SSM - Qualitative Research in Health 6 (2024) 100502

Contents lists available at ScienceDirect

SSM - Qualitative Research in Health

journal homepage: www.journals.elsevier.com/ssm-qualitative-research-in-health

Prenatal care in urban China: Qualitative study on challenges and coping mechanisms

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ARTICLE INFO

Keywords:
Prenatal care
Healthcare access
Quality of care
Semi-structured interviews
China

ABSTRACT

This study aims to identify challenges that women face in accessing prenatal care services in urban China and their coping mechanisms to deal with the challenges. We conducted semi-structured interviews in June and July in 2019 with 38 women who had experience of childbirth within the last five years. Through interviews, this study pays particular attention to a quality of prenatal care services by focusing on women's experiences in seeking for such services. The findings suggest that most participants had access to standardized prenatal care services but faced two challenges: long wait time and short doctor-patient interaction time. These challenges stem from overcrowded hospitals. The findings also illuminate power and information asymmetry between doctors and patients. Women leverage social networks with friends, colleagues, and former classmates to fill in the gap of short doctor-patient interaction by obtaining relevant information about pregnancy and prenatal care services. The analyses of interviews and a social networking site also suggest that online social networks play a similar role to fill in the informational gap. Still, social networks remain a coping mechanism rather than a fundamental solution to the systemic issues within the public health system.

1. Introduction

Prenatal care has direct influence on birth outcomes and pregnant people's wellbeing. The *WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience* indicates that prenatal care has direct impacts on birth outcomes as it "reduces maternal and perinatal morbidity and mortality" (World Health Organization, 2016b, p. 1). Further, prenatal care also serves as a channel through which "social, cultural, emotional and psychological support" can be provided to pregnant people to ensure their wellbeing and positive experiences (World Health Organization, 2016b, ix). The United Nations' 2030 Agenda for Sustainable Development also indicates a renewed commitment to maternal and reproductive health.[1]

The maternal and child health (MCH) is an integral part of public health in China. Along with immunization and infectious disease control, it is regarded as basic public health services to be provided by the state and gained the government's attention comparatively early (Wang et al., 2019; Yuan et al., 2019). Although a major health system reform was not introduced until 2009, the Chinese government produced a series of legislations and national plans related to MCH in the early 1990s and 2000s (Bogg et al., 2010; Guo et al., 2008, 2015; Wu et al., 2012). The Ministry of Health established the Department of Maternal and Child Health Care and Community Health in 1998 (Wu et al., 2012), and Maternal and Child Care Hospitals and Centers were established around the country by 2008 (Guo et al., 2015). In 2009, the government included maternal care in the Basic Public Health Service project (Zhao et al., 2020), and introduced the Five Strategies for Maternal and Newborn Safety in 2016 (J. Liu et al., 2020). MCH is also a key component in the Health China 2030 plan (Qiao et al., 2021).

This study aims to identify (1) challenges that women face in accessing prenatal care services in China and (2) their coping mechanisms to deal with challenges based on qualitative analyses of interview data. We conducted semi-structured interviews in June and July in 2019 with 38 women who had experiences of childbirth within the past five years in urban China.

While building on previous studies, this study offers unique contributions by assessing a "quality" of prenatal care services by focusing on women's experiences in seeking for such services. This approach goes beyond an assessment of a presence or absence of access to prenatal care services. The existing studies on maternal care services in China tend to measure access based on quantified medical standards, such as the number of prenatal exams received (Anson, 2004; Bogg et al., 2002; Fan

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[1] See https://sdgs.un.org/goals/goal3#targets_and_indicators.

https://doi.org/10.1016/j.ssmqr.2024.100502
Received 10 May 2024; Received in revised form 15 October 2024; Accepted 9 November 2024
Available online 10 November 2024

et al., 2017; Feng et al., 2022; W. Hu et al., 2021; Jiang et al., 2020; X. Liu et al., 2011; Long, Zhang, Xu, et al., 2010; Short & Zhang, 2004; Tang et al., 2019; You et al., 2019; R. Zhang et al., 2018; Zhou et al., 2019; Zong et al., 2018) and types of prenatal exams received (Chen et al., 2007; Feng et al., 2022; W. Hu et al., 2021; Long, Zhang, Hemminki, et al., 2010; Nwaru et al., 2012; You et al., 2019; Zhou et al., 2019). Based on these measurements, there is a high level of access to prenatal care services especially in urban China (China Center for Health Statistics and Information, 2015). However, these results do not account for a quality of care.

Therefore, this study uses qualitative methodology to examine a quality of services from women's perspectives. While some existing studies have examined quantified levels of satisfaction with prenatal care services in China (Y. Liu et al., 2021; Zhu et al., 2020), this study pays a particular attention to unquantified measures of prenatal care services and women's experiences with prenatal care services in a more holistic manner. The WHO suggests that "positive pregnancy experience" encompasses "maternal self-esteem, competence and autonomy" (World Health Organization, 2016b, 2). In fact, Raven et al. (2015) find through interviews that women are dissatisfied with a lack of inclusion in the decision making processes during provisions of delivery services in China.

The results find that an availability of care was not a large issue in our interview site. There was a standardized frequency and interval of prenatal care exams, and our interview participants received similar types of exams. Still, there remain two challenges: a long wait time and a short doctor-patient interaction time. Patients have to wait for a long time to see a doctor, and doctors spend short amount of time interacting with patients to provide explanations about prenatal care services and exam results. These challenges stem from overcrowded hospitals. The results identify that the issue of short doctor-patient interaction time is related to the power and information asymmetry between doctors and patients. Analyses of the interview data and an online social networking site find that women use both in-person and online social networks to fill in the gap of short doctor-patient interaction by obtaining relevant information about pregnancy and prenatal care services.

The paper proceeds as follows. First, we discuss the research methods we used in this study, including sampling method, sample characteristics, interview method, and analytical method. Then, we discuss themes we identified through our interviews. The themes are organized three areas of inquiry we had for this study: (1) availability of care, (2) quality of care, and (3) roles of social networks. The discussion section makes a connection between these themes to obtain a coherent inference on how systemic issues lead to challenges regarding a quality of care, and how patients use social networks cope with some of these challenges. The discussion section also connects findings with existing scholarship. We conclude with discussing some policy recommendations and limitations of this study.

2. Methods

2.1. Data

The data is derived from the semi-structured interview we conducted on women's access to prenatal care services in China in June and July 2019. We conducted semi-structured interviews with 38 women who had experiences of childbirth within the past five years. All the interview participants are from urban China, however we recruited women from varieties of socio-economic status. The interviews were conducted in an urban city in Northwest China. The study was approved by the Institutional Review Board (IRB) at the university where the corresponding author obtained a doctoral degree from. The oral consent was granted from the interview participants. Written consent was waived with an approval from the IRB since the interviews took place in a country context where civil liberties are limited. Because written consent forms would be the only material that contains participants' personally identifiable information, oral consent was used to protect participants' privacy and confidentiality. We did not collect any personally identifiable information.

2.2. Sampling method

The sampling method is a stratified purposive sampling. In order to diversify the interview participants' socio-economic backgrounds, we conducted interviews at multiple sites including both mid/high-income and low-income communities. This includes five communities in three different administrative units (districts) (see Table 1). Among the three administrative units, two are mid/high-income areas and one is a low-income area. We sampled from one to two communities in each administrative unit. Among the five communities, three are mid/high-income communities and two are low-income communities. As a result, about 40% of the respondents are from the mid/high-income communities and the other 60% are from the low-income communities. It was a purposive sampling in that we deliberately recruited women who have experiences of childbirth within the past five years. We recruited them at various sites where we can identify women with small children, such as local parks, clinics, and pre-school institutions.

We interviewed 38 women who have experiences of childbirth within the past five years. Existing studies find a sample size for saturation among health-related qualitative interview studies to be 17 (Francis et al., 2010; Hennink & Kaiser, 2022). Malterud et al. (2016) suggest that a sample size for qualitative interview studies should be guided by levels of information power. Information power is determined by a study aim, sample specificity, use of theory, quality of dialogue, and analysis strategy (Malterud et al., 2016). The last criterion was of particular concern to this study. As we use a thematic cross-case analysis method, it requires a larger sample size. This may warrant a sample size larger than 17. In fact, a study that analyzed 140 qualitative health studies find the mean sample size to be 33 (Vasileiou et al., 2018), and another study examining 560 qualitative interview studies find the mean sample size to be 31 (Mason, 2006). Based on these considerations, a minimum sample size between 17 and 31 is required, and this study's sample size fulfilled the requirement.

2.3. Sample characteristics

A majority of the interview participants (over 80%) had their child delivery within the last three years, and several of them had just delivered their children within the last several months. The interview participants' age ranges between 26 and 41 years old, and their levels of education attainment also varies from middle school, high school, secondary vocational school, junior college, to college and graduate degree. About 79% of the participants have a college degree (including junior colleges). Due to the purposeful sampling method described above, their economic status also varies. The participants also have a variety of occupations, including employment in public sector, private sector, self-employed, and full-time mothers. Table A1 in the Supplementary Materials shows the demographic characteristics of the study participants.

Table 1
Stratified purposive sampling.

Administrative Unit	Administrative Code
District 1	
Community 1	D1C1
District 2	
Community 1	D2C1
Community 2	D2C2
District 3	
Community 1	D3C1
Community 2	D3C2

Note: participants' individual code cited in the results section is derived from the administrative code.

2.4. Interview method

The interview method was semi-structured interviews. The Semi-structured interview method is suitable for the present study due to its flexibility and structure. The flexibility of semi-structured interviews is beneficial in discovering the complex processes of decision makings and nuanced experiences in accessing prenatal care services. Further, individual interviews will allow the interviewees to express their own experiences of pregnancy from their own perspectives including whether the service providers considered women's agency and autonomy in providing the care. On the other hand, a certain degree of structure in semi-structured interviews assure that the study finds answers to the research question. The Supplementary Materials include the interview guide (see Table A2).[2] The questions address three broad issue areas: (1) availability of care, (2) quality of care, and (3) social networks.

2.5. Analysis method

In order to analyze the interview data, we first transcribed the interview data and made a spreadsheet organizing the participants' responses in terms of their prenatal care experiences and demographics. Each row was an individual participant, and each column was a theme/topic and demographics. This helps examine whether their prenatal care experiences are driven by their socio-economic status or particular hospitals they received the medical care from (patterns across interviews). We also conducted close examinations of each individual interview separately to make connections within in each individual interview to have a holistic view of individual stories (patterns within interviews). This analysis method of interview data was adopted from a previous study on family planning policy and governance in China (Kennedy & Shi, 2019).

Table A3 in Supplementary Materials show the analysis frame we initial used to organize the interview data to identify broad themes and to examine patterns across participants. The initial analysis frame had six areas of inquiry: hospital choice, prenatal exams, experiences, social networks, cost, and demographics. Then, based on this initial analysis, we created a condensed analysis frame (see Table A4) to further narrow down themes. For an east of analysis, we applied a coding scheme to categorize observations within the condensed analysis frame (see Table A5).

3. Results

Table 2 summarizes the themes identified through analyses. In terms of an availability of care, two themes emerged: standardized antenatal care and a popularity of Tier 3 hospitals. The three themes emerged regarding quality of care were challenges women faced in their prenatal care service experiences: a long wait time, a lack of interaction with doctors, power and information asymmetry. We also had another area of inquiry that is roles of social networks among women seeking prenatal care services. The remainder of the section elaborates on findings under each theme. Then, the discussion section connects these themes to obtain a coherent inference.

3.1. Standardized antenatal care process

The WHO and China's Ministry of Health (MOH) set standards for a quantity of prenatal care services (World Health Organization, 2016b; Wu et al., 2008). The WHO recommends eight contacts with prenatal care providers[3] (World Health Organization, 2016b). China's MOH recommends five prenatal care visits for rural and eight prenatal care visits for urban areas (Wu et al., 2012).

Table 2
Themes identified through analyses.

Issue areas	Identified Themes	Summary Results
Availability of care	Standardized antenatal care	Standardized frequency and interval of prenatal care exams and similar types of exams across participants.
	Hospital choice	Tier 3 hospitals and specialized hospitals are popular due to the common perception that upper-level hospitals provide better quality care.
Quality of care	Crowded and long wait time	The most frequently mentioned challenge is crowded hospitals and a long wait time. Participants perceive them to be a systemic issue.
	Lack of physician-patient interaction	Doctors spend short amount of time interacting with patients to provide explanations about prenatal care services and exam results.
	Power and information asymmetry	Doctors have more information about prenatal care and more decision-making power about care services than patients.
Social networks	Roles of social networks and information	Patients use in-person and online social networks to compensate for the lack of information provided by medical practitioners.

The results indicate that almost all the interview participants had more than eight prenatal care exams, exceeding both the WHO and China's MOH standard. Over 85% of the participants received more than 10 prenatal care exams. More importantly, many participants described a standard process of prenatal care exams, increasing in frequency during the time of pregnancy: once a month, once in two weeks, and once a week.[4] According to some, the frequency changes by a trimester.[5] A participant described this frequency of exams as a standardized or institutionalized process by stating that: "I received the number of exams according to the *regulation*" (emphasis added).[6] Another participant stated that: "I know a majority of people receive exams once a month in the first trimester, once in two weeks in the second trimester, and once a week in the third trimester. But I received exams once a month or once in three weeks because I had little problems."[7] These statements suggest that there is a standardized frequency and interval of prenatal care exams. This standardized process was described consistently across different hospitals and the interviewees' socio-economic backgrounds.

Further, most participants also described the types of prenatal care services received in a mostly similar manner. The two most mentioned prenatal care exams were ultrasound and down syndrome exams. Other frequently mentioned exams include: fetal heart monitoring, blood test, blood sugar and diabetes exam, cardiac screening test, congenital anomalies exam, blood pressure, infectious disease test, and liver function test. The cardiac screening tests include echocardiogram and

[2] The quality of the interview questions was validated through expert consultations. The Principal Investigator consulted an Assistant Professor who works at a local university with extensive fieldwork experiences. During this consultation, the interview guide was modified a few times. Later, additional modifications were made in consultation with another local scholar with a master's degree and fieldwork experiences.

[3] WHO updated the recommended minimum number of prenatal care contacts with health professionals from four to eight in 2016 (World Health Organization, 2016a). According to the data by UNICEF, 69% had a minimum of four prenatal care contacts in China in 2013 (United Nations International Children's Emergency Fund, 2018).

[4] Interviews: D1C1_3, D2C1_1, D2C1_2, D2C1_4, D2C2_2, D2C2_3, D3C1_6, D3C2_13. Another cited frequency starts from once a month and shifts to once a week (D2C1_7, D3C1_3, D3C2_1, D3C2_2).

[5] Interviews: D1C1_3, D2C1_4, D2C2_3, D3C1_6, D3C2_13.

[6] Interview: D1C1_3.

[7] Interview: D1C1_2.

electrocardiogram. The congenital anomalies exams include chromosome exam, amniocentesis, noninvasive prenatal testing (NIPT), and so on. The infectious disease tests include hepatitis B and other infectious diseases.

3.2. Hospital choice

In China, hospitals are classified into three ranks: Tier 1 (primary), Tier 2 (secondary), and Tier 3 (tertiary) (Cai et al., 2018; Y. Li et al., 2020). Each tier has three ranks: A, B, and C rank. The upper tier hospitals have greater capabilities for medical care, education, and research (Cai et al., 2018; Y. Li et al., 2020) as well as better infrastructure, equipment, and human resources (T. Zhang et al., 2017). In terms of maternal care services, there are also two types of hospitals among the Tier 3 hospitals: general hospitals and specialized hospitals. The specialized hospitals are "maternal and child health hospitals" and they specialize in maternal and child healthcare services. Most of our interview participants (76%) chose Tier 3 hospitals to receive prenatal care services. Among those who selected Tier 3 hospitals, a little less than a half chose specialized hospitals. The rest of the participants chose Tier 2 hospitals.

Among those who chose Tier 3 hospitals, the most cited reason for their selection is the perceived quality of care, reputation, and the brand of Tier 3 hospitals. About a half of them mentioned one of the three factors (quality, reputation, and brand) as a reason why they selected a Tier 3 hospital. For example, among those who mentioned the quality or reputation of a hospital, a participant said: "I feel like the overall standard is relatively high."[8] For some participants, the mere fact that the hospital is classified as Tier 3 A rank or specialized is the most important factor. For instance, a participant who chose a Tier 3 hospital said she selected the hospital because of the "Tier 3 A rank hospital brand,"[9] and another participant even more simply stated that "it is a Tier 3 A rank hospital."[10] Similarly, some of those who selected the maternal and childcare hospitals emphasized that these hospitals are *specialized* hospitals by stating that: "It specializes in OBGYN, and better than general hospitals"[11] and "It is an experienced hospital and a specialized hospital. Everyone goes there".[12] This result presents a striking difference from the motivation among those who chose Tier 2 hospitals. The participants who chose Tier 2 hospitals only mentioned one of the following two reasons for their selection of the hospitals: close to home and not crowded.

While the major reason behind the popularity of specialized hospitals and Tier 3 hospitals is due to the common perception that upper-level hospitals provide better quality care, some women also pointed to a critical role of recommendation and social connections. For instance, some participants discussed their selection of Tier 3 maternal and child health hospitals as: "a close friend recommended"[13] and "My friend recommended this hospital."[14] These quotes suggest that social connections among friends play a role to circulate information about hospitals and influence individuals' hospital choices.

3.3. Challenges: crowded, long wait time & lack of physician-patient interaction

The three most common challenges mentioned about prenatal care services were: (1) overcrowded hospitals, (2) long wait time, and (3) short doctor-patient interaction time. Over 30% mentioned overcrowded hospitals, and this is the most frequently mentioned challenge. About 20% mentioned the long wait time as a challenge. For instance, a participant stated: "There are too many people, and it cannot be very good."[15] Another participant similarly answered to the question on public prenatal care service evaluation that: "It is 50 out of 100. There are too many people in public hospitals." She further explained to us that the reason her hospital (Tier 3 A rank maternal and child health hospital) was crowded is because there is only one good public hospital, and everyone goes to the same hospital.[16]

Indeed, the interview results show that the issue of crowded hospitals and a long wait time go hand in hand. For example, two participants stated respectively that: "There were too many people and I waited very long"[17] and "there are too many people, and a wait time is long."[18] This indicates that the long wait time stems from crowded hospitals. An interviewee showed her dissatisfaction with a long wait time by stating that the need to "stand in line is unreasonable."[19] About 60% of the respondents said that they had to wait 1 h or more before they can see a doctor. A participant had to wait two to 3 h before every prenatal care service, and she said it was "too long and too inconvenient."[20] Waiting all morning was also not uncommon. An interviewee described the wait time as "normally all morning. The fastest is 30–60 min"[21] Another interviewee similarly referred to the wait time as "half a day if it is fast, and all day if it is late."[22] Given that most of our participants received 10 or more prenatal care exams, the frequency of doctor visit is more than once a month during the nine months of pregnancy. This shows the magnitude of time cost on women.

Further analyses of the interviews also indicate that the issue of long wait time is a systemic issue that is present across different hospitals, and ordinary people have no choice but to deal with it. An interviewee stated that: "The wait time is too long, but there is nothing that can be done about it."[23] Another interviewee said: "It is the same thing in every hospital, the time to stand in line is long."[24] These quotes suggest that overcrowded hospitals and long wait time is not just a problem of one or two most popular Tier 3 rank A hospitals, but a feature of the health system at large. Some interviews illuminate the sentiments that it is just how it is and there is nothing individual patients can do to change the situation. Although the interviews focused on prenatal care services, a few participants also talked about a shortage of inpatient beds.[25] A participant told us that: "The supporting facilities are not perfect, and the inpatient beds are especially crowded at a peak time. But, I heard that the S hospital's inpatient beds are even more crowded, so I feel like my hospital is not bad" (the name of the hospital was substituted with the letter S to maintain an anonymity of the interview).[26]

The long wait time is also often contrasted with the short amount of time a doctor spends with patients. Over 30% expressed discontent about the short consultation time with their doctors. Most of the participants said that their doctors only spend less than 10 min with them, sometimes even less than a few minutes. A participant said that her interaction with the doctor was 2 min and that "I need to ask and the doctor finally explains" about prenatal care exams. When we asked her about her opinion of her doctor's services, she said it is "bad" and the interaction time is short. After completing the exams, she had to leave

[8] Interview: D2C1_2.
[9] Interview: D2C1_8.
[10] Interview: D3C1_1.
[11] Interview: D2C1_5.
[12] Interview: D3C1_6.
[13] Interview: D2C1_9.
[14] Interview: D3C2_17.
[15] Interview: D2C1_7.
[16] Interview: D3C1_6.
[17] Interview: D3C1_5.
[18] Interview: D3C2_1.
[19] Interview: D2C1_3.
[20] Interview: D3C2_16.
[21] Interview: D2C1_7.
[22] Interview: D2C1_2.
[23] Interview: D3C2_5.
[24] Interview: D3C2_16.
[25] Interviews: D2C1_1, D2C1_2, D2C1_5, D3C2_3.
[26] Interview: D2C1_1.

right away.[27] Another participant similarly described the duration she interacted with her doctor as "short" (one to 2 min), and she thinks that the doctor's services were "not very good" because "the doctor's attitudes were bad, and there was no interaction" on top of the long time she had to spend standing in line.[28]

Some other participants further elaborated on their experiences in interacting with their doctors and pointed out that their doctors generally do not provide explanations about prenatal care exams and mechanically perform exams. A participant said: "I am not very satisfied with the hospital's services. The doctor only conducted exams" without providing any explanations, advice or interaction.[29] Another participant expressed her discontent by stating that: "The doctor generally does not speak, and explains very little" and "I am very dissatisfied. They don't provide services for the sake of the child, the nurses' morals are bad, the doctor does not voluntarily provide a lot of information."[30] These results illustrate a normal mode of doctor-patient interaction, defined as how doctors interact with patients in person. Doctors just follow a standardized procedure of prenatal care exams while providing little to no explanation about exams (both before and after exams) and almost no involvement of patients in decision making processes.

Some participants attribute the short doctor-patient interaction time to the crowded hospitals. For instance, a participant said: "When I have question, the doctor can explain, but normally (the doctor) does not talk. There are too many people, and little explanations."[31] Another participant similarly stated that the doctor spends about 10 min to look at the exam results and that "there are too many people, so when I ask, the doctor finally explains."[32] For a few patients, their doctors did not provide any explanations about prenatal care exams.[33] These findings suggest that it requires the patients to know the right questions to ask their doctors in order to receive explanations about exams and results, and also to involve in any decision-making processes.

3.4. Power and information asymmetry

Another relevant theme illuminated was an asymmetry of decision-making power and information between patients and physicians. Many participants indicated that they followed their doctor's instruction to receive prenatal care services. There was a common phrase that many participants used: "I listen to what the doctor says".[34] Some participants also phrased it as: "according to the doctor's plan,"[35] "they are all what the doctor arranged,"[36] and "I did all the exams that the doctor said."[37] This suggests that the decision-making power regarding prenatal care exams are largely with the doctors and medical care institutions. This also points to the inherent information asymmetry between doctors and patients. The information asymmetry is defined as the imbalance in the amount of information doctors have vis-à-vis patients have, where doctors have more information and knowledge about medical care than patients.

At the same time, patients are not just passively receiving prenatal care services. Many participants (over 40%) mentioned that they looked up information about prenatal care exams online. For example, when discussing a frequency of prenatal care exams, a participant said: "Before seeing the doctor, I knew the basics. I saw them online, and other people have also told me." She also obtained information about types of prenatal exams from the internet and friends (including former classmates and neighbors).[38] This suggests that they are not just passively and blindly following what doctors say. Rather, they are active seekers of information about medical care processes. They are both willing to and capable of participating in decision-making processes. The online social networking sites also provide a means for patients to fill in the gap of information asymmetry. A participant said: "I listen to what the doctor says. There is also information that I obtained from the WeChat official accounts". She told us that these accounts are obstetrics-related accounts.[39] Patients with prior information about medical procedures are better prepared to ask questions and understand their doctor's suggestions and diagnosis.

Women also share information among each other. Several participants talked about how they obtained information about prenatal care exams from their friends, including colleagues, former classmates, and neighbors. For instance, a participant talked about types of prenatal care exams and said: "I already knew before seeing the doctor because my friends talked about them".[40] Similarly, another participant stated: "I heard from my friends about the general information about pregnancy and information about prenatal care exams. I also saw them online." They were friends who experienced pregnancy before her.[41] Thud, the social networks among women facilitate sharing of information.

3.5. Roles of social networks

Social connections also play a role in facilitating an information sharing to compensate for the lack of information provided by medical practitioners. The short physician-patient interaction time and a lack of explanations provided by physicians mean that patients need to inform themselves of prenatal care services such as how to interpret prenatal care exam results if they want to know more than the fact that their doctor does not find any problems. Patients must also have sufficient knowledge about prenatal care exams to know the right questions to ask. Having more information can also improve doctor-patient interactions by enabling patients to benefit more from the interactions.

About 68% of the participants said that they obtained pregnancy-related information from their informal social networks, including friends, colleagues, family members, former classmates, and neighbors. They tend to obtain information from their friends who were pregnant before them or were pregnant at the same time with them. For instance, a participant stated that: "I had pregnancy-related information from the colleagues around me. I could ask them questions." She told us that they are all around her age, and that some were pregnant before her and some were pregnant at the same time with her.[42] Another participant also told us that she obtained information from her friends and colleagues who had experiences of pregnancy prior to her.[43] Similarly, another participant obtained information from two of her colleagues who had experiences of pregnancy, and she saw them frequently at work.[44]

There were also a few participants who built new social networks during their pregnancy, and they obtained information from these new social contacts. One participant said: "At the time of prenatal exams, we pregnant women all chatted together when we stood in line."[45] Another participant similarly stated that among her friends and colleagues from whom she obtained information: "some people I knew before my

[27] Interview: D3C2_15.
[28] Interview: D3C2_16.
[29] Interview: D1C1_2.
[30] Interview: D2C1_8.
[31] Interview: D2C1_5.
[32] Interview: D2C1_7.
[33] Interviews: D1C1_3, D2C1_9, D3C1_4, D3C1_6.
[34] Interviews: D2C1_7, D2C1_9, D2C2_3, D3C1_1, D3C1_2, D3C1_3, D3C1_5, D3C1_6, D3C2_1, D3C2_3, D3C2_5, D3C2_6, D3C2_9, D3C2_10, D3C2_14, D3C2_15, D3C2_16, D3C2_17.
[35] Interviews: D2C1_2, D2C2_1.
[36] Interview: D2C1_3.
[37] Interviews: D2C2_1, D2C2_2, D3C2_12.
[38] Interview: D3C2_4.
[39] Interview: D3C2_5.
[40] Interview: D3C2_7.
[41] Interview: D3C2_8.
[42] Interview: D2C1_2.
[43] Interview: D2C1_6.
[44] Interview: D3C1_1.
[45] Interview: D2C1_1.

pregnancy. Some are friends I made at the hospital."[46] She also told us that she interacted with them a lot on WeChat (a social networking site with an instant messaging function). Ironically, the long wait time may also facilitate new social networks because women can talk with each other while they wait to see a doctor for prenatal care exams.

Besides in-person social networks, online social networks also play a role in filling in the information gap. Indeed, most interview participants mentioned that they belong to online social networks via social networking sites. Almost 80% of the participants used online social networks during their pregnancy. These online social networks and social networking sites specialize in topics of pregnancy and childcare. The most popular is smart phone apps with nearly 70% of the participants having used an app that specializes in pregnancy and childcare. Just among our interview participants, there were mentions of more than 10 different apps on pregnancy and childcare. The most frequently mentioned apps include: babytree (*baobaoshu*), childcare academy (*yuxueyuan*), meet you (*meiyou*), dear baby (*qinbaobao*), and mom net (*mamawang*). They all provide information about pregnancy, prenatal care exams, and childcare along with functions to track and record processes of pregnancy and childcare. They also function as social networking sites where users can connect and interact with each other.

The targeted and temporal use of these networks suggest that their main role is to supply specialized information that is only relevant during the period of pregnancy or infant care. Some participants whose children are older than one year indicated that they don't use the pregnancy-related apps as frequently anymore. For instance, a participant who used to use two apps said: "I used to use, but I use little now."[47] Other similar comments included: "I used to use, but I don't use it anymore. It was called mama-something. I can't remember clearly." and "I used an APP, but I forgot."[48] This suggests that women utilize the online networks for a specific purpose of obtaining specialized information during their pregnancy.

In addition to apps, some participants also mentioned that they follow social media accounts related to pregnancy or belong to social media groups to obtain pregnancy-related information. WeChat and Weibo are popular social media platforms in China. WeChat has an individual and group chat function as well as photos and contents sharing function, and Weibo is a Twitter-like microblogging site. Some participants follow WeChat official accounts and Weibo accounts that are related to pregnancy. Some participants also belong to WeChat groups. For instance, a participant said: "On WeChat there is a mothers' group. On this group, I can receive responses when I have questions." She also told us that she has not met the members of this online group in-person. Sometimes someone answers her questions, and sometimes no one answers her questions.[49] Another participant similarly stated that she has a WeChat group, and she can consult and seek for advice in this group.[50] These results suggest that online social networks mainly function to provide information.

In order to further our understanding of online social networking platforms, we conducted a qualitative content analysis of an online social networking site specialized in topics of pregnancy and childcare.[51] We chose the most commonly mentioned social networking site for the analysis – the app and website called *babytree*. The analysis aims to identify functions of the website and is based on the publicly available website of *babytree*.

The results of the analyses suggest that the two main functions are: (1) providing information and (2) providing a platform where people can interact with one another. In regard to the first function, *babytree* provides information on pregnancy and childcare via articles, posts, and online tools. For example, a "pregnancy and baby care weekly" provides information on what to expect for each week of pregnancy. The information includes types of prenatal exams, what symptoms to look for, and recommended food recipes. Users can also obtain personalized "prenatal care exam timeline" by selecting either an expected birthdate of a baby or an estimated date of conception and the website shows specific dates when users need to get certain prenatal care examinations. They can also find out how to interpret results of their ultrasound examination under an "understand ultrasound results" section. The section provides detailed explanation of each exam item of ultrasound and referential "normal" scores for each item.

Furthermore, *babytree* also provides a platform where women with similar experiences or interests can interact with one another. These platforms are called "communities." There are communities on different topics. Users can post a thread about their experiences and questions, and other users can respond to the post. For instance, a community on baby care had more than 42 million members with more than 7 million threads at the time of analysis. There are also same age groups such as "June 2020 same age community" where users who are to give birth in June 2020 belong to and chat with each other.

4. Discussion

The analysis of the interview data identified two challenges in prenatal care service access within this urban locality: a long wait time and a lack of doctor-patient interaction, due to overcrowded hospitals. In terms of the basic access to necessary care, there does not seem to be any major obstacles. There is a standardized prenatal care process, so patients receive roughly similar prenatal care services in terms of "frequency" and "types" of prenatal care services. The challenges exist in the "process" of receiving care rather than a presence or absence of access. Doctors appear to mechanically follow the standardized care procedures while providing little to no explanations about exams they perform, and women are not involved in decision-making processes in receiving these care services. The severely short doctor-patient interaction time limits opportunities where patients can ask doctors questions even though some interviews suggest that doctors do answer questions when they ask. This short doctor consultation time follows a long wait time that ranges between a few hours to half a day. These two challenges go hand in hand to raise discontent among patients. It is not difficult to imagine a sense of frustration when someone needs to wait half a day in the waiting room to receive care services but receives no personalized interaction from the medical professionals before or after the services.

The challenges of a long wait time and short doctor-patient interaction time within overcrowded hospitals are present across different communities (both high- and low-income communities), different educational levels of participants, and different hospitals. This suggests that these are broader and systemic issues of the healthcare system in general. In fact, some participants described the issue of a long wait time as something that cannot be helped or something that is the same in any hospitals.[52] While the interview data indicates an overwhelming popularity of Tier 3 hospitals, this popularity leads to an issue of overcrowded Tier 3 hospitals.

There were two participants who had to switch from a Tier 3 hospital to a Tier 2 hospital, because the Tier 3 hospitals were too crowded. The first interviewee who said that she had to move from a Tier 3 to Tier 2 hospital said that "the first hospital was difficult to register." This means that she faced a difficulty in the process of queueing up to get registered before she sees a doctor or receives prenatal care services. She also told us that the wait time at the Tier 3 hospital was about two to 3 h, whereas it was about 30 min to 1 h and "a little faster" at the Tier 2 hospital.[53]

[46] Interview: D3C2_1.
[47] Interview: D2C1_7.
[48] Interviews: D2C1_9, D3C1_4.
[49] Interview: D1C1_3.
[50] Interview: D2C1_1.
[51] The analysis was conducted in April 2020.
[52] Interviews: D3C2_5 and D3C2_16.
[53] Interview: D3C1_3.

The second interviewee who also moved from a Tier 3 to Tier 2 hospital said: "there were too many people at the first hospital, and the second hospital had less people." The wait time at the Tier 3 hospital was one to 2 h, while it was about 30 min at the Tier 2 hospital.[54] This also does not mean that the patients' experiences with Tier 2 hospitals are without challenges. Eight participants obtained care at Tier 2 hospitals. More than a half of them still expressed their grievances regarding a long wait time and a short doctor-patient interaction. Therefore, it may be the issue of the health system as a whole, resulting in the long wait time and short doctor consultation time.

The finding is largely consistent with previous studies' findings. The existing studies suggest that upper-tier hospitals are crowded because people prefer to pursue care at upper-tier hospitals (L. Hu et al., 2019; J. Li et al., 2016; Y. Li et al., 2020). Some studies report that some Tier 3 hospitals have more than 100 patients per doctor per day (L. Hu et al., 2019; Y. Li et al., 2020). This has led to a long wait time and short doctor consultation time among upper-tier hospitals (Cheng et al., 2017; L. Hu et al., 2019; T. Zhang et al., 2017). This is because people distrust the quality of medical care at primary care institutions and prefer to go to bigger and upper tier hospitals (Cheng et al., 2017; J. Li et al., 2016; Yip et al., 2019; T. Zhang et al., 2017). Our interview result also reflects this general sentiment that upper-level hospitals are better and more trustworthy. Due to the hierarchical hospital system that classifies hospitals into ranks based on their capabilities and resources, there is a prevalent perception among people that upper-tier hospitals and higher ranked hospitals are better and provide a higher standard care. Thus, for many patients, it is important that their hospitals are classified as Tier 3 A rank and specialized, communicating a general impression of a higher standard and good reputation.

At the same time, there are a few exception cases where patients' socio-political position can mitigate the challenges. For instance, a participant told us that her husband's sister works in the hospital, and she can see a doctor easily with the help of her sister-in-law. She was aware of the differences between her experience and her friends' experiences. She said: "According to my friends, they are all not very satisfied with the hospitals' services. They wake up at 6 a.m. to go to the hospitals, and still have to wait long." There were also two other participants who had personal connections at the hospitals they went to. For one participant, her husband works at the hospital, and the other had a close friend working at the hospital. Although these two participants did not explicitly mention specific benefits that their personal contacts provided, their experiences are consistent: their usual wait time was short. They all described the wait time as: "not that long," "10 min" and "not long." This is a big difference from waiting for a few hours or half a day. We also observed another case where a participant expressed great satisfaction with the public prenatal care services, because local public service office even gave her a call to check on her during her pregnancy. A further analysis suggests that her experience is particular to her socio-political status: her spouse works for a local government.

Another aspect of prenatal care services where patients' socio-economic status might make a difference is cost of care and insurance reimbursement. The actual cost of prenatal care services varied across participants between 2000 and 20,000 yuan (between 300 and 3000 USD).[55] A potential explanation for this discrepancy may be an insurance coverage. All the participants who spent more than 10,000 yuan did not get any reimbursements from their insurance, while most of the people who paid less than 3000 yuan received reimbursements. The insurance coverage may be associated with socio-occupational and socio-economic status. For instance, three participants working in a public sector secured generous reimbursements through a public health insurance. A participant working at a hospital received a reimbursement of 7600 yuan from her work unit insurance, and another local governance unit employee said that she used a public insurance and had a reimbursement of about 2–3000 yuan, costing her 2000 yuan out-of-pocket (OOP). Two other participants who paid less than 3000 yuan had reimbursements from private insurance. Being a public-sector employee or being able to afford a private insurance might be associated with better insurance reimbursement. Still, this result should be interpreted with a caution, and more discussion is in the conclusion section.

Fig. 1 illustrates the identified challenges, influencing factors, and a coping mechanism. In the middle are the challenges of a long wait time and short doctor-patient interaction, deriving from the issue of over-crowded hospitals. On the left are systemic influencing factors. The hospital system classifies hospitals into ranks based on their capabilities and resources, and primary care institutions remain under-invested (Cheng et al., 2017; J. Li et al., 2016; T. Zhang et al., 2017). Indeed, Yip et al. (2019) report that misdiagnosis and improper prescription of antibiotics are persistent among primary care institutions. As a result, people distrust the quality of medical care at primary care institutions and go to bigger and upper tier hospitals (Cheng et al., 2017; J. Li et al., 2016; Yip et al., 2019; T. Zhang et al., 2017). Our interview result also reflects the sentiment that upper-level hospitals are better and more trustworthy. This structure conditions individuals' hospital choice by fostering and reinforcing a preference for upper-level hospitals.

The short doctor consultation time may also stem from the norm of doctor paternalism (see the right side of Fig. 1). The paternalistic mode of doctor-patient relations refers to a situation "… where the physician is the dominant parental figure in the relationship, making decisions that he or she (the physician) believes is the best for the patient" (Peck & Conner, 2011, 547). In the paternalistic doctor-patient relations, patients are not involved in decision makings, and there is a power asymmetry between a doctor and a patient in terms of their power to control communication, information and decision makings (Peck & Conner, 2011). The doctor paternalism builds on the asymmetrical power balance between a doctor and a patient (Peck & Conner, 2011). There is a fundamental power asymmetry between doctors and patients, and societal power relations also manifest in doctor-patient relationships (Peck & Conner, 2011). There is also an informational asymmetry in that doctors always have more information about medical care compared to patients. The paternalistic mode of doctor-patient interaction and a lack of consultation time mutually reinforces the informational asymmetry (as illustrated on the right side of Fig. 1 with a bidirectional arrow).

The result is limited roles of patients in informed decision makings. This is reflected on the common phrase of "I listen to what the doctor says" and the short doctor-patient interactions. This also means that doctors do not spend sufficient time with patients to address questions they may have about their pregnancy (including nutrition and pregnancy-related illness/discomfort) and prenatal care exam results. The WHO report discusses the importance of quality of care that provides "maternal self-esteem, competence and autonomy" (World Health Organization, 2016b, 2). Therefore, high-quality care services are the ones that respect women's autonomy as well as their self-esteem and competence. A full involvement of women in informed decision makings and transparent information sharing and communication from medical practitioners is critical. The norm of doctor paternalism reflected on the lack of doctor-patient interaction can undermine the quality of care. This finding is also consistent with a previous interview study's finding that women expressed their discontent with a lack of their involvement in decision making processes during delivery services (Raven et al., 2015).

Accordingly, social networks play a role in filling the informational gaps. Social networks provide a space where women can ask questions to others with experiences of pregnancy and obtain information that is tailored to their needs. Women can inform themselves of prenatal exams, symptoms, coping methods with symptoms, and diet

[54] Interview: D3C1_5.

[55] The most common range of cost was 5000–6000 yuan (800–900 USD). More than a half of the participants paid between 4000 and 7000 yuan (600–1000 USD).

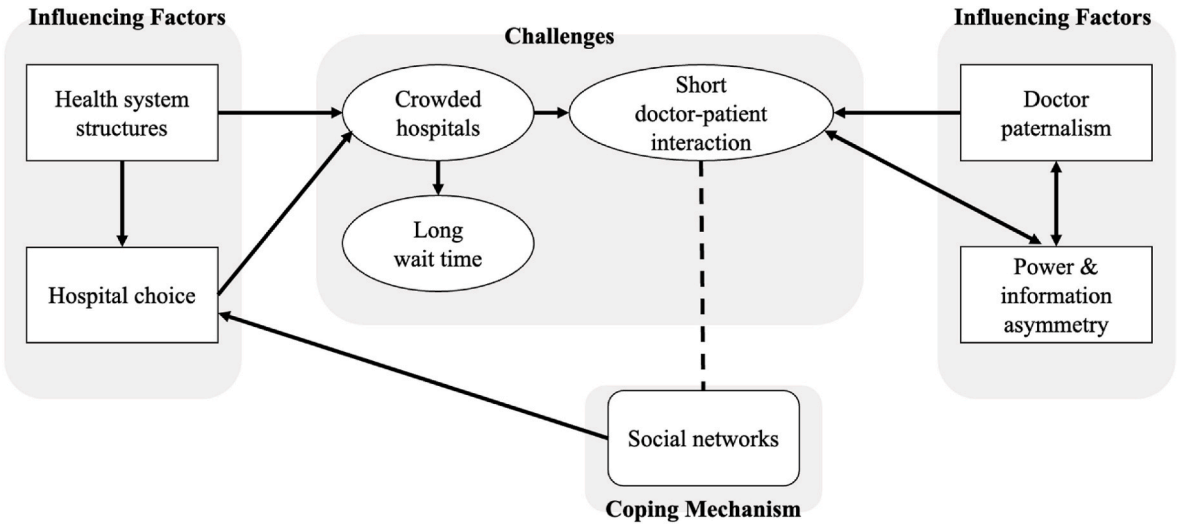

Fig. 1. Identified challenges, influencing factors, and a coping mechanism.

recommendations. They can even use their online social networks to interpret prenatal care exams. The findings also indicate that women also tend to inform themselves of prenatal care exams prior to seeking care. The greater the level of information patients have prior to their short doctor visit, the more benefits they get from the visit. Patients with less information will get fewer explanations and opportunities to ask questions. Thus, social networks inform patients what are the right questions to ask a doctor in order for them to receive explanations about exams and results, and also to involve in any decision-making processes.

Another emerging role of social networks is emotional and psychological support that they provide. The existence of various topical communities where users can interact with one another on an online social networking site suggest that there is a demand for social networks among people who have similar experiences. What people are seeking for might be connections and assurance by sharing experiences of struggles and challenges with other similarly situated people rather than instrumental networks to obtain information. Indeed, on *babytree* online communities there are posts and comments about challenges in getting sleep (while providing baby care), difficulty in eating during pregnancy, or relationship troubles with their partners. There are also other topical communities that offer emotional support. An example is a group on "pregnancy preparation" titled "exchange pregnancy preparation experiences, wish for everyone to have successful pregnancy" for people who are attempting to be pregnant. Another example is a community on "women's minds" titled "exchange emotions and state of mind, wish you a light in darkness and company in your dream." These examples suggest that social connections may also provide psychological support besides providing information. It might also be the case that these types of social networks fill in the gaps of the lack of personalized interaction with medical professionals. The role of social networks as a coping mechanism is illustrated as a dashed line on Fig. 1.

The informational role of social networks is well documented among studies on maternal care service access. The existing literature suggests that women have greater access to maternal care services when they share information with one another via informal social networks (Edmonds et al., 2012; Gage, 2007; McTavish & Moore, 2015). In Cameroon, McTavish and Moore (2015) find that having social networks characterized by high levels of education increases the number of maternity care visits. Similarly in Mali, Gage (2007) finds positive effects of having social networks whose members are higher educated and have used prenatal care services in the past. Thus, "who your neighbors are" is an influential factor for the use of prenatal care services (Gage, 1979, 2007). In the current study, we observed a similar phenomenon in a hospital choice. Some participants chose a particular hospital because people in their social networks recommended. On Fig. 1, this relationship is indicated by an arrow pointing from social network to hospital choice. Social networks play a role to circulate information about hospitals and influence individuals' hospital choices. In Bangladesh, Edmonds et al. (2012) find women are more likely to receive skilled assistance for delivery when their social network members encourage them to do so. This suggests that a particular kind of social networks encourages access to healthcare services, further corroborating the effect of information dissemination via social connections.

In recent years, there is also an increasing scholarly attention to informational roles online social networks play in prenatal care services. For instance a study finds that WeChat group communication is effective in providing health education to pregnant people with gestational diabetes mellitus in China (Tian et al., 2021). Another study has also pointed out a utility of web-based prenatal education in China (Huang et al., 2022). This study contributes to these growing studies on roles that online networks and platforms play in health education.

At the same time, scholarship on women's social capital critically point out that women's informal networks tend to fill in the gaps of formal institutions to meet their everyday demands when adequate social services are not provided. For instance, when formal institutions do not provide sufficient child care services, women's social capital can be a support network providing informal care (Lowndes, 2004). One such example is women's use of informal support network for childcare in the UK because the public institutions do not sufficiently provide such services (Lowndes, 2004). However, as a result, formal institutions can even take advantage of the preexisting women's social capital without providing adequate public social services to meet women's needs (Molyneux, 2002; Mulcahy et al., 2010). In the context of poverty alleviation effort in Latin America, Molyneux (2002) argues that women's social capital "is mobilized as the safety net for irresponsible macro-economic politics and poor governance" (179).

Therefore, social networks remain a coping mechanism rather than a fundamental solution to the systemic issues within the public health system. Social networks are not a substitute of consultation time with doctors. There are two issues of relying on social networks to remedy the issue. First, social networks may not always provide accurate information. The danger of misinformation is grave especially in the case of healthcare. Medical practitioners are trained and certified. This is precisely why patients consult doctors to obtain diagnosis, exams, and treatment rather than ordering and shopping exams and treatment based on self-diagnosis and without a need for doctors. Second, social networks reinforce and/or exacerbate existing inequalities in healthcare access. Those who are endowed with abundant social connections can

obtain better care or more information than those who do not have the networks. Uneven levels of social networks among individuals lead to unequal information and a disparity in their healthcare access and experiences.

5. Conclusion

5.1. Findings and implications

The findings suggest that the main challenges in prenatal care services access in our study area were a long wait time and short doctor-patient interaction time. Although almost all of our interview participants had access to the standardized prenatal care services, the wait time and lack of consultation time still present obstacles to prenatal care access. A few participants could not gain access to prenatal care services at their preferred healthcare institutions due to the long wait time. The long wait time also negatively impacts overall experiences of prenatal care services and cost patients their time. The lack of doctor-patient interaction creates an informational gap where patients cannot obtain full information about their health and prenatal care services they receive. The paternalistic mode of doctor-patient interaction also leads to a lack of women's involvement in decision making processes and negatively impacts their pregnancy experiences. This is also an issue of quality of care that respects "maternal self-esteem, competence and autonomy" (World Health Organization, 2016b, 2).

While this study focuses on prenatal care services, these challenges are consistent with the general issues of healthcare access in China. The existing studies find that upper-tier hospitals are overcrowded because people prefer to pursue care at upper-tier hospitals (L. Hu et al., 2019; J. Li et al., 2016; Y. Li et al., 2020). This is because people prefer to go to bigger and upper tier hospitals (Cheng et al., 2017; J. Li et al., 2016; Yip et al., 2019; T. Zhang et al., 2017). The interview responses about hospital selections in this study also reflect this general sentiment that the higher ranked hospitals are better and more trustworthy. However, this has led to the long waiting time and short doctor consultation time among the upper-tier hospitals (Cheng et al., 2017; L. Hu et al., 2019; T. Zhang et al., 2017). The prevalence of these issues across different hospitals also suggest that these are systemic issues that are beyond just a few hospitals.

Under these circumstances, women may use their social networks as a coping mechanism to obtain more information and psychological support. Social connections with friends, colleagues, and former classmates can fill in the gap of short doctor-patient interaction by providing relevant information about pregnancy and prenatal care services. This includes information necessary prior to visiting a doctor such as reputation of hospitals, prenatal care service availability, and prenatal care procedures, as well as information necessary after visiting a doctor such as how to interpret prenatal care exams and remaining questions about maternal health. Online social networks also play a similar function to provide information and a space where women can ask each other questions since they do not get opportunities to ask questions to their doctors. The analyses of a popular online platform also suggest that these social networks can provide psychological support, filling in the gap of impersonalized and highly procedural prenatal care service provisions. Still, social networks remain a coping mechanism rather than a fundamental solution to the systemic issues within the public health system.

This study's findings suggest that an increased public service institutional capacity can improve general access and also mitigate an access disparity that stems from the use of social connections. Since 2012, the Chinese government has been focusing on reforming inefficient public hospitals and creating primary care centered system with local-level pilot experiments (Yip et al., 2019). These continuous effort in improving the primary care services and public hospital system is beneficial in mitigating the remaining challenges. Structures condition medical providers' behaviors in a certain manner through incentive structures and norms. Thus, a structural reform can lead to a patient-centered norms and orientation toward quality of care.

5.2. Limitations

The current study also has three limitations. First, we find that some institutional features such as an appointment system can also reduce a wait time. There were few participants who mentioned that their wait time was short due to an appointment system. At the same time, there were also few participants who still had to wait one to 2 h even with their appointments. We also find that among the participants who went to the same hospital, some used an appointment system while others still had to wait for a long time without an appointment. Future studies should examine the variation in institutional features such as appointment system and what distinguished those who benefit from it and those who don't.

Second, this study's interview data alone does not fully explain why some women received insurance reimbursements (of varying amount) and some women did not receive any reimbursements within the same city. In general, a reimbursement rate for prenatal care services was extremely low among our interview participants, while the China's government statistics suggest that over 90 percent of the population had some form of health insurance in 2018 (National Bureau of Statistics of China 2019). One possible explanation is a lack of awareness about the insurance package or how to use the insurance. However, several of our participants stated that they used the insurance, but they did not get reimbursements. These are cases where they have insurance, and they used the insurance, but the insurance did not cover the prenatal care service cost. Therefore, future study can further delve into the workings of the public insurance system in prenatal care services.

The final limitation to note is that the present study is only limited to a single urban locality with a limited sample. While we made a conscious effort to sample from communities of different economic status, our sample is biased toward those with privileged socio-economic status. Most of our interview participants have college degrees, have a house and a car. Thus, we must interpret the results with these sample characteristics in mind. Furthermore, the conditions in rural China are likely to be very different, and this study does not account for the rural-urban gap in prenatal care services.

Ethical statement

Our study was approved by The University of Kansas Institutional Review Board (approval no. STUDY00144021). All participants provided oral informed consent prior to enrollment in the study.

Funding

None.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

This study derives from the author's doctoral dissertation. The author thanks her/their Ph.D. advisor John James Kennedy for support throughout the project, as well as the support she/they received from Rigao Liu and Dr. Hongyan Liu to conduct fieldwork interviews. The author also attributes the research inspiration to conversations she/they had with Hongyan Liu. The author is also grateful for the support she/they received to conduct fieldwork interviews from the graduate students and faculty at the Center for Experimental Economics in Education

(CEEE) at Shaanxi Normal University, including Dr. Shi Yaojiang, Huan Wang, and Ruirui Dang. Finally, the author thanks all the interview participants for their time and participation. Any errors are the author's responsibility.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmqr.2024.100502.

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