiatric disorders is often stressful because the patients need long and frequent conversations, many of them repeatedly consult the GP with the same symptoms and some patients have no insight into the disease. From the GPs' view another frequently encountered patient group were patients with somatoform disorders. These included, for example, patients with unclear chest, abdominal or whole body pain or patients with irritable bowel syndrome. The treatment of these patients and the clarification of their symptoms is

time-consuming. GPs reported that it is difficult to convey to the patient that the complaints are not based on an organic cause. GPs also reported that there are many people with dementia among their older patients. The contact with relatives or caregivers plays a major role in the treatment of these patients. Moreover, some GPs have described patients with substance abuse disorders who are dependent on alcohol, medication such as painkillers or sleeping pills, or illegal drugs as a common patient type. For some GPs caring for this patient group is stressful due to frequent and time consuming consultations. In addition, requests for prescriptions often have to be refused.

Patient types classified by sociodemographic characteristics

Theme 2 summarised patient types according to sociodemographic characteristics. GPs mentioned that they have patients with social problems due to poverty/low income and educationally disadvantaged patients with low health literacy. These two patient types needed more time-consuming advice and management. From the perspective of the GPs many patients who are affected by poverty struggle with addiction and mental problems and/or poor health conditions. In contrast, GPs reported another category typically for the sociodemographic cluster: privately insured patients. GPs described them as very demanding.

I saw in [place in Schleswig-Holstein], [...] the community, I think, got three huge containers of dirt out of this [...] house. It was horrible. And then she sued the community. After that nobody dared to help her again. And unfortunately we see her in the emergency service with a regularity. This is sometimes very appalling and is becoming more frequent, even in areas where you don't think it's possible. (Section 223, rural GP group)

This is more a, actual a claim. Is probably the same as with patients with a lot of money. The private patient assumes that he basically finances the entire practice with his doctor-patient contact or visit. (Section 252, environs GP group)

GPs reported that patients with migration background sometimes have very different disease concepts. Some patients, for example, Turkish-born patients, have a different understanding of the disease than other patients due to their origin or culture. This could lead to difficulties in clarifying symptoms and the assessment of treatment urgency and intensity. GPs needed more time for these patients. The described problems concern the category patients with migration background and communication problems as well.

What I find exciting in these groups, what sometimes makes it easier for me for example, we have quite a lot Polish pickers with us. Polish pain is very much the same as German pain. So that is, when [a] Pole says 'my leg hurts'. Then I know roughly how his leg hurts. I don't know about Turkish pain. This [...] is really a problem. So I know that my Turkish patients get disproportionately more painkillers and more

antibiotics from me and I can't get it, although I know it. I can't reduce it because I fail because of the language barrier and the way they describe the pain and I can't get it any other way. (Section 312, rural GP group)

Further patient categories in this theme were minors accompanied by their parents and minors who come alone for consultation. These two groups seemed to be rather less common in the GP practices. Urban GPs reported that children from urban areas were mainly treated by the paediatrician. Rural GPs described that they treated also children particularly when the paediatrician practices were very crowded.

Patient types classified by specific care needs

Theme 3 comprised patients with specific care needs. GPs described patients with other social problems, for example, marital problems, loneliness or workplace bullying. Especially patients suffering from loneliness influenced the GP practice routine. They came without a special reason for consultation and used the waiting areas for social contacts with other people.

So, I think it's more of a social problem than a medical problem. That is why they are so often in the clinic. There they meet people. They usually live alone and have some social contact there and can just talk. (Section 80, rural GP group)

Patients regularly needing home visits, patients living in a nursing home or senior citizens living on their own without caregivers had in common that they required an additional treatment effort. GPs took responsibility for their older patients and they have to organise their medical treatment which led to a higher workload.

We just have the very few old people in the nursing home. They have no relatives at all. Nobody cares anymore. Yes [...] so that we no longer have any contact persons even in help so. (Section 1091, urban GP group)

Sometimes the children are far away and there are often very brave old women who really managed it alone for years. Giant garden, huge house and all that. Then it just doesn't work anymore, but they don't want to. Very, very difficult to find a satisfactory solution for everyone, right? (Section 244–246, rural GP group)

Patients who are caregivers themselves were described as a vulnerable group with a need of psychosocial support and a higher risk of developing health problems due to the exhausting care situation.

So some caring relatives do it very well and you have to treat them too, because they can also get exhausted and there are very nice circumstances and just terrible ones. (Section 206, rural GP group)

This theme also included struggling single parents. According to the GPs this group deserves special attention. Mothers who care for their children alone in

addition to a job were overworked, this complicated the treatment and has a negative effect on their health status.

GP A: As a group of people, I can still think of the group of single mothers [...].

GP B: Overworked, clearly. Overworked and have problems everywhere. [...] Whatever they do, it will always be [a] problem.

GP A: Yes, it is very difficult, so because there are quite a lot of them here and I think that their situation is quite understandable. (Section 202–204, urban GP group)

Patient characteristics classified by patient behaviour

Theme 4 classified patient types on the basis of common behaviours. Among them are patients who present for consultation bringing along a self-diagnosis obtained via different media. Some of these patients had a clear idea of what they have, what they need and what the GP has to do. These contacts were time-consuming, but some of these patients were in a positive way well informed.

I would differentiate the internet patients again, because I think there are the ones who are really so annoying and are hypochondriacal in some way. But [...] others [...] are [...] uncomfortable for us because they often really know details better than we do, because they deal with certain things that we have already neglected in routine or [things] we are no longer up to date with. (Section 160, rural GP group)

A frequently described patient group was the patients with poor therapy adherence. The GPs complained that these patients do not follow their recommended lifestyle changes for example, healthy nutrition, physical education, restrictions in smoking and drinking behaviour or medication intake. Working with these patients was very frustrating for the GPs. The most frequent mentioned patient group was the demanding patients. These patients had high expectations towards their GP. They asked for special services, for example, prolonged sickness certificates, inappropriate medication, physiotherapy or massages.

The orthopaedic surgeon had no time. He could somehow protect himself and then they end up with us and "I brought something with me what does that mean"? Than you really notice, you somehow got a ball in your goal. (Section 207, urban GP group)

Two patient categories can be summarised as high users: patients who had at least one consultation per week and patients who regularly make excessive demands on GPs time during the consultation. These patients consume a lot resources of the GP and their practice management.

So, there really are patients who are up to twenty times a quarter. [...] Well, they always have a reason. So, [...] if it's medication, medication questions, blood sampling, interpretation of results. Then they come from the specialists in order to interpret their results, because that obviously doesn't take place there. I do not know. Or [because] you want to

hear something about it again. (Section 77–79, rural GP group)

These are the ones that are actually scheduled with a quarter of an hour and that just consume 45 min regularly and where it is sometimes difficult to slow them down. Often they really have something. Sure, if it's a tumour patient, you can't him ... or if you want to discuss bullying at work for the first time, then you can't get rid of them for a moment. But there are some patients where you know in advance that they basically have nothing and still need three quarters of an hour. (Section 139, environs GP group)

Another category concerning patient's behaviour reported by the GPs were patients who proactively consult additional specialists or different GPs for the same problem. This behaviour could be also called 'doctor (s) hopping'. Patients change their GPs or other specialists until they get the desired medication or diagnosis.

Also the doctor hoppers, who had maybe seven doctors as general practitioners within a year. And say, 'Oh, we've heard so much beautiful from you'. But they say that to everyone, we know that, we all know that. (Section 174, rural GP group)

Theme 4 contained besides these predominantly demanding patients also the regular patients of the practice. GPs reported that they know many of their regular patients well and the treatment of patients with a long doctor–patient relationship is often very satisfying.

But there are also many close [patients] who have been with you for years and who actually appreciate the experience of the doctor and thus put themselves in my hand, I would also say. If you've known them for a long time, a lot actually. Where there is a good relationship of trust, where you can also say clear words, but they are not angry afterwards. (Section 155, rural GP group)

Frequencies and regional differences of patient types

The relative frequency of consultation by the 27 categories of patient types in the total sample, urban areas, environs and rural areas is shown in [table 3](#). Percentages relate to all patients seen in the practices and are averaged across all GPs interviewed, in the total sample as well as in the specified regions respectively. The most common patient types were, besides the 'regular patients of the practice' (85.2%), 'patients with a chronic illness' (57.7%) and—probably largely overlapping with this category—'patients with multimorbidity' (45.9%). In bivariate analyses, many patient types had a higher frequency in urban areas compared with rural areas. The biggest differences were found for 'patients with psychiatric disorders' (19.2% in urban areas vs 12.5% in rural areas), 'educationally disadvantaged patients with low health literacy' (15.8% vs 9.1%) and 'senior citizens living on their own without caregivers' (16.0% vs 11.2%). In contrast, 'minors accompanied by their parents' was the only patient type significantly higher stated in rural areas (3.1% vs 6.3%).

The results of the two logistic regression models are shown in the [tables 4 and 5](#). Five patient types were identified by the first stepwise backward selection to be more prevalent in urban areas than in rural areas. The highest ORs were found for 'patients with migration background and culturally different disease concepts' (OR 1.23; 95% CI 1.06 to 1.42), 'privately insured patients' (OR 1.17; 95% CI 1.05 to 1.31) and 'educationally disadvantaged patients with low health literacy' (OR 1.11; 95% CI 1.04 to 1.19). Three patient types were identified to be less prevalent in urban areas than in rural areas. These included 'minors accompanied by their parents' (OR 0.71; 95% CI 0.61 to 0.83), 'patients with poor therapy adherence' (OR 0.87; 95% CI 0.80 to 0.95) and 'patients with dementia' (OR 0.90; 95% CI 0.82 to 0.99). The second stepwise backwards selection revealed two categories being more prevalent in environs than in rural areas: 'Privately insured patients' (OR 1.10; 95% CI 1.03 to 1.18), 'patient who proactively consult additional specialists for the same problem' (OR 1.06; 95% CI 1.01 to 1.12) and one being less prevalent in environs: 'patients who are caregivers' (OR 0.91; 95% CI 0.83 to 0.99).

DISCUSSION

Main findings

We derived 27 categories of patient types from the GP focus groups. This patient types could be assigned to four themes: morbidity, sociodemographic characteristics, specific care needs and patient behaviour. GPs from urban areas deal with higher frequencies of patients with psychiatric, social and cultural problems. Furthermore, patients with low health literacy, senior citizens living alone and patients who proactively consult additional specialists were represented more often in urban areas. Only minors accompanied by their parents were more common in rural areas. The biggest difference between urban and rural areas were found in five patient types being more prevalent in urban areas and in three patient types being more prevalent in rural areas.

Strengths and limitations

As far as we know this is the first mixed-methods study exploring patient types in GP practices and quantifying and comparing the frequencies of these patient types seen in urban, environ and rural GP practices in northern Germany. In order to maximise the heterogeneity of focus group participants' experience in the qualitative part of the study, we ensured to include both male and female GPs, with longer and shorter durations of practice experience, lower and higher age, from smaller and larger practices and different types of practices from all three areas. Nevertheless, GPs who participated in the focus groups could differ from non-participants due to their motivation, practice experience and special problems from their regions. This could possibly have biased our identified patient types. However, we could include a large variety and high number of focus group participants

Table 3 Relative frequencies of the consultations by categories of patient types in GP practices divided by region^{MA}

	Total (n=210)	Urban areas (n=65)	Environs (n=74)	Rural areas (n=71)	P value (U/R)	P value (E/R)
Theme 1: Morbidity						
Patients with a chronic illness	57.7%	57.2%	57.3%	58.6%	0.662	0.680
Patients with multimorbidity	45.9%	47.4%	43.3%	47.2%	0.953	0.224
Patients with psychiatric disorders	14.7%	19.2%	12.8%	12.5%	0.002	0.839
Patients with somatoform disorders	14.4%	15.6%	14.6%	13.0%	0.175	0.464
Patients with dementia	6.4%	5.7%	7.1%	6.3%	0.549	0.417
Patients with substance abuse disorders	5.6%	7.2%	5.2%	4.5%	0.017	0.441
Theme 2: Sociodemographic characteristics						
Educationally disadvantaged patients with low health literacy	10.9%	15.8%	8.4%	9.1%	0.004	0.666
Privately insured patients	8.4%	9.3%	9.4%	6.6%	0.074	0.007
Patients with social problems due to poverty/low income	5.9%	8.7%	4.2%	5.3%	0.020	0.270
Minors accompanied by their parents	4.8%	3.1%	5.0%	6.3%	<0.001	0.139
Patients with migration background and culturally different disease concepts	3.9%	6.5%	3.0%	2.5%	<0.001	0.492
Patients with migration background and communication problems	3.5%	5.6%	2.6%	2.6%	0.002	0.962
Minors who come to consultation on their own	3.0%	2.7%	3.4%	2.8%	0.928	0.270
Theme 3: Specific care needs						
Senior citizens living on their own without caregivers	13.2%	16.0%	12.7%	11.2%	0.034	0.401
Patients with other social problems	9.2%	12.5%	7.4%	8.1%	0.021	0.579
Patients regularly needing home visits	8.7%	8.4%	8.3%	9.5%	0.370	0.277
Patients living in a nursing home	8.1%	7.8%	7.9%	8.6%	0.553	0.642
Patients who are caregivers	4.8%	5.2%	4.2%	5.0%	0.739	0.356
Struggling single parents	4.3%	4.9%	3.9%	4.2%	0.469	0.719
Theme 4: Patient behaviour						
Regular patients of the practice	85.2%	83.3%	86.0%	86.1%	0.245	0.969
Patients, who come with self-diagnoses via media	13.2%	14.1%	13.6%	11.8%	0.308	0.408
Patients with poor therapy adherence	11.3%	9.2%	12.7%	11.9%	0.135	0.722
Demanding patients	11.1%	11.0%	11.0%	11.2%	0.926	0.920
Patients who regularly make excessive demands on GPs time	7.6%	9.5%	7.6%	6.0%	0.086	0.301
Patients who proactively consult additional specialists for the same problem	6.7%	7.5%	7.8%	4.7%	0.008	0.016
Frequent attenders	6.0%	5.7%	5.4%	6.8%	0.537	0.434
Patients who proactively consult different GPs because of the same problem	2.7%	2.8%	3.0%	2.3%	0.435	0.375

Statistically significant results ($p \leq 0.05$) are shown in bold.

E/R, comparison 'environs' versus 'rural areas'; GP, general practitioner; MA, multiple answers permitted; U/R, comparison 'urban areas' versus 'rural areas'.

in our study. The GPs were exclusively from the regions of northern Germany so that the sample might possibly not represent the rest of Germany.

GP practices had been included via a quota sampling into the quantitative part of the study. 91.9% of the administrative districts in the survey area could be included and GPs of less favoured areas which are difficult to reach by public transport, were also represented in the study. We have to contact a high number of 4956

GPs which revealed a comparatively low participation rate of 4.3% interviewed GPs. In Quota sampling the participation rate is not important, however, it may still affect the representativeness of the GP population. Furthermore, we performed a comparison of the data of study participants in the included regions with the statistics of the German national association of statutory health insurance physicians.²¹ GPs participating in our study had only been slightly older (urban areas: +0.9 years; environs:

Table 4 Association between the frequencies of the consultations of categories of patient types in GP practices and urban areas versus rural areas: results of a logistic regression

Urban areas versus rural areas	OR	95% CI	P value
Minors accompanied by their parents	0.71	0.61 to 0.83	<0.001
Privately insured patients	1.17	1.05 to 1.31	0.005
Patients with poor therapy adherence	0.87	0.80 to 0.95	0.002
Senior citizens living on their own without caregivers	1.05	1.01 to 1.09	0.014
Educationally disadvantaged patients with low health literacy	1.11	1.04 to 1.19	0.001
Patients with psychiatric disorders	1.07	1.02 to 1.12	0.011
Patients with dementia	0.90	0.82 to 0.99	0.036
Patients with migration background and culturally different disease concepts	1.23	1.06 to 1.42	0.007

GP, general practitioner.

+0.4 years; rural areas: +0.6 years) and slightly more often males than the basic study population of the selected districts (urban areas: +3.6%; rural areas: +3.6%).

The identification of the patient types took place before the European refugee crisis in Germany arrived. The measurement of the frequencies of the patient types was carried out during this period (2015–2017). It can be assumed that the refugees have only slowly integrated into the general practices.²² Therefore, the patient types ‘patients with migration background and culturally different disease concepts’ and ‘patients with migration background and communication problems’ could be nowadays found more frequently in general practices. It could also affect other patient types like ‘patients with psychiatric problems’, which are frequently found in the refugee population.²³

The contributions of the GPs in the focus groups and the answers in the interviews might have been influenced

Table 5 Association between the frequencies of the consultations of categories of patients types in GP practices and environs versus rural areas: results of a logistic regression

Environns versus rural areas	OR	95% CI	P value
Patients who are caregivers	0.91	0.83 to 0.99	0.022
Privately insured patients	1.10	1.03 to 1.18	0.005
Patients who proactively consult additional specialists for the same problem	1.06	1.01 to 1.12	0.024

GP, general practitioner.

by memory gaps, errors or social desirability. The order of the questions of the focus group guideline may influenced the answers of the GPs regarding the patient types. Before we asked which kind of patients consult them most often to initiate a discussion about patient types, we asked the GPs to describe the most common reasons for consultations in their practice, for example, chronic back pain or acute infections of the respiratory tract. This could have led the discussion in a certain direction. Nevertheless, we decided the order of the questions to focus in the patient type part on patient characteristics which describes the behaviour, needs or morbidity of a group of patients and not only the reasons for consultations in general practice. Our focus group discussions were supported by at least two experienced moderators out of four (IS, NJP, HH and MS). The interviewers of the quantitative GP interviews had received substantial training and had been supervised in regular meetings throughout the entire study period to minimise the interviewer bias. Additionally, it should be noted that our study had a mixed-methods design which combined the advantages of qualitative and quantitative data.

The stepwise variable selection used for identifying significant differences between the regions reacts sensitively to differences in the distribution of the variables and it is not considered a reliable method of variable selection.²⁴ The results from these analyses therefore describe only one possible, but not necessarily the best solution. Additionally, coefficients resulting from stepwise backward selection analyses tend to be biased upwards in scale and the probability of false positive results is increased.²⁵ For this reasons, these analyses should be interpreted with care and considered as purely explorative.

Comparison with literature and discussion of results

Some studies dealt with the influence of patient characteristics on consultation length or high frequencies in general practice. Characteristics associated with a higher use of consultation frequency were among other things female sex, higher age, unemployment, poverty, living alone or isolation, but regional differences of the distribution of these patient characteristics were regularly not considered.^{26–29} Carr-Hill *et al* found higher rates of consultations for patients living in urban areas.¹⁴ whereas a study of Mukhtar *et al* did not find significant association for practice rurality status.¹³

A German study about differences in the provision of lifestyle counselling for cardiovascular disease prevention between urban and rural regions reported that rural GPs named more often a lack of adherence by the patients and urban GPs were more often confronted with patients with a migration background, communication problems and culturally different disease concepts as well.³⁰ We were able to confirm these results in our study.

GPs from urban areas more often deal with language problems and culturally different disease concepts due to higher proportions of patients with migration background in cities.^{30 31} Furthermore, GPs from urban areas

of our study reported higher frequencies of patients with psychiatric disorders. Two reviews about urban–rural differences in depression showed similar results for the most reviewed studies as well. However, studies conducted in China revealed higher prevalence of depression among rural residents.^{32 33} Breslau *et al* used a large nationally representative sample from the USA and suggest that the prevalence of mental disorders did not differ between urban and rural areas.³⁴ Other studies reported a higher prevalence of psychiatric disorders in urban areas.^{35–38} Poor mental health is associated with poverty as well as migration.^{39 40} Our previous paper about the regional differences in reasons for consultation and GPs service spectrum showed higher frequencies of social problems and psychosomatic basic care for patients in urban areas.³ This accumulation of psychosocial patient problems in urban areas represents a big challenge for urban GPs.

The here presented study found a significant negative association between urban areas and rural areas for patients with dementia. Koller *et al* reported regional variations between urban and rural patients with dementia concerning the specialist treatment after the incident diagnosis of dementia. While urban patients more often consult neurologists and psychiatrists (NPs) in the year before and after the initial dementia diagnosis, rural patients tend to contact their primary care physicians more often but NPs less often.⁴¹ This means a higher workload for rural GPs as regards the treatment of patients with dementia.

Our study revealed higher frequencies of minors accompanied by their parents in GP practices in rural areas. Another study from Germany arrived at the same result. 13.5% of family practices from major cities provided care for infants compared with 26.5% of surgeries in medium-sized towns and 37.5% in small towns or rural areas.⁴²

Implications for research and clinical practice

An analysis of the Zi-practice-panel from the Central Research Institute of Ambulatory Health Care in Germany (Zi) in 2015 showed a higher income for GPs from rural areas than urban areas in Germany. The main reason was the size of the practices. Rural GPs treated 1161 patients in the fourth quarter of 2015, while their colleagues in the city treated 1047 patients. Furthermore, the rural GPs worked 2 hours per week more than the urban GPs.⁴³ Our study also showed that the GPs from urban areas treated less patients than their colleagues from rural areas. However, they managed higher frequencies of patients with psychiatric, social and culturally problems which can be very complex and time consuming. In addition, urban GPs often just act as a providers of medical services⁸ and their patients have a lower commitment.⁴⁴ Further research is needed to explore these differences particularly related to the entire German territory.

The identified regional differences should also be included as learning content in the training of medical students and young GPs. In Germany the training of GPs is regulated by the respective regulations on continuing

medical education of the federal states.⁴⁵ This results in a great variety and legal differences in the federal states. These trainings include the identified problems as psychosomatic primary care, addiction therapy or social medicine but to our knowledge they do not focus on regional differences.⁴⁶ The Baden-Württemberg General Practice Competence Centre has developed Germany's first competence-based curriculum for general practice training assistants. GPs and the German College of General Practitioners and Family Physicians (DEGAM) were involved.⁴⁷ This curriculum does not include either the topic regional differences of patient types in general practice. Future revisions of these curricula should consider these regional differences.

Future GPs could compensate the specific needs of their patient clientele with medical training aligned with the requirements of the region. For example, the training for GPs from urban areas should put an emphasis on the treatment of patients with psychiatric, social and cultural problems. Whereas rural GPs need advanced skills regarding the care for children or in compliant patients. Generally, GPs from all regions should be better prepared to address the problems with the worst outcomes, because the differences in the frequencies of topics like psychiatric disorders, poor therapy adherence, hypochondria or drug abuse could also mean that these problems are less talked about or less identified in rural areas. Adjusting the training of GPs accordingly could facilitate a better response to these regional challenges in healthcare.

Acknowledgements We would like to express our appreciation to the numerous GPs who facilitated this study with their participation and Anne Stark for filling in as moderator of focus groups in times of need. We also like to thank Linda Krause and Eik Vettorazzi for statistical advice.

Contributors MS, IS, NJP and HH conceived and designed the study. HH, NJP and IS facilitated the focus groups and analysed qualitative data. IS analysed the quantitative data. DL, AK and HH significantly contributed to the study design and/or discussion of the study results. HH and IS drafted the manuscript. All the authors commented on the draft and read and approved the final version of the manuscript.

Funding The study was supported by the Hamburg and Schleswig-Holstein Association of Statutory Health Insurance Physicians (grant number KVHH-KVSH-2015/1). The funding body had no role in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript.

Competing interests None declared.

Patient consent for publication Not required.

Ethics approval The study was approved by the Ethics Commission of the Hamburg Medical Association on 12 August 2013 (file number PV 4535).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement No data are available. The ethics approval does not allowed data sharing.

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