Reasons for encounter and health problems managed by general practitioners in the rural areas of Beijing, China: A cross-sectional study

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Abstract

Objective

The purpose of this study was to describe the patients' reasons for encounter (RFE) and health problems managed by general practitioners (GPs) in the rural areas of Beijing to provide evidences for health services planning and GPs training.

Methods

This study was conducted at 14 community health service centers (CHSCs) in 6 suburban districts of Beijing, using a multistage sampling method. A total of 100 GPs was selected from the study sites. A self-designed data collection form was developed on the basis of Subjective-Objective-Assessment-Plan (SOAP), including patient characteristics, RFEs, health problems, interventions, and consultation length. Each GP recorded and coded their 100 consecutive patients' RFEs and health problems with the International Classification of Primary Care, 2nd version (ICPC-2). Descriptive statistics were employed to describe the distribution of RFE and health problems. Student t-test and analysis of variance were used to compare the differences of mean number of RFE or health problems per encounter by patient characteristics.

Results

A total of 10,000 patient encounters with 13,705 RFEs and 15,460 health problems were recorded. The RFEs and health problems were mainly distributed in respiratory, circulatory, musculoskeletal, endocrine, metabolic and nutritional, and digestive systems. Cough and hypertension were the most common RFE and health problem, respectively. With increased ages, the mean number of RFEs decreased and the mean number of health problems increased. Patients with Beijing medical insurance had less RFEs and more health problems than those in other cities (p<0.001). Patients who had visited the CHSC previously and signed contracts with the GP team had more health problems than those who had not (p<0.001).

Conclusions

These findings present a view of patients' demands and work contents of GPs in Beijing rural areas and can provide reference for health services planning and GPs training.

Introduction

A good primary care infrastructure is positively associated with health outcomes and negatively associated with costs on health care [1]. And there can't be a good primary care system without general practice. General practice was introduced into China in 1980s. To speed up the development of general practice and improve the quality of primary care services, a series of policies including finance support, personnel training, pharmaceutical system, and health insurance were established by the Chinese government in the past 2 decades [2–6]. In the past decade, the primary care network was mostly developed around China. Till the end of 2012, 3,3562 CHSC were established across the nation [7]. A CHSC is a primary care institution in where GPs can provide health services for local residents [8]. In the CHSC, the GP provides services in a team approach with nurses, and preventive medicine professionals. Patients are encouraged to sign a contract with one of the GP teams in CHSC. The team is responsible for providing continuous care and additional services for patients who have signed contracts [9].

Currently, China is in the transition process of health reform and primary health care plays a leading role in it. For policy and the professional education purposes, it is important to understand patients' needs and health problems in the primary care population. Patients' demands can be reflected by their reasons for encounter (RFEs) which refers to the reasons why a patient enter the health care system. Diagnoses or health problems refer to provider's assessment of patient's health problems and reflect provider's view. It was demonstrated that RFEs were the main element to impact the patient's perspective on the diagnostic process and subsequent interventions [10].

The International Classification of Primary Care (ICPC), developed by the WONCA International Classification Committee (WICC) in 1987, is a useful tool to record patient RFEs and health problems in primary care. It includes three important elements which could be provided in primary care system: reasons for encounter (RFEs), diagnoses or problems, and process of care. It has 17 chapters based on body systems, with one additional chapter for psychological problems and one for social problems [11]. Each chapter is divided into seven components. Component 1 codes symptoms and complaints, while Component 7 codes diseases. A RFE can be either a symptom (Component 1) or a disease (Component 7). A health problem usually has a disease label diagnostic title. However, if a disease-label diagnostic is not appropriate, ICPC recommends the use of the symptom itself as a diagnostic [10]. Components 2–6 deal with interventions and can be used to code an RFE which is presented as a request for an intervention. It is argued that documenting and coding the RFEs with ICPC can improve the quality of primary care data [10].

As the first city introducing general practice into Mainland China, Beijing is also one of the pilot provinces for health reform. Moreover, GPs training for rural areas had been initiated since 2012 in several cities of China. Beijing was among the first group of cities implementing this training program. Therefore, knowledge of the general practice in pilot cities like Beijing can provide reference for other provinces.

Several studies had recorded RFEs and health problems through ICPC in urban CHSCs of Beijing [12–13], while little is known about that in rural areas. Previous research suggested

that rural patients and GPs were different from their non-rural counterparts [14]. The aim of this study was to investigate patients' RFE and health problems managed by GPs in rural areas of Beijing to provide evidence for developing policies on health services planning and GPs training in rural areas.

Method

Ethics statement

This study was approved by the Ethical Committee of Capital Medical University, Beijing, China. Written informed consents were obtained from all participants involved in this study. For participants under the age of eighteen, written informed consents were obtained from their guardians. All participants were ensured that their information were kept confidential and only be used in this research.

Subjects selected and data acquisition

Multistage sampling method was adopted in this study. As the Capital of China, Beijing has 6 urban districts and 10 suburban districts. According to the Provisions on the Division of Urban and Rural Areas proposed by the National Bureau of Statistic, suburban districts are subdivided into towns and rural areas[15]. On the first stage, 6 of 10 suburban districts in Beijing were selected randomly as study sites. On the second stage, 14 rural CHSCs in these study sites were selected by purposive sampling method with the following criteria: (1) located in the rural areas, (2) stable amounts of patients, and (3) available for this study. Experts of general practice were consulted before purposive sampling. On the third stage, 100 GPs who met the following inclusion criteria were invited to participate in this survey: (1) worked in this center for 5 years or above, (2) obtained the medical license of practicing doctor, (3) obtained certificates of general practice training, and (4) are now undertaking the diagnosis and treatment work in clinical practice.

Before the investigation, a research team was established, including two research experts of general practice, two GPs and three postgraduates of general practice. After discussion, the research team developed a data collection form specifically for this study which was based on the Subjective-Objective-Assessment-Plan (SOAP), an approach of recording electronic patient record (EMR). The contents included (1) patients' socio-demographic data, (2) up to 4 reasons for encounter (RFEs) and codes, (3) diagnoses/health problems and codes, (4) interventions, and (5) the consultation length. Each participating GP was required to record the details of consecutive 100 patients' encounters during or after the consultation with the data collection forms.

The GPs were trained before the beginning of the study in terms of the purpose and contents of this survey, specifications of recording forms, and the principles of ICPC-2 coding. Training courses were conducted in the Capital Medical University. One of the research experts in our team (XL) who participated in the translation of ICPC-2 from English into Chinese in 2000, was responsible for introducing the concept and code principles of RFEs and health problems using ICPC-2 in the training courses. A book on clarification of the inclusion and exclusion for codes was distributed to each GP. The research expert also trained two postgraduates as central coders, who assumed the responsibility of supervising the whole research process. The research experts were consulted when there were any difficulties in coding.

The investigation began on December 8, 2014. The main purpose of this study was to obtain an as comprehensive spectrum of the patients' RFEs and health problems as possible. Therefore, if a patient returned for the same problem within the same week, only the first encounter was recorded. Completed forms were collected and checked by two postgraduates in the

research team. For forms with missing data, the GPs were required to record a new patient's encounter to replace it. Eventually, the survey ended on January 27, 2015.

Statistical analysis

Epidata 3.0 was used to establish the database and double-entry was performed by two post-graduates in our research team. All data analyses were carried out in SPSS for Windows 22.0. Descriptive statistics were employed to describe the number, distribution and rank of patients' RFE and health problems. Student t-test and analysis of variance were used to compare the differences of mean number of RFE or health problems per encounter according to patient characteristics.

Results

The characteristics of participating GPs

Of the 100 participating GPs, 59% were males and their mean age was 40.4±6.46 (ranging from 27 to 65) years. Most of the participating GPs (68%) obtained the education level of university. Their mean length working in rural CHSCs was 18.3±6.88 (ranging from 27 to 65) years. Detailed information on characteristics of the GPs is presented in Table 1.

Distribution of RFEs and health problems

A total of 10,000 patients encounters were recorded by 100 GPs. There were 13,705 RFEs (1.37 per encounter) and 15,460 health problems (1.55 per encounter) from 10,000 encounters. The average consultation length of each encounter was 8.1±6.98 minutes. The distribution of RFEs and health problems according to the17 chapters of the ICPC-2 are shown in Table 2. "R: Respiratory", "K: Circulatory", L: "Musculoskeletal", "T: Endocrine, metabolic and nutritional", and "D: Digestive", were among the top five chapters for both RFEs and health problems.

Table 1. Characteristics of the participating GPs.

GPs characteristic	N/%
Sex	
Male	41
Female	59
Age group	
<35 years	19
35–44 years	57
45–54 years	22
55+ years	2
Final education level	
University	68
Senior college	29
Junior college or secondary school	3
Years in current rural CHSCs	
5–9 years	15
10–19 years	39
$\geq$ 20 years	46

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Table 2. The frequencies of RFE and health problems, according to the chapters in the ICPC- 2.

ICPC-2 chapter	RFE frequencies	RFE (%) n = 13,705	ICPC-2 chapter	Health problem frequencies	Health problems (%) n = 15,460
R respiratory	3498	47.9	K circulatory	5563	36.0
K circulatory	2028	27.8	R respiratory	3846	24.9
L musculoskeletal	1065	14.6	T endocrine, metabolic and nutritional	1995	12.9
T endocrine, metabolic and nutritional	880	12.1	L musculoskeletal	1418	9.2
D digestive	806	11.0	D digestive	1014	6.6
A general and unspecified	546	7.5	A general and unspecified	476	3.1
N neurological	463	6.4	U urology	212	1.4
U urology	186	2.6	X female genital system	201	1.3
X female genital system and breast	161	2.2	S skin	178	1.2
P psychological	117	1.6	P psychological	148	1.0
S skin	79	1.1	N neurological	126	0.8
F eye	79	1.1	F eye	110	0.7
B blood, blood forming organs, lymphatics, spleen	32	0.4	Y male genital system	80	0.5
Y male genital system	32	0.4	B blood, blood forming organs, lymphatics, spleen	51	0.3
H ear	22	0.3	W pregnancy, childbirth, family planning	23	0.2
Z social problems	36	0.1	H ear	19	0.1
W pregnancy, childbirth, family planning	3	0.0	Z social problems	0	0
Total	13,705	100	Total	15,460	100

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Top 30 recorded RFEs and health problems managed by rural GPs

Tables 3 and 4 present the top 30 RFEs and health problems recorded, respectively. In this part, we referred to BEACH (Bettering the Evaluation and Care of Health) program of Australia [16]. Code groups were used to analyze the reasons for encounter and problems managed, which means some RFEs and health problems include multiple ICPC-2 codes. For example, "Abdominal pain" includes D01, Abdominal pain/cramps, general, D02, Abdominal pain, epigastric, and D06, Abdominal pain, localized, other. "Hypertension" includes K86, uncomplicated hypertension, and K87, complicated hypertension. In this study, we distinguished the prescription refill and follow up encounter. The former referred to prescription as the only reason for encounter. When patients visited the CHSCs with requests for other intervention for an already existing health problem except for prescription, then the RFE of this encounter was defined as follow up encounter.

The top 30 RFEs accounted for 73.6% of all RFEs, most of which were symptom descriptions such as cough, fever, or throat symptoms/complaint. Cough was the most common RFE, accounting for 13.4% of the total RFEs. The results showed that prescription refill for chronic diseases accounted for a high proportion.

Table 4 presented the top 30 health problems, which accounted for 89.8% of all health problems. Chronic diseases, including hypertension, diabetes, ischaemic heart disease, and cerebrovascular diseases, accounted for almost half of total health problems (44.6%). Acute upper respiratory infection was the second health problem.

Table 3. The top 30 RFEs in descending order of frequency.

Order	ICPC-code	Patient reason for encounter	Frequencies	RFEs (%) n = 13,705	Cumulative %
1	R05	**Cough**	1,841	13.4	13.4
2	K50	**Prescription refill for hypertension**	1685	12.3	25.7
3	R21	**Throat symptom/complaint**	1,101	8.0	33.7
4	T50	**Prescription refill for diabetes**	785	5.7	39.4
5	R07	**Sneezing/nasal congestion**	772	5.7	45.1
6	A03	**Fever**	440	3.2	48.3
7	N17	**Vertigo/dizziness**	388	2.8	51.1
8	R25	**Sputum/phlegm abnormal**	385	2.8	53.9
9	K50	**Prescription refill for ischaemic heart disease**	249	1.8	55.7
10	D01, D02, D06	**Abdominal pain***	231	1.7	57.4
11	T50	**Prescription refill for lipid disorder**	189	1.4	58.8
12	D03	**Heartburn**	186	1.4	60.2
13	L02, L03, L86	**Back complaint***	177	1.3	61.5
14	P06	**Sleep disorders**	149	1.1	62.6
15	N01	**Headache**	143	1.0	63.6
16	L15	**Knee symptom/complaint**	142	1.0	64.6
17	-30, -31	**Check up- all***	124	0.9	65.5
18	D08	**Flatulence/gas/belching**	113	0.8	66.3
19	U02	**Urinary frequency/urgency**	107	0.8	67.1
20	K04	**Palpitations/awareness of heart**	106	0.8	67.9
21	K50	**Prescription refill for cerebrovascular disease**	96	0.7	68.6
22	L14	**Leg/thigh symptom/complaint**	84	0.6	69.2
23	U01	**Dysuria/painful urination**	83	0.6	69.8
24	D18	**Change in faeces/bowel movement**	81	0.6	70.4
25	L20	**Joint symptom/complaint NOS**	81	0.6	71
26	K02	**Pressure/tightness of heart**	77	0.6	71.6
27	K63	**Follow-up encounter for Hypertension**	74	0.5	72.1
28	K63	**Follow-up encounter for Ischaemic heart disease***	71	0.5	72.6
29	L04	**Chest symptom/complaint**	71	0.5	73.1
30	R03	**Wheezing**	67	0.5	73.6
Total	-	-	10,098	73.6	-

* Include multiple ICPC-2 codes.

The RFEs of patients with common health problems

For patients with only one health problem, acute hypertension, upper respiratory infection, and diabetes were the top three diagnoses. To understand how RFEs related to health problems, we described the top 5 RFEs of patients with these three problems. Table 5 showed that symptoms were main RFEs in acute upper respiratory infection, while reasons like prescription refill and follow up were dominant in hypertension and diabetes.

Number of RFEs and health problems per encounter and their distribution for patient characteristics

Table 6 shows the mean number of RFEs and health problems per encounter. The majority of patients (70.3%) presented the CHSCs with only one RFE. Patients who had only one health problem accounted for 59.1%.

Table 4. Top 30 health problems in descending order of frequency.

Order	ICPC-code	Health problems	Frequencies	Health problems (%) n = 15,460	Cumulative %
1	K86, K87	**Hypertension***	3529	22.8	22.8
2	R74	**Upper respiratory infection, acute**	2287	14.8	37.6
3	T89, T90, W85	**Diabetes-all***	1511	9.8	47.4
4	K74, K76	**Ischaemic heart disease***	1167	7.6	55.0
5	K89, K90, K91	**Cerebrovascular disease***	677	4.4	59.4
6	L89, L90, L91	**Osteoarthrosis***	604	3.9	63.3
7	T93	**Lipid disorder**	421	2.7	66.0
8	A90	**No disease**	418	2.7	68.7
9	D87	**Stomach function disorder**	414	2.7	71.4
10	R77	**Laryngitis/tracheitis, acute**	387	2.5	73.9
11	R78	**Acute bronchitis/bronchiolitis**	362	2.3	76.2
12	L84, L86	**Back syndrome***	236	1.5	77.7
13	R76	**Tonsillitis, acute**	202	1.3	79.0
14	R83	**Respiratory infection, other**	201	1.3	80.3
15	R79	**Chronic bronchitis**	147	1.0	81.3
16	L83	**Neck syndrome**	130	0.8	82.1
17	L95	**Osteoporosis**	127	0.8	82.9
18	D84	**Oesophagus disease**	122	0.8	83.7
20	U70, U71	**Urinary tract infection***	121	0.8	84.5
19	D85, D86	**Peptic ulcer***	118	0.8	85.3
21	D12	**Constipations**	110	0.7	86.0
22	P06	**Sleep disturbance**	88	0.6	86.6
23	A80	**Trauma/injury NOS**	79	0.5	87.1
24	R80	**Influenza**	70	0.5	87.6
25	Y85	**Benign prostatic hypertrophy**	70	0.5	88.1
26	X88	**Fibrocystic disease breast**	57	0.4	88.5
27	R81	**Pneumonia**	56	0.4	88.9
28	D82	**Teeth/gum disease**	52	0.3	89.2
29	X84	**Vaginitis/vulvitis NOS**	52	0.3	89.5
30	L87	**Bursitis/tendinitis/synovitis NOS**	47	0.3	89.8
Total	-	-	13, 862	89.8	-

* Include multiple ICPC-2 codes.

Table 7 presents the difference of mean number of RFEs and health problems per encounter classified by patient characteristics. With the increase of ages, the mean number of RFEs decreased and the mean number of health problems increased. Patients aged 14 or below had more RFEs and less health problems than other age groups. Patients with medical insurance in Beijing had less RFEs and more health problems than those in other cities (p<0.001). Patients for the first time to this center had more RFEs and less health problems than patients who had visited to this center previously (p<0.001). Patients who had signed contracts with the GPs team had more health problems than those who had not (p<0.001).

Discussion

To optimize primary health care and improve the service quality, it is necessary to know whom we are seeing and why they see us [17]. Health providers in general practice should not only be directed at health problems but also be responsive to patients' need [18]. In this study,

Table 5. Top 5 RFEs for patients with top 3 common health problems.

Hypertension	N	%
K50 Prescription refill for hypertension	765	66.8
K63 Follow-up encounter for hypertension	175	14.8
N17 Vertigo/dizziness	107	9.0
K25 Fear of hypertension	13	1.1
K29 Cardiovascular symptom/complaint, other	11	0.9
Total top 5	1071	92.6
Total	1184	100
Acute upper respiratory infection	N	%
R05 Cough	581	36.5
R21 Throat symptom/complaint	327	20.5
R07 Sneezing/nasal congestion	297	18.6
A03 Fever	182	11.4
R50 Request for medications	85	5.3
Total top 5	1472	92.3
Total	1593	100
Diabetes	N	%
T50 Prescription refill for diabetes	369	78.5
Follow-up encounter for diabetes	68	14.5
T01 Excessive thirst	13	2.8
T02 Excessive appetite	5	1.1
U02 Urinary frequency/urgency	4	0.9
Total top 5	459	97.7
Total	470	100

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both RFEs and health problems managed were recorded and coded to reflect the needs of rural population as well as the work contents of GPs in rural areas of Beijing.

The distribution of RFEs and health problems

The results showed that GPs in rural areas served patients from all age groups. The RFEs and health problems were distributed in almost all organs and body systems. The health problems managed by GPs included both acute and chronic problems. These reflected the comprehensive characteristic of general practice. However, psychological problems in this study were not as common as other populations. A study conducted in a tertiary hospital found that psychological problem accounted for 12.5% and depression was the fifth diagnosis [19]. Studies conducted in primary care of other countries also found a higher proportion of psychological problems [20–23]. One of the explanations might be the lack of knowledge on psychological symptoms and problems for patients and GP in rural areas. In ICPC-2, chronic alcohol abuse and tobacco abuse belong to psychological chapter. However, almost no one came the CHSC for these reasons and no related diagnoses were made by GPs. Moreover, it might be related to different cultural backgrounds. In Chinese culture, many patients with psychological or psychiatric problems are still associated with stigma, especially in relatively poor rural areas. Even though patients have psychological symptoms, they may not go to consult the GPs. This finding implied that the whole-person care of general practice was not achieved in rural areas of Beijing in terms of mental health. It revealed that GPs should recognize and pay attention to patients' potential psychological complaints. Training on psychological problems should be strengthened in the future.

Table 6. Numbers of RFEs and health problems per encounter.

Number of RFEs	Number of encounters	%	Number of health problems	Number of encounters	%
No RFE	0	0	No disease	418	41.8
One RFE	7029	70.3	One problem	5914	59.1
Two RFEs	2303	23.0	Two problems	2424	24.3
Three RFEs	602	6.0	Three problems	866	8.7
Four RFEs	66	0.7	Four problems or above	378	3.8
Total	10, 000	100	Total	10, 000	100

Note: RFEs—reasons for encounter.

The common RFEs and health problems

The similarities in common RFEs and health problems were found between our study and other populations, especially in RFEs [23–26]. Examples included cough, fever, throat symptoms/complaints, headache, and back complaints. Although cough was the most common RFE, we found that hypertension was the most common health problem. This was not contradictory. In this study, we collected up to 4 RFEs presented by patients and all health problems diagnosed by GPs. The health problems included both existing illnesses and new diagnoses.

Table 7. Mean number of RFE and health problems per encounter by patient characteristics.

Patient Characteristics	N	Mean number of RFE (95% CI)	P value	Mean number of health problems (95% CI)	P value
Sex[a]			0.515		0.618
Male	4746	1.32 (1.31–1.34)		1.51(1.48)	
Female	5235	1.32 (1.30–1.34)		1.50(1.54)	
Age groups[a]			0.000*		0.000*
0–14 years	307	1.66 (1.57–1.75)		1.11 (1.06–1.16)[§]	
15–24 years	221	1.44 (1.36–1.51)[†]		1.01 (0.94–1.08)[§]	
25–44 years	1802	1.36 (1.37–1.39)[†]		1.24 (1.20–1.27)	
45–59 years	3613	1.28 (1.27–1.30)[‡]		1.48 (1.46–1.51)	
60 years or above	4014	1.30 (1.29–1.32)[‡]		1.70 (1.67–1.73)	
Medical insurance location[a]			0.001*		0.000*
Beijing	9354	1.32(1.31–1.33)		1.51 (1.49–1.53)	
Other provinces	230	1.46(1.38–1.55)		1.16(1.07–1.25)	
Is it the first time to this center?[a]			0.000*		0.000*
Yes	689	1.42(1.37–1.46)		1.17 (1.12–1.23)	
No	9046	1.32(1.30–1.33)		1.53 (1.51–1.55)	
Whether sign contracts with the GP team?[a]			0.131		0.000*
Yes	5892	1.33(1.31–1.34)		1.66 (1.63–1.68)	
No	3807	1.31(1.29–1.33)		1.27 (1.24–1.29)	

[a]The missing data was removed.

*There was statistically significant difference.

[†]There was no statistically significant difference between the 15–24 years group and the 25–44 years group, p>0.05.

[‡]There was no statistically significant difference between the 45–59 years group and the 60 years or above group, p>0.05.

[§]There was no statistically significant difference between the 0–14 years group and the 15–24 years group, p>0.05. Unless otherwise indicated, there was statistically significant difference for mean number of RFE and health problem per encounter between each two age groups.

For example, some patients visit the CHSC for cough or other reasons, but he might be diagnosed with hypertension previously.

Like other populations, chronic non-communicable diseases, e.g. hypertension, diabetes, were common problems managed by rural GPs [25–26]. Corresponding to a high proportion of chronic diseases, prescription refill was a very common RFE in this study. This finding was consistent with a study conducted in urban areas of Beijing [27]. It revealed a special phenomenon that GPs both in urban and rural areas spent a large amount of time on prescription refill for patients. There may be some reasons for this phenomenon. On the one hand, CHSCs have implemented standardized chronic disease management since recent years and most patients with chronic diseases can be managed within general practice by GPs [28]. On the other hand, according to the Regulation of Prescription Management issued by the Ministry of Health and policies of medical insurance, to improve the quality of prescription and ensure the safety of patients, patients with chronic diseases have to renew medications for chronic diseases every two weeks or one month [29].

The mix nature of acute onset diseases was found in our study. Acute onset diseases in the primary care setting consist of two categories: 1) major acute diseases that threaten life expectancy and lasting functioning (for example: MI; pulmonary embolism), and 2) self-limiting illness (for example: cough; URTI; gastro-enteritis; low back pain). For acute diseases, early diagnosis and intervention are important. While for self-limiting illness, the emphasis is on health education, and a restraint approach, avoiding over-prescribing (antibiotics, pain medication) and medicalization.

When prescription or follow-up become the main content of GPs' daily work, we may concern that their treatment of acute onset diseases may be hindered or limited. On the one hand, the consultation length will be greatly shortened. Jin GH found that the media consultation length was only 2.0 minutes in CHSC. Even for patients with symptoms, the consultation length was only 3.0 minutes. Moreover, he found that the physical examination and history taking provided by GPs were reduced [27]. This might affect the service quality. On the other hand, when GPs spent most of their time on prescription and follow-up for chronic diseases, they may lose their ability to deal with acute onset diseases.

We further described the top 5 RFEs of common health problems. The results presented us the variation RFEs between various health problems. It confirmed the conclusion that symptoms were the main RFEs in URTI, while prescription refill and follow up were main RFEs in chronic diseases like hypertension and diabetes. These findings were of great significance. Because patients visiting the CHSC for the same health problem might have different reasons to consult, this may lead to different response and management from the GPs [18]. We found that although a high prevalence of chronic illnesses existed in this population, follow up encounter was much fewer than prescription refill in management of these diseases. It is worthy of our attention that GPs should not only repeat prescription for patients with chronic diseases. They have more important roles in the management of these diseases, such as monitoring disease progress and offering the best treatment regime to these patients.

The difference in number of RFEs and health problems among patients with different characteristics

Another finding was that patients of different characteristics had differences in demands for health care and co-morbid problems. With the age increases, patients have less RFEs but more health problems. It was consistent with previous study that older patients had more health problems per visit than younger ones [30]. It suggested that co-morbid problems were more common in older patients.

We also found that patients without Beijing medical insurance had more RFEs but less health problems than those who had Beijing medical insurance. It might be related to the health care seeking behavior. A study found that the ratio of health care seeking behavior among migrants without Beijing medical insurance was lower than Beijing local residents [31]. Although the coverage rate of medical insurance is high in China, it is nearly impossible to transfer insurance relations between different cities. Patients without Beijing medical insurance have to pay the medical expense at their own when visit the community health centers in Beijing, which may result in more barrier to access health care even though they have more demands. Therefore, patients without Beijing medical insurance should be paid more attention in the future policy making process. For example, making the medical insurance interchangeable among different provinces and cities may be a solution to this problem.

Patients who had visited their primary care center previously and signed contracts with GPs team tended to have more health problems than those not. Two reasons can be used to explain these results. On the one hand, GPs are more familiar with the health situations of the patients they managed and those who visited them frequently. On the other hand, patients with multiple health problems returned to see the GPs more frequently than patients with fewer problems. It revealed the importance of continuous care provided by GPs for patients with multiple health problems.

Strengths and limitations

China is in the process of health reform focusing on primary care. Many provinces of China, including Beijing, are implementing the GPs training programs in rural areas. This study presented the situation of general practice in rural areas of Beijing, which could provide important evidence for policy making and GPs training.

However, there were limitations in this study. First, limited by the conditions, purposive sampling was used when selecting rural CHSCs, which may have lead to bias. However, the sample selection strictly followed the inclusion criteria and 6 out of 10 suburban districts in Beijing were selected randomly. Therefore, we think this study could represent the work status of GPs in rural areas of Beijing. Second, this survey was conducted in winter season and the short duration of this investigation could not provide a longitudinal data. A high proportion of URTI may be related to the season to some extent. To reduce this bias, we plan to collect data of other seasons in the future study.

Conclusion

The current study presented patients' reasons for encounter and health problems managed by GPs in rural areas. GPs in rural areas of Beijing managed a range of health problems almost distributed in all body system and all age groups, which reflected the comprehensive care provided by GPs in some degree. However, psychological problems were not as common as other populations, which is worthy of the attention of GPs. Chronic diseases were common health problems among this population. Except for repeat prescription, GPs play more important roles in management of these diseases, such as monitoring disease progress and offering the best treatment regime to these patients.

As Chinese government is implementing the primary care reform, the data is helpful to understand the patient needs and work contents of GPs in rural areas as well as provide more evidence for the development of primary care.

Supporting information

S1 File. Date set on 100 patient encounters of a GP.
(SAV)

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References

1. Starfield B, Shi L. Policy relevant determinants of health: an international perspective. HEALTH POLICY. 2002; 60(3):201–18. PMID: 11965331

2. National Development and Reform Commission, Opinions of the CPC Central Committee and the State Council on deepening the healthcare system reform [in Chinese]. 2009. http://www.nhfpc.gov.cn/bgt/s9507/200904/98b45a278bcb4176a77b61bae4da34c6.shtml.

3. State Council. Guiding Opinions of the State Council on the Establishment of General Practice Medicine [in Chinese]. 2011. http://www.gov.cn/zwgk/2011-07/07/content_1901099.htm

4. National Health and Family Planning Commission of the People's Republic of China. National Rural Doctors Education Schedule (2011–2020) [in Chinese]. 2013. http://www.nhfpc.gov.cn/zwgk/jdjd/201310/5cbf07ab592147a58e17a4a9968cae08.shtml.

5. Min L, Qingping X, Xingzhou W. Theory construction and practical exploration on rural health personnel training model [in Chinese]. Chinese Journal of Medical Education. 2014; 34(5):673–5.

6. Wang HH, Wang JJ, Zhou ZH, Wang XW, Xu L. General practice education and training in southern China: recent development and ongoing challenges under the health care reform. Malays Fam Physician. 2010; 8(3):2–10.

7. National Health and Family Planning Commission of the People's Republic of China, 2013 China Health Statistics Yearbook of China [in Chinese].2013. http://www.nhfpc.gov.cn/zwgk/tjnj1/ejlist.shtml.

8. Ministry of Health and National Administration of Chinese Traditional Medicine. Basic standards of urban community health service center and station [in Chinese].2006. http://www.gov.cn/zwgk/2006-08/10/content_359200.htm.

9. National Health and Family Planning Commission of the People's Republic of China.Notice on the issuance of guidance for general practitioners contracting severices [in Chinese].2016. http://www.nhfpc.gov.cn/tigs/s3577/201606/e3e7d2670a8b4163b1fe8e409c7887af.shtml.Accessed 25 May 2017.

10. Soler Jean Karl, Okkes Inge. Reasons for encounter and symptom diagnoses: a superior description of patients' problems in contrast to medically unexplained symptoms (MUS).Fam Prac,2012; 29:272–282

11. Wonca International Classification. ICPC-2: International Classification of Primary care. 2nd. Oxford, UK: Oxford University Press; 1998.

12. Wun Y, Lu X, Liang W, Dickinson J. The work by the developing primary care team in China: a survey in two cities. FAM PRACT. 2000; 17(1):10–5. PMID: 10673482

13. Shao S, Zhao F, Wang J, Feng L, Lu X, Du J, et al. The ecology of medical care in Beijing. PLOS ONE. 2013; 8(12):e82446. https://doi.org/10.1371/journal.pone.0082446 PMID: 24340029

14. Blankfield Robert P., Goodwin Meredith, Jaen Carlos R., Stange Kurt C.. Addressing the Unique Challenges of Inner-City Practice: a Direct Observation Studyof Inner- City, Rural, and Suburban Family Practices. Journal of Urban Health: Bulletin of the New York Academy of Medicine. 2002; 79(2):173–85.

15. National Bureau of Statistics of the People's Republic of China. Provisions on the Division of Urban and Rural Areas [in Chinese]. 2015. http://www.stats.gov.cn/tjsj/tjbz/tjyqhdmhcxhfdm/2015/11.html.

16. Britt Helena, Miller Graeme C, Bayram Clare, Henderson Joan, Valenti Lisa, Harrison Christopher, et al. A decade of Australian general practice activity 2006–07 to 2015–16. Sydney: Sydney University Press;2016.

17. Dawes M. Symptoms, reasons for encounter and diagnoses. Family practice is an international discipline. FAM PRACT. 2012; 29(3):243–4. https://doi.org/10.1093/fampra/cms018 PMID: 22421059

18. Olde HT, van Ravesteijn H, Lucassen P, van Boven K, van Weel-Baumgarten E, van Weel C. Why the 'reason for encounter' should be incorporated in the analysis of outcome of care. Br J Gen Pract. 2011 Dec; 61(593): e839–e841. https://doi.org/10.3399/bjgp11X613269 PMID: 22242223

19. Zhou ZH, Huang WJ, Chen SY, Guo JZ, Jin SH. Patient Reasons for Encounter and Problems Managed at A General Practice Clinic Affiliated to A Tertiary Hospital. Chinese General Practice [in Chinese]. 2012; 15(8B):2652–5.

20. Moth G, Olesen F, Vedsted P. Reasons for encounter and disease patterns in Danish primary care: Changes over 16 years. SCAND J PRIM HEALTH. 2012; 30(2):70–5.

21. Takeshima T, Kumada M, Mise J, Ishikawa Y, Yoshizawa H, Nakamura T, et al. Reasons for encounter and diagnoses of new outpatients at a small community hospital in Japan: an observational study. International Journal of General Medicine.2014, 7: 259–69. https://doi.org/10.2147/IJGM.S62384 PMID: 24940078

22. Rosendal M, Vedsted P, Christensen KS, Moth G. Psychological and social problems in primary care patients—general practitioners' assessment and classification. SCAND J PRIM HEALTH. 2013; 31(1):43–9.

23. Soler JK, Okkes I, Oskam S, van Boven K, Zivotic P, Jevtic M, et al. An international comparative family medicine study of the Transition Project data from the Netherlands, Malta and Serbia. Is family medicine an international discipline? Comparing incidence and prevalence rates of reasons for encounter and diagnostic titles of episodes of care across populations. FAM PRACT. 2012; 29(3):283–98. https://doi.org/10.1093/fampra/cmr098 PMID: 22308182

24. Okkes IM, Polderman GO, Fryer GE, Yamada T, Bujak M, Oskam SK, et al. The role of family practice in different health care systems: a comparison of reasons for encounter, diagnoses, and interventions in primary care populations in the Netherlands, Japan, Poland, and the United States. J Fam Pract. 2002; 51(1):72–3. PMID: 11927068

25. Katz A, Halas G, Dillon M, Sloshower J. Describing the content of primary care: limitations of Canadian billing data. 2012; 13(1):7.

26. Bindman AB, Forrest CB, Britt H, Crampton P, Majeed A. Diagnostic scope of and exposure to primary care physicians in Australia, New Zealand, and the United States: cross sectional analysis of results from three national surveys. BMJ. 2007; 334(7606):1261. https://doi.org/10.1136/bmj.39203.658970.55 PMID: 17504790

27. Jin G, Zhao Y, Chen C, Wang W, Du J, Lu X. The Length and Content of General Practice Consultation in Two Urban Districts of Beijing: A Preliminary Observation Study. PLOS ONE. 2015; 10(8):e135121.

28. Gao GY, Han YL, Zhu ZF, Cui B, Wang LS. Study on the effective of the drugs zero-profit in Beijing township health center [in Chinese]. Chinese Hospitals.2009, 13(7):21–25.

29. National Health and Family Planning Commission of the People's Republic of China.Management of Drug and Prescription.2004. http://www.nhfpc.gov.cn/zwgkzt/wsbysj/200804/18354.shtml.

30. John WB, Terry HH, Rodney E, Kurt CS, Marlon M, Marguerite E et al. How Many Problems Do Family Physicians Manage at Each Encounter? A WReN Study. Ann Fam Med. 2004; 2(5): 405–410. https://doi.org/10.1370/afm.94 PMID: 15506571

31. Lu Y. Test of the "healthy migrant hypothesis": a longitudinal analysis of health selectivity of internal migration in Indonesia. Soc Sci Med 67: 1331–1339. https://doi.org/10.1016/j.socscimed.2008.06.017 PMID: 18639967