


# BMJ Open Factors influencing the prescription pattern of essential medicines from the perspectives of general practitioners and patients: a qualitative study in China

Xiaolei Chen <sup>1</sup>, Tiancheng Zhang,<sup>1</sup> Huanling Wang,<sup>2</sup> Zhengwen Feng,<sup>1</sup> Guanghui Jin,<sup>1</sup> Shuang Shao,<sup>1</sup> Juan Du<sup>1</sup>

**To cite:** Chen X, Zhang T, Wang H, *et al.* Factors influencing the prescription pattern of essential medicines from the perspectives of general practitioners and patients: a qualitative study in China. *BMJ Open* 2022;**12**:e055091. doi:10.1136/bmjopen-2021-055091

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2021-055091>).

SS and JD contributed equally.

Received 05 July 2021

Accepted 07 March 2022



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

<sup>1</sup>School of General Practice and Continuing Education, Capital Medical University, Beijing, China

<sup>2</sup>Department of General Practice, Shuangjing Community Health Service Center, Chaoyang District, Beijing, China

## Correspondence to

Professor Juan Du; [cuckoo@ccmu.edu.cn](mailto:cuckoo@ccmu.edu.cn) and Professor Shuang Shao; [shaoshuang@ccmu.edu.cn](mailto:shaoshuang@ccmu.edu.cn)

## ABSTRACT

**Objectives** This qualitative study aimed to explore the factors influencing the prescription patterns of essential medicines (EMs) from the perspectives of general practitioners (GPs) and patients in Beijing, China.

**Design** The qualitative study was conducted using individual in-depth interviews.

**Setting** This study was conducted from January to August 2020, in community health service centres (CHSCs) across six urban districts of Beijing, China.

**Participants** A total of 17 GPs from 17 CHSCs in 6 urban districts and 22 patients with non-communicable diseases from three CHSCs in the three urban districts of Beijing were recruited using the purposive sampling method and a three-stage sampling strategy, respectively.

**Results** Five major themes were identified among factors influencing the prescription pattern of EMs: (1) efficacy and safety of medicines, (2) prescription recommendations from physicians in tertiary or secondary hospitals, (3) patients' medication preference, (4) financial status of patients and (5) minimum requirement for the prescription of EMs.

**Conclusion** The findings of this study contribute to our understanding of the factors influencing the prescription patterns and utilisation of EMs from the perspectives of GPs and patients, respectively. Policymakers should implement policies and measures to promote the National Essential Medicines System in China.

## BACKGROUND

Medicine plays an important role in preventing diseases, reducing pain and saving lives.<sup>1</sup> Due to the lack of medicine, millions of people worldwide experience illness, disability and death.<sup>2</sup> To address this, WHO proposed the concept of essential medicines (EMs) in 1975.<sup>3</sup> EMs are those that satisfy the priority healthcare needs of the population and have sufficient supply, show efficacy and safety and comparative cost-effectiveness.<sup>4</sup> By 2017, at least 137 countries worldwide, including high-income and low-income and middle-income countries, had established their own National Essential Medicines System (NEMS).<sup>5</sup> In

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ To the best of our knowledge, this study was the first to qualitatively explore the factors affecting the prescription patterns of essential medicines.
- ⇒ The individual in-depth interviews made it possible to discover more hidden information.
- ⇒ Since this was a qualitative study, the results were considered as preliminary.
- ⇒ Participants in our study were selected exclusively from urban districts of Beijing, which limits the generalisability of our results.

response to WHO's appeal, China joined the WHO Essential Medicines Action Plan and committed to initiating the NEMS in 1979.<sup>6</sup> On account of major issues associated with medication distribution, storage, usage, pricing and supervision, the use of EMs in the low-income and middle-income countries remains suboptimal.<sup>7</sup> Compared with an average of 18% in the Organization for Economic Co-operation and Development countries, medications accounted for 20%–60% of health spending in low-income and middle-income countries, and up to 90% of people purchase medicine through out-of-pocket payments in low-income and middle-income countries.<sup>8</sup> Between 1995 and 2008, 40%–60% of Chinese households' out-of-pocket healthcare expenditures were related to the purchase of medicine.<sup>9</sup> The total health expenditure of China accounted for 5.15% of the gross domestic product (GDP) in 2009,<sup>10</sup> while medications accounted for 43.6% of the average medical costs for inpatients and 51.5% for outpatients.<sup>11 12</sup>

To provide affordable and equitable healthcare for the public, the Chinese government has established a medical security system, including basic medical insurance systems as the backbone, medical aid system as a safety net for the poor and a commercial

medical insurance system as supplementary. The basic medical insurance systems include Urban Employee Basic Medical Insurance (UEBMI, launched in 1998), the New Rural Cooperative Medical Scheme (NRCMS, launched in 2003) and the Urban Resident Basic Medical Insurance (URBMI, launched in 2007). In 2016, NRCMS and URBMI were integrated as the Urban-Rural Resident Basic Medical Insurance Scheme (URRBMI).<sup>13 14</sup> The medical aid system provides double benefits to the poor; this includes subsidising their enrolment in basic medical insurance and providing cash assistance to reimburse their medical expenditures.<sup>15</sup> As a supplement to the basic medical insurance system, commercial medical insurance covers out-of-pocket medical expenses after reimbursement by the basic medical insurance, as well as various insurance products beyond the coverage of basic medical insurance, such as the medical second option, advanced registration and VIP ward reimbursement.<sup>16</sup>

In 2010, approximately 92% of the Chinese population was covered by the basic medical insurance system,<sup>17</sup> and by 2020, this proportion increased to 97%.<sup>18</sup> However, several problems with the medical insurance system have led to high out-of-pocket medical expenses among patients in China. First, medical insurance reimbursement only covers inpatient medical expenses in most provinces. Second, health insurance deductibles (ie, an amount of money that an insured person pays out of pocket before the medical insurance begins paying the covered medical services) have been set up for each type of medical insurance, including UEBMI, URRBMI and commercial medical insurance. Finally, some medications are not covered by the basic medical insurance system (eg, some imported medications for cancer treatment)<sup>19</sup>; moreover, only 6.9% of people purchased commercial medical insurance in China in 2013.<sup>20</sup>

To further improve the availability, affordability and rational use of medicine, the State Council of China officially established the NEMS in 2009<sup>21</sup> and issued the National Essential Medicines List 2009 (NEML), containing 205 generic medicines and 102 traditional Chinese medicines.<sup>22</sup> Moreover, several strategies have been proposed by the government to improve the quality of EMs, such as assessment of the consistency of quality and efficacy between generic and original medications, optimisation of the manufacturing process, improvement of the quality of excipient and packaging material and establishment of strict drug approval procedures (eg, generic medicine needs to be bioequivalent to the original in order to be approved).<sup>23</sup> Meanwhile, drugs can be removed from and added to the NEML due to the changing pattern of drug usage. The NEML was also modified in several ways, including: (1) the random selection of evaluation experts from a bevy of experts on EMs, (2) a list of candidate medicines was established according to the results of evidence evaluation and pharmacoeconomics, (3) the NEML was determined through a voting process by experts and (4) the released NEML was approved by the National Essential Medicines

Committee.<sup>24</sup> The NEML was revised eight times, and the latest version implemented in 2018 included 417 types of generic medicines and 268 types of traditional Chinese medicines.<sup>25</sup> Compared with NEML 2012, 22 types of medicines were removed and 187 were added in the NEML 2018.<sup>26</sup>

NEMS was implemented in primary healthcare institutions (PHCIs) after the first stage of 'China's medical and pharmaceutical system reform'.<sup>27</sup> All government-run PHCIs, including community health service centres (CHSCs)/stations, township health centres and village clinics, were required to stock and prescribe EMs.<sup>21</sup> A series of supporting policies targeting medicine price regulation and control were launched, such as the province-based competitive bidding system for medications,<sup>13</sup> zero-markup drug policy for all chemical medicines<sup>28</sup> and the national centralised drug procurement policy.<sup>29</sup> Previous studies have revealed that the implementation of the NEMS has successfully reduced costs<sup>30</sup> and improved the rational use of medicine.<sup>9 31</sup> However, some issues still restrict the use of EMs in China, such as low awareness and mistrustful attitudes towards EMs by patients,<sup>9</sup> and fewer EMs prescribed in higher-level hospitals than in PHCIs.<sup>32</sup>

As the capital of China, Beijing was one of the first cities to implement the NEMS, and by the end of March 2010, a total of 324 CHSCs had implemented this system. All CHSCs were required to stock EMs, and these were used as the first-line of treatment to achieve a designated level of utilisation.<sup>33</sup> Different hospitals in Beijing were required to reach the required ratios of EM prescription amid all medications ( $\geq 25\%$  for tertiary hospitals,  $\geq 30\%$  for secondary hospitals and  $\geq 50\%$  for PHCIs), but the required ratios were lower than those in other provinces across China.<sup>34-36</sup> In essence, as providers and recipients of EMs, the choice of medication by doctors and patients may influence the prescription pattern of EMs. Therefore, to increase the proportion of EM prescriptions and improve the rational use of medicine in Beijing, the factors that affect general practitioners' (GP) decision to prescribe EMs and patients' selection of EMs must be explored. The results could help identify the obstacles in the prescription of EMs and develop targeted intervention measures to regulate the rational use of EMs.

## METHODS

### Study design

A qualitative approach was adopted for this study, as this method can be used to evaluate individual inner feelings and discover hidden information.<sup>37</sup> This approach enabled the researchers to ask open-ended questions and explore the factors influencing EM prescription patterns. The qualitative semi-structured interview guidelines for GPs and patients were developed based on the existing literature and research objectives. Pilot tests were separately conducted by five GPs with five patients to assess the readability, reasonableness and understandability of the

interview guidelines. Methods were reported according to the criteria of the Consolidated criteria for Reporting Qualitative research-32 checklist.<sup>38</sup>

### Research team

The research team consisted of a professor, an associate professor, a lecturer in general practice, three graduate students and a GP. The interviewer and researchers had previous experience in conducting qualitative research. Participants were informed of the purpose and procedure of the study.

### Participants and recruitment

Purposive sampling was used to select 17 GPs from 17 CHSCs across 6 urban districts of Beijing. All GPs invited to participate in our study were included in the interviews, and the response rate was 100%. With the recommendation of managers in the selected CHSCs, GP interviewees who met the inclusion criteria were invited to participate in this research. The inclusion criteria were as follows: (1) a minimum of 5 years of work experience in CHSCs, (2) the ability to answer the interviewer's questions clearly and use good verbal expression skills and (3) a willingness to participate in this study. A total of 22 patients with non-communicable diseases (NCDs: disease with long duration and multiple causations)<sup>39</sup> were interviewed from three CHSCs in three urban districts using a three-stage sampling strategy. The selection process included three stages. In stage 1, six districts were divided into three types of regions based on the GDP per capita, including regions with a GDP per capita of over US\$46 000 (*Dongcheng and Xicheng* districts), a GDP per capita between US\$31 000 and US\$46 000 (*Haidian and Chaoyang* districts) and a GDP per capita below US\$31 000 (*Fengtai and Shijingshan* districts).<sup>40</sup> One district was randomly selected from each region (*the Dongcheng, Chaoyang and Fengtai* districts). In stage 2, one CHSC was randomly selected from each sample district. Finally, in stage 3, investigators approached potential participants in each selected CHSC and recruited eligible interviewees randomly; however, 3 out of 25 patients (12.0%) refused to be interviewed. Patients who (1) developed one or more common NCDs (such as hypertension, diabetes, coronary heart disease and hyperlipidaemia), (2) had consecutive visits to CHSCs for >6 months and at least once a month, (3) were able to understand the questions and had good verbal expression skills and (4) were willing to participate in this study, were eligible.

### Data collection

#### Individual in-depth interviews with GPs

Individual in-depth interviews with GPs were conducted from January to March 2020 via WeChat (a mobile text and voice messaging communication service). A semi-structured interview outline was used to collect the qualitative data. The topics of the interview included (1) the GPs' awareness of and attitudes towards NEMS, (2) the current situation and reasons

for the prescription pattern of EMs and (3) suggestions for improving the prescription behaviours of EMs. Through 'WeChat', written informed consents were obtained, and interviewees were informed of the interview outline prior to interviews. The duration of each interview ranged from 30 min to 1 hour. All interviews were audio recorded, with the consent of the participants.

#### Individual in-depth interviews with patients

In-depth, face-to-face interviews were conducted in a private room between June and August 2020. A semi-structured interview outline was used to collect the qualitative data. Topics included (1) the standard for selecting medicine to treat NCD(s), (2) properties of medicines that patients were concerned about, (3) attitudes toward EMs and (4) reasons for accepting or rejecting GPs' suggestions to change the types of medicines (EMs or not). Each interview lasted for 30–45 min. Written notes were taken, and all interviews were audio recorded with the consent of the patients.

### Data analysis

Qualitative data were analysed using a content analysis approach. Data management and coding were carried out using NVivo software. To ensure the accuracy of the data analysis, three researchers from the research team performed the initial analysis independently within 24 hours after the interview. They listened to the recording multiple times and transcribed it verbatim using word-processing software. The researchers read all the materials several times to familiarise themselves with the general framework, then independently classified and manually coded the data. After coding, the list of categories was determined using higher-level headings. Finally, the main categories and subcategories were formulated and grouped to generate themes. If ambiguity was observed in the coding and category creation, the researchers discussed and resolved the disagreements until a consensus was reached. Data saturation occurred after interviewing 14 GPs and 18 patients, and three to four interviews were conducted to ensure that no additional insights emerged.

### Patient and public involvement

There were no GP and patient involvement in the design of the study.

## RESULTS

### Characteristics of GPs and patients

A total of 17 GPs and 22 patients with NCDs were interviewed, and their characteristics are presented in [table 1](#).

### Qualitative findings

Overall, GPs and patients had surprisingly similar views on the factors affecting EM prescription patterns during interviews. Analysis of the interview

**Table 1** Characteristics of GPs and patients interviewed

Items	GPs (n)	Patients (n)
Mean age (year)	38.5±3.9	62.9±8.1
Gender		
Female	16	17
Male	1	5
Education		
Junior high school degree	0	6
Senior high school degree	0	6
Technical secondary school degree/Junior college degree	0	6
Bachelor's degree	11	3
Master's degree or above	6	1
Professional title*		
Attending physician	12	N/A
Associate chief physician	3	N/A
Chief physician	2	N/A
Employed years		
≤10	4	N/A
11–20	10	N/A
21–30	3	N/A
Insurance status†		
URRBMI	N/A	1
UEBMI	N/A	19
Government-funded insurance	N/A	2
Personal monthly income (US\$)		
<461.5	N/A	3
461.5–923.1	N/A	9
923.1–1538.5	N/A	9
≥1538.5	N/A	1

\*Attending physician is an intermediate professional title, while associate chief physicians and chief physicians are senior professional titles.

†URRBMI covers urban and rural residents without formal employment, including children, students and older people without previous employment and migrants; UEBMI covers employees and retirees who have work units or are engaged in the individual economy and government-funded insurance refers to a social security system implemented by China to cover civil servants and has no deductibles and visiting designated hospitals. GP, general practitioner; UEBMI, Urban Employee Basic Medical Insurance; URRBMI, Urban-Rural Resident Basic Medical Insurance Scheme.

transcriptions of both GPs and patients yielded five themes related to the factors affecting the prescription pattern of EMs, including four common themes: (1) efficacy and safety of medicines, (2) prescription recommendations from physicians in tertiary or secondary hospitals, (3) patients' medication preference, (4) financial status of patients and one theme

specific only to GPs: (5) minimum requirement for the prescription of EMs.

Direct quotes from the interviews are shown below in italics. 'GP' and 'P' stand for general practitioners and patients who participated in the interviews.

### Efficacy and safety of medicines

The interviews showed that GPs were willing to prescribe medications with evidence-based effectiveness. GPs mainly considered the efficacy and safety of medicines rather than the categories of EMs and non-EMs in the prescribing process. In order to provide better health-care, GPs actively acquired information about the efficacy and safety of medicines from training and feedback of patients. Fifteen patients also considered the efficacy and safety when selecting medicines.

*I will choose some medicines that I often use in the clinic because they are very stable and effective according to my clinical experience, rather than EMs or non-EMs. (GP2)*

*The first factor that affects prescription patterns is the efficacy of the medicines. Similar to hypertension, I will consider replacing [EMs] with non-EMs if all the EMs used by my patients are ineffective. Therefore, the efficacy of these medicines is of utmost importance. (GP10)*

*From my point of view, I care about the high efficacy and low side effects of medicines, not their price. The key factors are efficacy and side effects. (P22)*

*Because I am a patient with cervical cancer, I mainly focused on the side effects of medicines. I need to know if the medications I take have any side effects that aggravate cervical cancer. (P9)*

*Regardless of the price and type, I chose effective medicines first. (P1)*

### Prescription recommendations from physicians in tertiary or secondary hospitals

Currently, diagnosis and long-term treatment regimens for patients with NCDs are provided by secondary or tertiary hospitals. GPs are primarily responsible for the health management of patients with NCDs. Thus, most treatment regimens were developed in accordance with the recommendations of doctors from higher-level hospitals.

*We are primarily responsible for the health management of patients with NCDs, and most treatment plans are made in tertiary hospitals. Similar to hypertension, patients were treated with angiotensin II receptor blockers (ARBs), calcium antagonists, diuretics, and beta-blockers by tertiary hospitals. We will not adjust the medication if the patient's blood pressure and liver and kidney functions are well controlled. (GP7)*

*Patients always bring prescriptions from tertiary hospitals to CHSCs, and most medicines in the*



prescriptions are non-EMs. If patients are reluctant to change them to EMs, we will prescribe the same medicines according to the recommendations of tertiary hospitals. (GP10)

I do not know whether I am taking EMs or not. I take medicines prescribed by doctors in tertiary hospitals for a long time. I need to follow the doctors' advice because I have no idea about medicine. (P6)

I chose Losartan to treat my hypertension according to the recommendation of physicians in a tertiary hospital, and I have no intention to change it. (P12)

### Patients' medication preference

Interviews showed that most patients had strong autonomy and preference for selecting medicines. Some patients tended to use non-EMs because they questioned the effectiveness and safety of EMs. To reduce the conflict between doctors and patients, GPs tended to respect the patients' choices, which limited their prescribing behaviour to some extent.

Chinese patients have strong autonomy in selecting medicines, and some of them come to CHSCs to refill medicines according to the prescriptions of tertiary hospitals. In particular, some elderly patients are superstitious about non-EMs. They believed that the more expensive it is, the better the curative effect it will have. (GP3)

Sometimes patients require us only to prescribe non-EMs, and they think they have a stable therapeutic effect. We explained the efficacy of EMs to them, but some of them still insisted on their ideas. Eventually, we must respect them and prescribe non-EMs for them. (GP5)

I prefer using non-EMs. In my opinion, non-EMs have fewer side effects than EMs do, giving me a sense of safety. (P9)

I do not accept replacing non-EMs with EMs. I do not know about the quality of EMs, and I do not want to try them. (P12)

### Financial status of patients

GPs prioritised prescribing EMs for patients with low income and reimbursement ratios. At the same time, these patients preferred cheap medicines and had a higher preference for EMs.

Medicines were selected according to the conditions and financial status of the patients. For example, if a patient with difficult financial status can be treated by both EMs and non-EMs, I will definitely choose EMs. (GP1)

If patients are on minimum living standards and are self-funded, I will choose EMs for them. (GP9)

Because of the low income, price is the most important factor in choosing medicines. If both types

of medicines can treat my disease, I would definitely choose the cheaper one, for example, EMs. (P16)

### Minimum requirement for the prescription of EMs

To reduce the costs of healthcare and improve the affordability of medicine, the Beijing Municipal Health Commission stipulated that the prescription proportion of EMs should be no less than 50% in CHSCs. As such, it is considered an indicator of the medical staff's level of performance, and compensation is affected if the standard is not reached. Therefore, to fulfil this stipulation, GPs will actively recommend EMs to patients during treatment.

Considering the minimum requirement for the prescription proportion of EMs in CHSCs, I will attempt to complete the task [recommend EMs]. If I cannot reach the standard, the payment for performance will be affected. (GP5)

I think the factors influencing EM prescribing behavior may be related to the prescription proportion of EM. It is very important to reach these standards for me. (GP6)

### DISCUSSION

WHO recommended that EMs should be selected according to their evidence of efficacy and safety,<sup>41</sup> while the NEMs were formulated and modified by expert opinions and clinical experience. Thus, open and transparent external supervision in China is lacking.<sup>24</sup> In the interviews, the efficacy and safety of medicines were considered important determinants of EM use by both GPs and patients, which was consistent with reports of previous studies in Chengdu and Xinjiang provinces.<sup>42 43</sup> Several patients preferred using non-EMs due to distrust towards the effectiveness and safety of EMs.<sup>9 44</sup> Therefore, the government should continue to strengthen the oversight on the quality and safety of EMs; for example, the government should entrust third-party agencies to complete the consistency evaluation of EMs, encourage pharmaceutical enterprises to carry out postmarketing evaluation of EMs and improve adverse drug reaction monitoring and reporting systems. Additionally, data on the effectiveness and clinical quality measurement of EMs performed by the government should be openly accessible to increase public confidence.<sup>45</sup>

In an Australian study, GPs thought specialists had a strong influence on their judgement when prescribing medicines in some clinical areas.<sup>46</sup> In our study, the prescription recommendations from physicians in tertiary or secondary hospitals were considered another important factor affecting the prescription pattern of EMs in CHSCs. Two factors may contribute to this phenomenon. First, although minimum proportions of EMs prescribed are required in different hospitals, they are not compulsory in secondary and tertiary hospitals. Compared with CHSCs, secondary and tertiary

hospitals are responsible for the diagnosis and treatment of acute, severe and complex diseases. EMs were not used as priority medicines, as several therapeutic drugs were not listed in the NEML, which in turn resulted in a low prescription ratio on average in these hospitals.<sup>47 48</sup> Normally, patients with NCD were diagnosed in higher-level hospitals<sup>49</sup> and referred back to CHSCs for long-term management by GPs. Most patients would not switch medications randomly unless one was ineffective or their current medication had a significant therapeutic advantage over the other medications recommended. Second, under the hierarchical medical system, although an increasing number of patients will visit CHSCs as their primary option,<sup>50</sup> many simply want to refill their medications rather than consult a physician, as they do not have a real or urgent problem.<sup>51</sup> Furthermore, most patients still choose to use medicine prescribed by physicians from higher-level hospitals out of distrust in GPs.<sup>52</sup> This finding suggests an appropriate increase in the proportion of EMs prescribed in secondary and tertiary hospitals, and encourages doctors in higher-level hospitals to prioritise the prescription of EMs. Meanwhile, financial incentives for physicians could help increase the proportion of EMs prescribed. For GPs, their ability to make better diagnoses and treatment decisions should be improved, further increasing patients' trust in them.

This study indicated that patients' preference for certain medicines was another important factor affecting the prescription behaviours of GPs. It cannot be denied that patients have strong autonomy and preference in selecting medicines, and that the demands of patients significantly affect the prescription behaviours of physicians.<sup>27</sup> Some patients expressed that although GPs frequently introduced the EMs, they were reluctant to change the medicines they were taking. On the contrary, patients had certain attitudes and beliefs about medication usage in the long-term treatment of NCDs, such as believing non-EMs blindly and questioning the effectiveness and safety of EMs.<sup>9 44 53</sup> By contrast, deteriorating doctor-patient relationships influenced the doctors' prescription decisions in China.<sup>54</sup> GPs might provide patients wider rights to choose their preferred medication in order to relieve the conflicts between doctors and patients. A previous study has shown that providing appropriate education is an important method to improve EM compliance in patients.<sup>55</sup> A variety of methods could be used to educate patients about EMs, including conducting regular lectures and disseminating correct knowledge on EMs through television and the internet.

In contrast to other cities, medical insurance reimbursements cover inpatient and outpatient expenses in Beijing. When outpatient expenses exceed the insurance deductible, the reimbursement ratio varies from 70% to 90% for UEBMI in different hospitals and 50% for URRBMI.<sup>56</sup> One study indicated that higher burdens on patients are associated with higher numbers of selected EMs.<sup>57</sup> Therefore, patients with low income and low reimbursement ratios have a higher preference for using

cheap medicines and EMs. However, the types of medicines are rarely taken into consideration in patients with UEBMI, as there is not much difference in the reimbursement ratio between EMs and non-EMs.<sup>58</sup> Therefore, in order to motivate patients to choose EMs, the reimbursement ratio of medicines should be adjusted, for example, making the reimbursement ratio of EMs higher than that of non-EMs could be an effective method.

This study has several strengths. It is the first study to explore the factors affecting the prescription pattern of EMs from the perspectives of GP and patients using a qualitative research method. It evaluated the individual inner feelings and deeper insights into participants' experiences and perceptions, which enabled an in-depth understanding of the determinants of selecting EMs by GPs and patients. However, this study had some limitations. Participants in our study were selected only from urban districts, and their understanding may be slightly different from those living in suburban and rural districts, which limits the generalisability of our results. Accordingly, future qualitative studies should be conducted in suburban and rural districts of Beijing. In addition, this study only explored the factors affecting the prescription pattern of EMs, which prevented the researchers from determining the relationship between these factors, comparing the degrees of influence exerted by each factor or discovering the most critical factor. Hence, further studies would be warranted to investigate these factors using a quantitative research method.

## CONCLUSION

The findings of this study contribute to understanding the factors that influence prescription patterns and utilisation of EMs from the perspectives of GPs and patients, respectively. This study suggests that policy makers should create feasible policies and measures to promote the NEMS in China, including ensuring the efficacy and safety of EMs, releasing the results of consistency evaluation between generic and original medications in a timely manner, increasing the proportion of EMs prescribed in secondary and tertiary hospitals appropriately and providing various forms of regular education on EMs for patients. More comprehensive research should be conducted in the future.

**Acknowledgements** To all the general practitioners and patients who participated in this study, we convey our sincere thanks for their contribution and for sharing their experiences. We also thank Lin Zhang for helping with patient recruitment.

**Contributors** JD and SS are responsible for the overall content as the guarantor. XC, SS and JD conceived the study design. XC, HW, TZ and SS were involved in data collection. XC, TZ and ZF converted audio-taped data to text and analysed the data. XC drafted the first manuscript and GJ, SS and JD revised the manuscript. XC, TZ, HW, ZF, GJ, SS and JD discussed and analysed the disparities of the themes and interpreted the data. All authors read and approved the final manuscript. JD and SS are responsible for the overall content as the guarantor.

**Funding** This study was supported by the Social Science Project of Beijing Municipal Education Commission (grant no. SM202010025002).

**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Consent obtained directly from patient(s)

**Ethics approval** All participants entered the study voluntarily and provided their written informed consent before participation. All information was kept anonymous and confidential, and did not cause any harm or negative social impact to participants. In light of the above, this study was exempted by the Medical Ethics Committee of Capital Medical University, Beijing, China. Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available on reasonable request. The dataset is the de-identified interview transcriptions of the 39 subjects (only in Chinese). Data are available from the corresponding author on reasonable request.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

#### ORCID iD

Xiaolei Chen <http://orcid.org/0000-0002-7511-7620>

#### REFERENCES

- Alefan Q, Amairi R, Tawalbeh S. Availability, prices and affordability of selected essential medicines in Jordan: a national survey. *BMC Health Serv Res* 2018;18:787.
- Lozano R, Naghavi M, Foreman K, *et al*. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the global burden of disease study 2010. *The Lancet* 2012;380:2095–128.
- World Health Organization. The selection of essential drugs. who technical report series, No.615, 1977. Available: [https://apps.who.int/iris/bitstream/handle/10665/41272/WHO\\_TRS\\_615.pdf](https://apps.who.int/iris/bitstream/handle/10665/41272/WHO_TRS_615.pdf) [Accessed 15 Apr 2021].
- Atif M, Malik I, Dawoud D. World Health organization essential medicines list and its impact on improving the use of medicines. In: *Encyclopedia of pharmacy practice and clinical pharmacy*, 2019.
- Persaud N, Jiang M, Shaikh R, *et al*. Comparison of essential medicines Lists in 137 countries. *Bull World Health Organ* 2019;97:394–404.
- Guan X, Liang H, Xue Y, *et al*. An analysis of China's national essential medicines policy. *J Public Health Policy* 2011;32:305–19.
- Gwee A, Coghlan B, Cranswick NE. *Enabling equitable access to essential medicines*. Springer International Publishing, 2015.
- Cameron A, Ewen M, Ross-Degnan D, *et al*. Medicine prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. *Lancet* 2009;373:240–9.
- Song Y, Bian Y, Li L. Current perspectives on China's national essential medicine system: primary care provider and patient views. *BMC Health Serv Res* 2016;16:30.
- National Health Commission of the People's Republic of China. The National health development statistical Bulletin, 2010. Available: <http://www.nhc.gov.cn/cms-search/xxgk/getManuscriptXxgk.htm?id=51512> [Accessed 20 May 2021].
- National Health Commission of the People's Republic of China. The National health development statistical Bulletin, 2009. Available: <http://www.nhc.gov.cn/mohwsbwstjxxzx/s7967/201004/46556.shtml> [Accessed 20 May 2021].
- Mao W, Huang Y, Chen W. An analysis on rational use and affordability of medicine after the implementation of national essential medicines policy and zero Mark-up policy in Hangzhou, China. *PLoS One* 2019;14:e0213638.
- Jiang H, Zhao M, Tian G, *et al*. Perceived effect of financial risk protection by the urban-rural resident basic medical insurance scheme: a mixed-methods study of rural residents in China. *BMJ Open* 2021;11:e047699.
- The State Council of China. Opinion on integration of basic medical insurance systems between urban and rural residents, 2016. Available: [http://www.gov.cn/zhengce/content/2016-01/12/content\\_10582.htm](http://www.gov.cn/zhengce/content/2016-01/12/content_10582.htm) [Accessed 20 October 2021].
- Liu K, Yang J, Lu C. Is the medical financial assistance program an effective supplement to social health insurance for low-income households in China? A cross-sectional study. *Int J Equity Health* 2017;16:138.
- Hou X, Zhang J. The effects of public health insurance expansion on private health insurance in urban China. *Int J Health Econ Manag* 2017. doi:10.1007/s10754-017-9213-0. [Epub ahead of print: 08 Feb 2017].
- Yip WC-M, Hsiao WC, Chen W, *et al*. Early appraisal of China's huge and complex health-care reforms. *Lancet* 2012;379:833–42.
- People's Daily Online. China's basic medical insurance system nearly covers entire population, 2020. Available: <http://en.people.cn/n3/2020/0119/c90000-9650123.html> [Accessed 20 Oct 2021].
- Zhang F, Xue B, Li Y, *et al*. Effect of Textual features on the success of medical crowdfunding: model development and Econometric analysis from the Tencent charity platform. *J Med Internet Res* 2021;23:e22395.
- National Health Commission of the People's Republic of China. An analysis report of national health services survey in China, 2013. Available: <http://www.nhc.gov.cn/ewebeditor/uploadfile/2016/10/20161026163512679.pdf> [Accessed 20 Oct 2021].
- The State Council of China. An implementation plan of recent priority areas in the health care system reform (2009–2011), 2009. Available: [http://www.gov.cn/zhengce/content/2009-04/07/content\\_6239.htm](http://www.gov.cn/zhengce/content/2009-04/07/content_6239.htm) [Accessed 15 Apr 2021].
- Yang C, Hu S, Ye D, *et al*. Evaluating price and availability of essential medicines in China: a mixed cross-sectional and longitudinal study. *Front Pharmacol* 2020;11:602421.
- General Office of the State Council of China. Opinions on reforming and improving the supply and use of generic medicine, 2018. Available: [http://www.gov.cn/zhengce/content/2018-04/03/content\\_5279546.htm](http://www.gov.cn/zhengce/content/2018-04/03/content_5279546.htm) [Accessed 20 Oct 2021].
- YP L, Shen JT. Application, development and innovation of essential medicine list. *Chin J Evid-based Med* 2013;13:1273–9.
- National Health Commission of the People's Republic of China. National essential medicines list, 2018. Available: <http://www.nhc.gov.cn/ewebeditor/uploadfile/2018/10/20181025195256627.pdf> [Accessed 20 Oct 2021].
- Zhang SS, Wu T, Zhan R. Interpretation of the 2018 edition of the National essential drugs list. *Health Economics Research* 2019;36:47–50.
- Zhou X, Zhang X, Yang L, *et al*. Influencing factors of physicians' prescription behavior in selecting essential medicines: a cross-sectional survey in Chinese County hospitals. *BMC Health Serv Res* 2019;19:980.
- National Health Commission of the People's Republic of China. Notice on the comprehensive reform of public hospitals, 2017. Available: <http://www.nhc.gov.cn/tigs/s3581/201704/0563e06eff4441ffa9772dc30b487848.shtml> [Accessed 20 Oct 2021].
- General Office of the State Council. Notice of the general office of the state Council on Issuing national drug centralized purchasing and using pilot, 2019. Available: [http://www.gov.cn/zhengce/content/2019-01/17/content\\_5358604.htm](http://www.gov.cn/zhengce/content/2019-01/17/content_5358604.htm) [Accessed 20 Oct 2021].
- Li Q, Chen F, Yang M, *et al*. The effect of China's national essential medicine policy on health expenses: evidence from a national study. *Inquiry* 2018;55:46958018787057.
- Hu S. Essential medicine policy in China: pros and cons. *J Med Econ* 2013;16:289–94.
- Dong Z, Tao Q, Sun G. Survey and analysis of the availability and affordability of essential drugs in Hefei based on WHO / HAI standard survey methods. *BMC Public Health* 2020;20:1405.
- Zhang F, Yang Y, Li SC. Analysis of the utilization status of essential medicines in Beijing's community health institutions. *Ther Innov Regul Sci* 2017;51:39–44.
- Health Commission of Jiangxi province. Management measures on the use of essential medicines in medical institutions in Jiangxi Province., 2019. Available: [http://hc.jiangxi.gov.cn/art/2019/8/19/art\\_38161\\_2375152.html](http://hc.jiangxi.gov.cn/art/2019/8/19/art_38161_2375152.html) [Accessed 20 May 2021].
- Shanghai Municipal Health Commission. Notice on promoting the equipment and use of essential medicines and enhancing drug supply, 2015. Available: <http://wsjkw.sh.gov.cn/yzgl/20180815/0012-59298.html> [Accessed 20 May 2021].
- Zhang TZ, Yin XX, Li M. Comparative study on the implementation of national essential medicine system in China. *Chinese Pharmaceutical Affairs* 2020;34:1359–65.
- Moser A, Korstjens I. Series: practical guidance to qualitative research. Part 1: introduction. *Eur J Gen Pract* 2017;23:271–3.
- Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349–57.
- WHO. Noncommunicable diseases, 2018. Available: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases> [Accessed 15 Oct 2021].



- 40 Beijing Municipal Bureau Statistics. *Beijing regional statistical Yearbook*, 2020.
- 41 Perumal-Pillay VA, Suleman F. Selection of essential medicines for South Africa - an analysis of in-depth interviews with national essential medicines list committee members. *BMC Health Serv Res* 2017;17:17.
- 42 HH L, Yang XY, Wang S. Investigation on the awareness of and training needs for the National essential medicine (2009 version) in key-workers or persons who are in charge of village town hospitals/community medical service centers in Chengdu City. *Chin J Evid-based Med* 2010;10:804–10.
- 43 Li M, Liu Y, Zhang T. Investigation on the awareness of and training needs for the National essential medicine (2009 version) in medical workers in Xinjiang Province. *Chin, Evid-based Med* 2011;11:29–34.
- 44 Wang HC, Wang Y, NN L. Analysis on outpatients' cognition of the essential drugs and its influencing factors in 9 county-level hospitals in Anhui province. *Chinese Pharmaceutical Affairs* 2016;30:186–90.
- 45 General Office of the State Council of China. Opinions of the general office of the state Council on improving the National essential medicine system, 2018. Available: <http://www.nhc.gov.cn/yaozs/s7655/201809/feb1852027a949f7894b03394784dd3f.shtml> [Accessed 01 May 2020].
- 46 Robertson J, Treloar CJ, Sprogis A, et al. The influence of specialists on prescribing by GPs. A qualitative study. *Aust Fam Physician* 2003;32:573–6.
- 47 YY L, Hu X, ZA W. Analysis of the use of essential medicines in 20 medical and health institutions in Beijing from 2013 to the first half year of 2014. *China Pharmacy* 2015;3354–7.
- 48 Chen S, WJ S, Zhen TM. The list of national essential medicines-based analysis of use of essential medicines in Shandong Province. *Chin J Med Libr Inf Sci* 2019;28:35–9.
- 49 Yu W, Li M, Ye F, et al. Patient preference and choice of healthcare providers in Shanghai, China: a cross-sectional study. *BMJ Open* 2017;7:e016418.
- 50 Zhou Z, Zhao Y, Shen C, et al. Evaluating the effect of hierarchical medical system on health seeking behavior: a difference-in-differences analysis in China. *Soc Sci Med* 2021;268:113372.
- 51 Jin G, Zhao Y, Chen C, et al. The length and content of general practice consultation in two urban districts of Beijing: a preliminary observation study. *PLoS One* 2015;10:e0135121.
- 52 Zhou XD, Li L, Hesketh T. Health system reform in rural China: voices of healthworkers and service-users. *Soc Sci Med* 2014;117:134–41.
- 53 JH M, XY X, Chu SZ. A survey analysis of the knowledge-attitude-practice (KAP) of essential drugs in the view of patients. *Chinese Journal of New Drugs* 2012;21:2109–20.
- 54 Jie L. New generations of Chinese doctors face crisis. *Lancet* 2012;379:1878.
- 55 Lowe CJ, Raynor DK, Purvis J, et al. Effects of a medicine review and education programme for older people in general practice. *Br J Clin Pharmacol* 2000;50:172–5.
- 56 The People's Government of Beijing Municipality. The reimbursement ratio of basic medical insurance in Beijing, 2021. Available: <http://www.bjchy.gov.cn/affair/ybjb/8a24fe837cec77d017cef6034d804b9.html> [Accessed 15 Oct 2021].
- 57 Bazargani YT, de Boer A, Leufkens HGM, et al. Selection of essential medicines for diabetes in low and middle income countries: a survey of 32 national essential medicines Lists. *PLoS One* 2014;9:e106072.
- 58 Chen XL, Shao S, Wu Y. Essential medicine prescribing behaviors of urban general practitioners in Beijing: a qualitative study. *Chinese General Practice* 2021;24:2814–8.