
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Midwifery 109 (2022) 103316

Contents lists available at ScienceDirect

Midwifery

journal homepage: www.elsevier.com/locate/midw

# Exploring lived experiences of informal caregivers for pregnant women seeking scheduled antenatal care during the COVID-19 lockdown in China: A phenomenological study

Yan Zuo[a], Bi-ru Luo[a], Ling-ning Wang[a], Bo-chao Cheng[b], Xiao-lin Hu[c,*]

[a] West China School of Nursing, Sichuan University / Department of Nursing, West China Second University Hospital, Sichuan University / Key Laboratory of Birth Defects and Related Diseases of Women and Children (Sichuan University), Ministry of Education. #20 3rd Section, Renmin Nan Road, Chengdu 610041 Sichuan Province, China

[b] Radiology Department, West China Second University Hospital, Sichuan University / Key Laboratory of Birth Defects and Related Diseases of Women and Children (Sichuan University), Ministry of Education. #20 3rd Section, Renmin Nan Road, Chengdu 610041 Sichuan Province, China

[c] West China School of Nursing, Sichuan University / Department of Nursing, West China Hospital, Sichuan University. #37 Guoxue Alley, Wuhou District, Chengdu 610041, Sichuan Province, China

ARTICLE INFO

*Article history:*
Received 22 November 2021
Revised 20 February 2022
Accepted 18 March 2022

*Keywords:*
Caregiver burden
COVID-19
Informal caregiver
Lived experience
Lockdown
Pregnant woman

ABSTRACT

*Objective:* We aimed to explore the lived experiences of informal caregivers for pregnant women seeking scheduled antenatal care during the early stage of China's COVID-19 lockdown and potential measures to address the challenges.
*Design:* This is a phenomenological qualitative study.
*Setting:* The study was carried out in a leading teaching hospital in Southwest China.
*Participants:* We recruited 15 informal caregivers for healthy pregnant women on routine antenatal visits about six months after China launched the city-wide lockdown and other control measures for COVID-19, including 10 males and 5 females with diverse demographic backgrounds.
*Measures and findings:* The research team developed a demographic form and an interview outline with key questions, conducted semi-structured interviews with the informal caregivers, and analyzed the data using the Colazzie's method. Five themes of lived experiences were revealed, *i.e.,* increased caregiving burdens, disruption of routines in family life, lack of accurate information and knowledge, active role adjustment, and positive attitudes and coping in a difficult time. Some caregivers reacted positively to the lockdown experience and saw it as an opportunity to rethink their lives and improve family relations.
*Key conclusions:* The informal caregivers experienced increased physical and psychological burdens. Strategies such as adoption of a less frequent prenatal visit schedule, use of tele-medicine technologies, and provision of accurate information and knowledge may help to ease the increased informal caregiving burdens. Psychological counseling, community services and disaster response policies specially targeting pregnant women and their informal caregivers may also be valuable resources.
*Implications for practice:* Attention should be drawn to the group of informal caregivers for pregnant women during a COVID-19 lockdown, including professional assistance delivered by nursing and other related professionals. Measures are called for to minimize exposure opportunities such as adoption of a new prenatal care schedule and tele-medicine technologies. Patient education with reliable information should be provided, preferably by nursing staff and physicians. Social support efforts including professional mental counseling may added and work with other resources such as community services and policy makers.



## Introduction

A cluster of serious pneumonia cases caused by an unknown pathogen was reported in Wuhan, capital city of Hubei province, China in December 2019 (Zhou et al., 2020). The new virus was soon confirmed to be transmissible between humans (Chan et al., 2020), which was later officially named the severe acute respira-

* Corresponding author.
*E-mail address:* huxiaolin1220@126.com (X.-l. Hu).

https://doi.org/10.1016/j.midw.2022.103316
0266-6138/

tory syndrome coronavirus 2 (SARS-CoV-2) and the condition it causes the coronavirus disease 2019 (COVID-19) (WHO, 2019). The Chinese government was quickly alerted and responded with a range of local and nationwide control measures. In tackling further spread of the virus, transportation in and out of Wuhan, the epicenter was suspended from 23 January 2020, after which the entire Hubei province was isolated the following day. On the same day of Wuhan's lockdown, the Chinese state authority raised its national public health response level to the maximum level of emergency, *i.e.,* Level 1 in China's 4-level Emergency System. Other control measures were introduced nationwide, including screening and isolation of suspected and confirmed cases, suspension of public transit, closure of all schools and entertainment venues, ban on public gatherings, prohibition of travel in and out of cities, and dissemination of information on mass media (Tian et al., 2020). Personal actions were required according to health authority recommendations, including frequent airing and disinfection of home environment, wearing a proper facial mask whenever going outdoors or entering a public space, and handwashing with soup water (China CDC, 2019). Certain essential public services remained operational, including hospitals providing prenatal care. The hospitals also introduced prevention and control mechanisms according to the national guidelines, such as taking temperature of every person entering the premises, designating separate space and passages for suspected cases, required wearing of facial masks at all times, isolating and referral of suspected and confirmed patients to a local designated hospital treating COVID-19 patients (China CDC, 2019).

As one of the most important life events in Chinese culture, childbearing has been traditionally stressed and pregnant women are well cared for, both professionally and informally. Prenatal visits are a common practice among Chinese childbearing women (National Health Commission of the People's Republic of China, 2019), who will typically register her case with one of the local obstetrics hospitals and visit the hospital at least ten times for routine checkups before laboring given that her gestation is not clinically complicated according to the guidelines of Chinese Medical Association (Chinese Medical Association, 2018). Informal prenatal care is often provided by the pregnant woman's family members, primarily one or more of her parents or parents-in-law. The husbands share some of the care tasks, who usually continue to work. Remunerated external help, such as a family relative, friend, and/or a hired nanny or sitter, may also be used, often in more affluent families. The informal caregiving includes preparing special diet, assistance with daily living activities, and providing company and support for pregnant women. The carers may often accompany the pregnant women on prenatal visits.

After the Chinese cities were locked down and other stringent control measures devised for the COVID-19 pandemic, the circumstances in which informal prenatal care was delivered were drastically changed. As a result, the behaviors and real-world experiences of the informal caregivers were changed significantly. The external help was no longer available due to the lockdown and transport ban. The tasks incurred by caregiving were different and increased. Many of the carers experienced greater burdens from caregiving. After searching the main databases including PubMed®, the Cochrane Library, Embase® and Ovid®, we were unable to find any literature focusing on the group of informal caregivers for pregnant women, reporting their experiences during the COVID-19 lockdown, or suggesting strategies to address possible challenges.

On the current study we aimed to explore the lived experiences of informal caregivers for pregnant women during the early stage of COVID-19 lockdown in China and some promising strategies to alleviate their caregiving burdens based on existing research results. Our findings may contribute to the understanding of the *status quo* of informal prenatal caregiving during the COVID-19 pandemic and shed light on useful measures to address similar situations in the continual COVID-19 lockdowns and future disaster events.

## Methods

### *Study design*

This is a phenomenological qualitative study to explore lived experiences of informal caregivers for pregnant women during the COVID-19 lockdown in China. Colaizz's method was employed for data analysis (Edward and Welch, 2011).

### *Ethical consideration and informed consent*

The study was ethically approved by the Academic Ethics Committee, West China Second University Hospital, Sichuan University (approval number YXKY194). After explaining the study to candidate participants in details before each interview, informed consents were signed with both the pregnant woman and her informal caregiver after they indicated full understanding.

### *Setting and sample*

The current study took place in a tertiary teaching hospital for woman and child health affiliated to a university in Chengdu, Sichuan province of Southwest China. The city is located over 1000 km away from Wuhan, the COVID-19 epicenter. National response measures were implemented in the city, such as citywide lockdown, suspension of transit, identification and quarantine of infected and suspected patients in the local hospitals designated to treat COVID-19, frequent personal hygiene and disinfection, and required use of personal protective equipment. The hospital was not a designated facility for admitting COVID-19 patients. An internal screening protocol was in place to identify and isolate any possibly infected individual, including such measures as automated body temperature measurement of all persons entering the facility with a thermal imaging system at the entrance, subsequent screening procedures outside each department, separate waiting areas and a fever clinic for febrile patients, and a specialist consultation and referral protocol for suspected cases.

We used purposive sampling to enroll participants. The primary investigator (first author) selected candidate study subjects from pregnant women visiting the hospital for prenatal care between May and July 2020, which some six months into the implementation of COVID-19 control measures. She approached the candidate dyads while they were in the waiting area of the Obstetrics Clinic of the hospital on one of their routine prenatal visits. The primary investigator then greeted them both, introduced herself, and talked casually with the dyad first when she visually assessed their overall mental statuses and communication abilities. Should she find the dyad suited for the study, she then explained the purpose and process of the study briefly and asked if both the pregnant woman and her accompanying caregiver were willing to participate. Then the primary investigator checked their eligibility against the inclusion and exclusion criteria. The eligible dyads were included.

The inclusion criteria for the study were: for pregnant women: (1) the pregnancy was uncomplicated; (2) the pregnant woman had a registered prenatal care file at the hospital; (3) the pregnant woman did not have any known serious or chronic physical or mental illnesses; (4) the pregnant woman was aged 18 years or older and had sufficient communication ability; for informal caregivers: (5) the caregiver did not receive financial compensation of any kind for his or her care delivery; (6) the caregiver provided at least eight hours of care daily for the pregnant woman over the last week to qualify as a primary informal caregiver; (7) the

informal caregiver had sufficient communication ability and was mentally fit as visually assessed by the primary investigator; for the dyad: (8) the pregnant woman and her primary informal caregiver gave written consent to part-take in the study. The exclusion criteria: for pregnant women: (1) complicated pregnancy; (2) the pregnant woman visited the hospital only for *ad hoc* prenatal care; (3) the pregnant woman had one or more serious or chronic disease or was mentally unfit for the study as visually assessed by the primary investigator; (4) the pregnant woman was aged below 18 years or did not have sufficient communication ability; for informal caregivers: (5) the caregiver received financial remuneration of any kind for the care delivered; (6) the caregiver's average daily care time was less than eight hours over the last week; (7) the informal caregiver did not have sufficient communication ability, or was known or observed to be mentally unfit for the study as visually assessed by the primary investigator; (8) the informal caregiver showed any concern or was uncomfortable to talk freely in the presence of the pregnant woman; for the dyad: (9) either one of the dyad refused to participate in the study; and (10) the dyad had a conflicting schedule for interview.

The sample size was determined with the data saturation method (Sandelowski, 1995), where we stopped enrolling and interviewing new subjects when data saturation was achieved, *i.e.* when the interviews ceased to yield new analytic information.

Strict COVID-19 precautions were exercised on every interpersonal encounter, including wearing proper masks, handwashing and disinfection before and after, social distancing of at least 1.5 m, disinfection of used items, and proper disposal of wastes produced during the interviews.

### *Data collection*

The research team included three registered nurses, each with more than 10 years of clinical experience, one radiologist, and one obstetrician. All members received training on phenomenological research and semi-structured interview. The research team designed the study and developed the interview questions. The primary investigator, who was also a psychological counselor with over five years' experience, conducted semi-structured interviews with the included subjects.

The interviews were situated in a designated meeting room in the Obstetrics Department of the hospital. The room was disinfected and properly aired. The primary investigator interviewed no more than two dyads face-to-face a day for precaution considerations. The informal caregiver was the targeted interviewee while with the pregnant woman was seated in the same room during an interview. The pregnant woman was allowed to add to her carer's response occasionally.

The subjects were invited for an interview right after they were included or after their clinic consultation on the current prenatal visit. After they were seated, the primary investigator explained the study in details and attained their informed consents. The primary investigator then turned on the recorders and began the interview with a grand tour question such as 'Could you describe how you feel about caring for a pregnant woman/your wife/your daughter… during the special time of COVID-19 lockdown?' and 'Have you experienced any changes in caring for a pregnant woman compared with before the epidemic?' Probing questions were asked to encourage the interviewee to elaborate, such as 'Could you tell me more about it?' and 'What would you say is the most difficult problem to deal with?'

Interview techniques such as rhetorical questioning, repetition and response were employed to collect the real psychological feelings of interviewee. The primary investigator took field notes including the interviewee's tone of speaking, notable facial expressions and gestures during the interview. The interviews lasted 27 min on average (range 20–32 min). The entire interview processes were audio recorded with two recorders. The recordings and field notes were cataloged right after an interview. The research team transcribed the recordings verbatim and double checked the transcriptions for accuracy within 24 h after each interview.

All personal identifiers of the subjects were replaced with serial numbers N1, N2… for anonymity. All data were kept confidential. Information on and recordings of the excluded subjects if any were properly destroyed, except for their demographic information kept for statistical calculations.

### *Rigor*

The following measures were taken to ensure quality of data: (1) the primary investigator maintained neutrality during interview, who only encouraged or oriented the interviewee when appropriate without giving any personal opinions or making a personal judgment; (2) the primary investigator clarified uncertain statements or feelings with the interviewee during the interview; (3) the transcriptions were emailed to the participants for verification; and (4) the research team resolved doubts or disagreements during transcription review with a discussion based on the original transcriptions and clarified with the interviewee if it remained unresolved.

### *Data analysis*

The data analysis process was based on Colazzie's method, including: (1) the research team members read each interview transcription in entirety to form an overall understanding; (2) the primary investigator worked as the primary coder with the other investigators to analyze and extract significant statements from the transcription; (3) the team encoded and gathered the recurrent statements of significant opinions; (4) the team classified similar codes into more comprehensive sub-themes; (5) the team summarized the sub-themes to form major themes; and (6) the primary investigator double checked with the interviewees to verify accuracy.

As mentioned above, in case there was a disagreement among the team, we would go back to the transcription for clarification. A phone call would be made to the interviewee in question for final resolution if the disagreement remained after the team reviewed the transcription.

## Findings

### *Demographics of study subjects*

Out of 18 candidates approached, we eventually included 15 dyads of pregnant women and their informal caregivers (83.3%), who came to our hospital on routine prenatal visits between May 2020 and July 2020. Three dyads were excluded for a conflicting schedule (16.7%). The informal caregivers were 5 women (33.3%) and 10 men (66.7%) aged 37.2 years on average (range 27 - 66 years). The pregnant women's average length of gestation was 26±1.50 weeks (range 10+3 – 39+1 weeks), most of whom were between 12 and 28 weeks (11, 73.3%). All 15 informal caregivers were immediate family members to the pregnant women, including 10 husbands (66.7%), 3 mothers (20.0%) and 2 mothers-in-law (13.3%). Most of the informal caregivers had an education level of undergraduate or over (10, 66.7%), followed by 3 at the level of high school (20.0%) and 2 primary school or lower (13.3%). Two of the informal caregivers did not give information on their occupations (13.3%). The other 13 participants occupations were diverse, including 3 retired persons (20.0%), 2 small business owners

**Table 1**
Demographics of informal caregivers ($N = 15$).

| | | *n* (%) |
|---|---|---|
| Gestational week | < 12 | 2 (13.3) |
| | 12 - 28 | 11 (73.3) |
| | > 28 | 2 (13.3) |
| Relation with pregnant woman | Husband | 10 (66.7) |
| | Mother | 3 (20.0) |
| | Mother-in-law | 2 (13.3) |
| Gender | Male | 10 (66.7) |
| | Female | 5 (33.3) |
| Age (years) | 20 - 29 | 4 (26.7) |
| | 30 - 39 | 3 (20.0) |
| | 40 - 49 | 3 (20.0) |
| | > 50 | 5 (33.3) |
| Education level | Primary school or lower | 2 (13.3) |
| | High school | 3 (20.0) |
| | Undergraduate or over | 10 (66.7) |
| Occupation | Administrator | 2 (13.3) |
| | Clerk | 1 (6.7) |
| | Teacher | 1 (6.7) |
| | Factory worker | 2 (13.3) |
| | Small business owner | 2 (13.3) |
| | Retired | 3 (20.0) |
| | Freelancer | 2 (13.3) |
| | Not reported | 2 (13.3) |

(13.3%), 2 administrators (13.3%), 2 factory workers (13.3%), 2 freelancers (13.3%), 1 clerk (6.7%) and 1 teacher (6.7%). Table 1 details the demographics of the study subjects.

*Themes of lived experiences of informal caregivers*

We summarised five major themes from the interviews with the informal caregivers, *i.e.* (1) informal caregivers experienced increased caregiving burdens; (2) routines in family life were disrupted; (3) there was lack of accurate information and knowledge; (4) informal caregivers adjusted their roles actively; and (5) informal caregivers showed positive attitudes and coping in a difficult time.

*Informal caregivers experienced increased caregiving burdens*

Most informal caregivers indicated a rise in caregiving burdens both physically and mentally. Caring for a pregnant woman could be difficult and stressful in itself, which was further complicated by the COVID-19 pandemic, lockdown and control measures. The informal caregivers experienced more complex psychological processes and greater pressure in their day-to-day caregiving.

*Their physical pressure was greater and care tasks increased*

The informal caregivers' physical burdens increased due to impact of the COVID-19 lockdown and control measures. The lockdown effectively prevented access to the external help such as sitters, nannies, family relatives and friends that would otherwise be available to provide or support prenatal caregiving. Participant N4 mentioned: 'Our a'yi (nanny) went back to her hometown. It seems that we have to do all housework for a while as the epidemic goes on'. There were more tasks incurred as a result of the COVID-19 control requirements, in particular disinfection. According to participants N1: 'All items at home must be wiped with alcohol every day'; N2: '(We) must disinfect hands and clothes with disinfectant after coming back home from the hospital'; and N14: 'As my daughter-in-law's gestation gets into the later weeks, we have to come to the hospital for a prenatal check every week. My son works in a facial mask factory. He has to work extra hours every day. Aren't there more things to attend to every time we leave home? Like disinfection and so on. Also put on a hat, wear shoe covers. I have to cook every day. Very busy. Tired, really tired!' Access to prenatal care was considerably more difficult because of the citywide transit suspension, which was not lifted until the later stage of the epidemic. This meant that private vehicles were the only means of transportation to the hospital. Riding a private car was not as simple as before COVID-19 according to participant N15: 'My wife can't ride any public vehicles lately. Every time we leave home it takes half an hour to disinfect the car.' Shutdown of most restaurants, supermarkets, food markets and grocery stores complicated daily care delivery. Participant N7: 'We need to keep changing food tastes. All restaurants and stores are closed outside. I got many recipes but some have failed.'

*Their psychological caregiving experiences were complicated*

In face of the COVID-19 pandemic, fear, worry and anxiety were common, which was especially true when the lockdown first began. According to participant N1: 'I will only feel safe after wiping everywhere every day, feeling safe for my daughter-in-law (pregnant woman) and dear grandbaby (fetus)'. The causes were various, such as virus transmission risks due to population flow, according to participant N3: 'Chengdu has major people flow. Many people come back to Chengdu from Hubei province (the epicenter) during the epidemic. The high-speed trains are highly developed. I'm very anxious and worried'; lack of knowledge about the virus, disease and how it could be treated, participant N12: 'The COVID-19 is highly contagious. The uncertainty about its transmission and treatment brings us fear, for both my wife and me. Our baby is in the most important stage of growth. Very worried. I even had rather terrifying dreams'; media coverage, participant N15: 'My wife gets nervous more easily after becoming pregnant in the first place. Now even more sensitive, especially sensitive to the news reports about the COVID-19 stats, pregnancy and child delivery. As a father-to-be, I'm very concerned about mother-to-child transmission too, but I definitely can't show it before her'; and worry about the pregnant women, participant N5: 'I can actually manage my own feelings. Mostly I'm worried about my wife that she may get anxious if I can't take good enough care of her. Prenatal checks have to be done. Very nervous every time we come to the hospital.'

**Family life routines were disrupted**

Most participants indicated that their daily routines and original life plans were disrupted because of the rapidly changing epidemic situation recently, which had resulted in changed care tasks and schedule. Shutdown of the local farm product markets significantly reduced the diversity of and access to food supplies, as participant N7 said: 'We can only go to a store to get food lately. There used to be so many fresh vegetables and fruits for us to choose from at will, especially those fresh vegetables from the countryside, which we can't get lately.' Participant N12 also mentioned: 'The food market near our neighborhood is closed because some suspected case was found. Buying food is not convenient.' Ban on crowd gathering and home stay requirements ruled out opportunities of social gathering in person. Outdoor activities such as daily walks and exercises for pregnant women were not allowed or intentionally avoided for fear of the virus. Participant N8 said: 'We don't party recently. It's not convenient for my wife to excise. She exercises completely indoors. The whole family stay in the home for whole days every day'. Participant N13 said: 'My daughter's pregnancy is getting in the late weeks. Shopping is not easy now. Many (shops) are closed. We stay home and can't go for walks in

the park. We cook some nice food together and kill time by making some little stuffs.'

*There was lack of accurate information and knowledge*

Because there was no known knowledge about this newly emerging virus and the conditions that it causes when COVID-19 was first reported in China, people were in almost complete lack of knowledge, except what had been learnt about the severe atypical respiratory syndrome (SARS) in 2002, which was caused by another coronavirus. Misinformation and rumors were not uncommon after China was first hit by COVID-19 in December 2019 as well as during the earlier days of response. Lack of accurate information and professional knowledge in this stage contributed to the confusion and anxiety among people. It was evident that our participants were rather confused about what they should do and, as a result, felt a sense of insecurity. According to participant N2: 'This is an era of information explosion. We watch the news every day and are concerned about the number of cases and pay attention to relevant knowledge. We were particularly nervous over the days during the Spring Festival.' Participant N3 mentioned similarly: 'When taking care of her (my wife), we talk about this (COVID-19), too. Hard to avoid the topic, you know. I'm still afraid what I say is inaccurate. It might make her worried and afraid.' Participant N15 pointed out even more frankly: 'One fears what's unknown. Is the virus transmissible from mother to child? Is it contagious among children? How is its transmissibility? None of these are clear. It makes us worried and feel insecure.' Lacking knowledge of the *status quo* of virus transmission and how to cope with it also caused fear. Participant N13 articulated: 'A case is confirmed in the neighborhood next to ours. I don't know if I have ever made contact with the family when I went to the market every day. I was shocked when I heard about it. Didn't know how to disinfect myself.' Participant N10 emphasized: 'I don't know how to disinfect our home. I just do what my daughter teaches me to do.' Participant N15 indicated concerns about healthcare facilities: 'I have rhinitis. Now and also after the baby is born, it could really be a problem if I continue to sneeze. I planned to see a doctor at a clinic but dared not go. Too many people in the hospital anyway.' Several participants indicated wishes to attain reliable professional information and knowledge about COVID-19, including health education provided online. Participant N9 expressed hope to attain information from the hospital: 'It's difficult to exercise during pregnancy. There are limited sources of information. (We) hope that the hospital may provide more guidance online.'

*Informal caregivers adjusted their roles actively*

The sudden outbreak of the COVID-19 epidemic and the massive lockdown and other response measures caused drastic changes to how informal prenatal care was delivered. The roles of informal caregivers had to change accordingly, including their roles in family relations, life plans, social activities and caregiving. Some of the participants stopped working because of the pandemic and picked up the duties as a caregiver, while some others had to assume caregiving because other carers had to continue working during the pandemic. For instance, participant N1 was family of a medical worker engaging in COVID-19 response: 'My child is a doctor. He is busy at the hospital recently and meets a lot of people. (He) doesn't see her for safety's sake. I have taken over all caregiving duties. (The wife) lives in my place now.'

Some of the informal caregivers reacted rather optimistically as they saw the lockdown as an opportunity for them to get away from work and spend more time with family. Participant N4 said cheerfully: 'Every time (we) come to the hospital for a prenatal visit, there are lots of preps to do. Taking the hand disinfection spray bottle, disinfecting the clothes and shoes when getting back home. Wah… To be honest, this is even more tiring than working. I have hardly done these things before' (burst into laughter). Participant N6 said similarly: 'My focus in life has shifted completely from work to family life lately. Make preparations for three meals a day. Take good care of my wife during her pregnancy. This is the most important thing and what I should do. I think I'm doing a pretty good job' (said with a smile).

The extended holidays, which gave more and continuous time to the informal caregivers with the pregnant women, were also a reason for a husband's change of role and positive reactions to caregiving, despite increased amount of care work, according to participant N12: 'I'm now the busiest person in the family. My wife counts on my care. Longer holidays lately, never like this before. I'm happy, too. I like the days when I can leave work on time every day and take care of my wife'.

*Informal caregivers showed positive attitudes and coping in a difficult time*

The pandemic and lockdown situation were a stressor that could cause fear, worry and anxiety. However, 'every cloud has a silver lining'. People's behaviors may change positively during the COVID-19 pandemic (Kalra and Deshmukh, 2020). It also meant more time for the pregnant women and their informal caregivers, in our case family members, to spend closely together, an adversary for the family to confront and go through together, and a rare valuable period for them to rethink their lives and relations. We noted positive attitudes among the participants towards what they experienced personally as an informal caregiver during the lockdown. They also found ways to cope with the difficult time and manage to provide quality care for their wives or children.

*Informal caregivers made insight into themselves and stressed positive experience of family*

When witnessing the disease and deaths during the pandemic, some of the informal caregivers began to look at themselves, life and family from a new perspective than before. There appeared to be positive changes in their attitudes and behaviors. According to participant N4: 'There are so many confirmed COVID-19 cases and deaths every day. (I) find life really unpredictable. I feel truly lucky that we are waiting for a new life to be born in this rather safer environment. I feel the sanctity of life. I'm very grateful…' Participant N6 articulated: 'After confronting the difficulties, (I) am actually not anxious any more. At this point, taking good care of my wife and baby is the most vital thing for me.'

*Informal caregivers experienced emotional fulfillment, sense of accomplishment and improved family relations*

The caring process seemed to bring the relationship between informal caregiver and pregnant woman closer. This was both true for a husband and a parent as an informal caregiver. Participant N15 (husband) told the interviewer:'(We) watch TV series, read books and play video games together. (I) try every way to make her laught. (I) don't work extra hours recently. (I) don't have pressure or business diners like before. Very quiet life now. We feel very sweet.' Participant N13 (parent) said: 'My daughter and I stay home. We make some small stuffs together while chatting. (Her father and I) were busy when we were younger. She was busy going to school, graduating, working and getting married. It's rare that we can communicate deeply like this. We find it very valuable.'

When a husband made his wife happy through his caring efforts, he felt a sense of accomplishment, as participant N3 pointed out: '(I) was always busy with work and felt fine to leave her (wife)

to the family. But now I cook every day, we watch TV together, chat after eating, and I feel very satisfied. I can really get used to a life like this, very good indeed.' Participant N7 even said proudly: 'Very valuable experience. (My) cooking skills have improved considerably. My wife says I'm pretty good at it now.'

## Discussion

Childbearing is a highly attended life event in Chinese culture. The attention has grown even higher and the way informal prenatal care is delivered has become more diverse and thorough as families are more financially affluent. Special care for a pregnant woman could even start before a planned pregnancy and last beyond child labor. The care tasks range from preparing special food, helping a pregnant woman with daily living activities, accompanying her on a prenatal visit at a hospital to providing personal company and psychological support. Identities of informal caregivers may be one or even more of the couple's parents, who in many cases may move to live with the couple; family relatives and friends, who may or may not receive economic remunerations; and hired external help such as a nanny or sitter. The husbands typically continue to work and may share some care tasks. The number of caregivers engaging in prenatal care, especial how much external help is hired, mostly depends on how affluent the family is.

After the COVID-19 epidemic broke out in December 2019, the usual way of informal prenatal care delivery was disrupted. The nationwide lockdown and other stringent control measures drastically changed the circumstances in which prenatal care was delivered. On one hand, the travel ban prevented most families from attaining external help. On the other hand, extended holidays freed up husbands and other family members for caregiving. As a result, there seemed to be a shift of caregiver identity from a more diverse makeup to more immediate family members. According to our findings, all the interviewed informal caregivers were either parents/parents-in-law or husbands of the pregnant women. The interview findings also revealed that hired help such as 'nannies' had left after the epidemic began. Without external help, fewer caregivers were available per pregnant woman and each caregiver would have to take up more care tasks.

Increased complexity and variety of informal care delivery also added new tasks during the lockdown. Accessibility of prenatal care was troubled because of suspension of urban public transit, which reduced the available options of means of transportation for prenatal visits to a hospital. Limited bus lines were kept for public use, which however were hardly chosen by pregnant women and their family for fear of virus transmission. Private cars seemed to be the most used vehicles according to our findings. Riding it meant more tasks including driving and disinfection before and after. After citywide lockdown began, only a handful of grocery stores and food markets were kept open. Access to food and daily groceries was more difficult and incurred other tasks such as disinfection of all containers, the purchased items and body surface every time a caregiver went for grocery shopping. Daily exercises of pregnant women became more challenging because most public spaces suited for a walk and exercises such as parks and malls were closed, temperature had to be checked at the entrances and exits of residential compounds, and disinfection and facial masks were required. Hospitals were required to devise infection screening and prevention mechanisms. The measures included a mandatory online appointment, temperature taking at the entrance of hospital and a double check before entering a clinic, wearing of facial masks at all times, distancing in the waiting areas, disinfection after physical contact, and use of designated space and passage if any sign of COVID-19 infection was detected. This complicated prenatal visits. An accompanying caregiver was more needed than before the pandemic to assist the pregnant women with the visit process. These considerably increased the physical burdens of the informal caregivers according to our findings. The caregivers seemed more stressed psychologically during the lockdown, especial the early stage of the pandemic. As the interviewees indicated, they were fearful, worried/concerned, and nervous. They feared for the transmission and infection of the virus, were worried/concerned because of absence or lack of accurate information and knowledge about the newly emerging disease, and were nervous about the safety of the pregnant women and the babies as well as whether they had done properly in delivering care. The emotional responses during the COVID-19 lockdown added up to their care burdens psychologically. Similar experiences have been reported of other special groups by a number of other researchers during the COVID-19 pandemic (Borges-Machado et al., 2020; Sheth et al., 2021; Penteado et al., 2020; Cohen et al., 2021)

There are known strategies that are potentially helpful for easing the informal caregivers' prenatal care burdens. Many of the additional care tasks were resulted from reduced accessibility of prenatal care according to our findings. A modified schedule which requires fewer prenatal visits may minimize the demand of a pregnant woman to access care, in particular those whose gestation is not medically complicated and only needs routine checks. Compared with the Chinese Medical Association guidelines, which most Chinese prenatal care providers adopt and require at least 10 routine prenatal visits throughout pregnancy, Peahl AF *et al.* evaluated a reduced prenatal visit schedule incorporating virtual visits (Peahl et al., 2021). Such a schedule with less frequent visits may not be necessary in times other than disasters like COVID-19, but could lower the need to access a care provider physically, hence reducing the informal care tasks incurred. Tele-medicine technologies including tele-consultation on a smart phone, remote monitoring and uploading of pregnant woman's vital signs, fetal heart rate and other physiological data, and home-delivery of medications are well developed and widely adopted during the COVID-19 pandemic (Peahl et al., 2021; Fryer et al., 2020; Zork et al., 2020; Pasadino et al., 2020). Replacing some of the routine physical prenatal visits with the online and remote technologies may well reduce the required frequency of physical access to a hospital. Another strategy is to localize some of the routine lab tests and examinations on a prenatal visit. Many of the community health centers were kept operational during China's COVID-19 lockdown. Patient attendance was not allowed but the health workers would make home visits to the households in the local neighborhoods, who were responsible for taking temperature and monitoring for signs of COVID-19 infection, delivering refill medications for the local chronic disease patients, and dealing with simple illnesses. It is suggestible that in future lockdown events, they should also collect blood and other samples of pregnant women and use the local laboratory for certain tests and examinations, saving the pregnant women and their informal caregivers a visit to hospital.

Information dissemination, education and psychological counseling may be helpful for alleviating the informal caregivers' psychological burden. According to our findings, fear for the COVID-19, especially in the early stage of the pandemic, was largely attributable to the absence or lack of accurate information and knowledge about the virus and the disease. There was no known knowledge of the pathogen whatsoever due to its total novelty. Rumors and misinformation were not uncommon in the beginning. The number of infected patients and death toll increasing by the day made it even worse psychologically. It was repeatedly expressed by the participants that accurate information and knowledge were needed, preferably from reliable sources such as health professionals. As an essential part of prenatal visits, pregnancy health education may be an opportunity to offer helpful information and knowledge for easing the informal caregivers' psychological burden. Health professionals involved in prenatal care,

both physicians and nursing staff, may contribute by offering information and knowledge. In future disaster situations where a lockdown is likely, health professionals may even act proactively, for instance, by preparing disease knowledge pamphlets to give out on a physical visit and organizing lectures offered to both pregnant women and their caregivers online in addition to their routine pregnancy health education. If a caregiver is psychologically troubled, for example experiencing burnout, professional counseling sessions should be recommended and scheduled.

Local community services may play a valuable part in alleviating informal caregiving burdens during pregnancy. To some extent, the Chinese community services were caught unprepared when first responding to the COVID-19 pandemic. There had never been a nationwide mobilization as thorough as the COVID-19 lockdown. Community services in response to COVID-19 focused on maintaining order of local neighborhoods, provisions of daily living necessities and pandemic control measures. The only special population that was specifically targeted was the elderly people, especially those with chronic diseases, to whom refill medications were prescribed online and delivered to their doors. Other special populations including pregnant women and their informal caregivers were treated the same way as the general population. Targeted services should be considered for the groups in future lockdown events. In addition to the healthcare needs mentioned above, other special needs in daily living during pregnancy, such as food and exercise, may also be attended in community services. Furthermore, emergency response measures addressing the needs of different special populations should be specified in future policy making. The efforts may serve their purposes best if done proactively based on the experiences gained from disaster events such as the COVID-19 pandemic and research findings such as the current study.

It is notable that the lockdown was not described only as a negative experience by the informal caregivers. Several interviewees found it to be an opportunity for them to rethink their lives and family relations; in some cases, a chance to improve the relations by caring for the mothers-to-be. Without external help, immediate family members, especial the husbands, who were freed up from work during the extended holidays and stayed home because of the lockdown, became the primary informal caregivers for their pregnant wives. Many of them adapted to their new roles positively. They seemed to enjoy the time spent caring for their wives according to our findings. The message that the lockdown could be 'the silver lining of a dark cloud' may be added to the health education and counseling sessions offered to the informal caregivers, which might allow them to see their heavier caregiving efforts during the lockdown from a positive perspective and react to the increased burdens more optimistically.

### *Limitations*

As the COVID-19 pandemic continues and mutant viral strains keep emerging, future lockdowns are not impossible. The experiences and potential response measures explored in our study may find merit in similar circumstances and even other disaster situations in China and other countries for individuals, families, healthcare providers, policy-makers and communities to develop strategies proactively for addressing the needs of the informal caregivers. However, the findings of our study should be generalized and applied with caution because prenatal informal caregiving practices may vary significantly from one country to another and there are differences in the national conditions, governing systems and cultures between societies. Caregivers, researchers and policy-makers should give full consideration to their local realities when adopting the recommended strategies in response to the COVID-19 lockdown or any other similar disaster event.

## Conclusions and implications for practice

Informal caregivers for pregnant women experienced increased caregiving burdens, found their life routines disrupted and their roles in caregiving altered as a result of the COVID-19 lockdown and control measures. Some carers, however, showed positive reactions and saw the period in lockdown as an opportunity to rethink their lives and improve family relations. Several strategies may hold promise for better informal prenatal caregiving in future lockdown events, including adoption of a prenatal visit schedule that requires less frequent physical presence, use of tele-medicine and tele-education technologies, and provision of accurate information and knowledge. Psychological counseling, community services and policies targeting the special groups of pregnant women and their informal caregivers may also be valuable resources. Patient education with reliable information should be provided, preferably by nursing staff and physicians. Social support efforts including professional mental counseling may added and work with other resources such as community services and policy makers.

## Author credit statement

Yan Zuo: Conceptualization, Methodology, Software, Data analysis, Writing, Original draft preparation, Editing. Bi-ru Luo: Conceptualization, Data curation, Data analysis, Reviewing. Ling-ning Wang: Data curation, Data analysis, Reviewing. Bo-chao Cheng: Supervision, Data analysis, Reviewing. Xiao-lin Hu: Conceptualization, Methodology, Data analysis, Revision, Reviewing.

## 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.

## Funding sources

This work was supported by Sichuan Provincial Nursing Society [grant number H19003].

## Acknowledgement

Not applicable.

## Ethical approval

The study was ethically approved by the Academic Ethics Committee, West China Second University Hospital, Sichuan University (approval number YXKY194).

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2022.103316.

## References

Borges-Machado, F., Barros, D., Ribeiro, Ó., Carvalho, J., 2020. The effects of COVID-19 home confinement in dementia care: physical and cognitive decline, severe neuropsychiatric symptoms and increased caregiving burden. Am. J. Alzheimer's Dis. Other Dement. 35, 1533317520976720. doi:10.1177/1533317520976720.

Chan, J.F., Yuan, S., Kok, K.H., To, K.K., Chu, H., Yang, J., Xing, F., Liu, J., Yip, C.C., Poon, R.W., Tsoi, H.W., Lo, S.K., Chan, K.H., Poon, V.K., Chan, W.M., Ip, J.D., Cai, J.P., Cheng, V.C., Chen, H., Hui, C.K., Yuen, K.Y., 2020. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet (London, England) 395 (10223), 514–523. doi:10.1016/S0140-6736(20)30154-9.

Chinese Center for Disease Control and Prevention. Guidelines on Prevention and Protection against Novel Coronavirus Pneumonia (version 1). http://www.chinacdc.cn/jkzt/crb/zl/szkb_11803/jszl_2275/202002/t20200201_212138.html [Accessed 15 August 2020)

Chinese Center for Disease Control and Prevention. Technical Guidance on Prevention and Control of Novel Coronavirus Pneumonia Virus Infection in Healthcare Facilities (version 1). http://www.chinacdc.cn/jkzt/crb/zl/szkb_11803/jszl_11815/202001/t20200123_211392.html [Accessed 15 August 2020)

Chinese Medical Association Obstetrics and Gynecology Branch, 2018. Guidelines on Preconception and Prenatal Healthcare. Chin. J. Perinat. Med. 2018 21 (3), 145–152. doi:10.3760/cma.j.issn.1007-9408.2018.03.001.

Cohen, S.A., Kunicki, Z.J., Drohan, M.M., Greaney, M.L., 2021. Exploring changes in caregiver burden and caregiving intensity due to COVID-19. Gerontol. Geriatr. Med. 7. doi:10.1177/2333721421999279, 2333721421999279.

Edward, K.L., Welch, T., 2011. The extension of Colaizzi's method of phenomenological enquiry. Contemp. Nurse 39 (2), 163–171. doi:10.5172/conu.2011.163.

Fryer, K., Delgado, A., Foti, T., Reid, C.N., Marshall, J., 2020. Implementation of obstetric telehealth during COVID-19 and beyond. Matern. Child Health J. 24 (9), 1104–1110. doi:10.1007/s10995-020-02967-7.

Kalra, K., Deshmukh, P., 2020. COVID-19: Is there a silver lining? JPMA J. Pak. Med. Assoc. 70 (5), S175–S176. doi:10.5455/JPMA.41, Suppl 3.

National Health Commission of the People's Republic of China, 2019. Year Book of Health in the People's Republic of China 2019. Peking Union Medical College Press 219 p.

Pasadino, F., DeMarco, K., & Lampert, E. (2020). Connecting with families through virtual perinatal education during the COVID-19 pandemic. MCN. The American Journal of Maternal Child Nursing, 45(6), 364–370. doi:10.1097/NMC.0000000000000665.

Peahl, A.F., Powell, A., Berlin, H., Smith, R.D., Krans, E., Waljee, J., Dalton, V.K., Heisler, M., Moniz, M.H., 2021. Patient and provider perspectives of a new prenatal care model introduced in response to the coronavirus disease 2019 pandemic. Am. J. Obstet. Gynecol. 224 (4), 384.e1–384.e11. doi:10.1016/j.ajog.2020.10.008.

Penteado, C.T., Loureiro, J.C., Pais, M.V., Carvalho, C.L., Sant'Ana, L., Valiengo, L., Stella, F., Forlenza, O.V., 2020. Mental health status of psychogeriatric patients during the 2019 new coronavirus disease (COVID-19) pandemic and effects on caregiver burden. Front. Psychiatry 11, 578672. doi:10.3389/fpsyt.2020.578672.

Sandelowski, M., 1995. Sample size in qualitative research. Res. Nurs. Health 18 (2), 179–183. doi:10.1002/nur.4770180211.

Sheth, K., Lorig, K., Stewart, A., Parodi, J.F., Ritter, P.L., 2021. Effects of COVID-19 on informal caregivers and the development and validation of a scale in English and Spanish to measure the impact of COVID-19 on caregivers. J. Appl. Gerontol. 40 (3), 235–243. doi:10.1177/0733464820971511.

Tian, H., Liu, Y., Li, Y., Wu, C.H., Chen, B., Kraemer, M., Li, B., Cai, J., Xu, B., Yang, Q., Wang, B., Yang, P., Cui, Y., Song, Y., Zheng, P., Wang, Q., Bjornstad, O.N., Yang, R., Grenfell, B.T., Pybus, O.G., Dye, C., 2020. An investigation of transmission control measures during the first 50 days of the COVID-19 epidemic in China. Science (New York, N.Y.) 368 (6491), 638–642. doi:10.1126/science.abb6105.

World Health Organization. Naming the coronavirus disease (COVID-19) and the virus that causes it. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it [Accessed 15 August 2020].

Zhou, P., Yang, X.L., Wang, X.G., Hu, B., Zhang, L., Zhang, W., Si, H.R., Zhu, Y., Li, B., Huang, C.L., Chen, H.D., Chen, J., Luo, Y., Guo, H., Jiang, R.D., Liu, M.Q., Chen, Y., Shen, X.R., Wang, X., Zheng, X.S., Shi, Z.L., 2020. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 579 (7798), 270–273. doi:10.1038/s41586-020-2012-7.

Zork, N.M., Aubey, J., Yates, H., 2020. Conversion and optimization of telehealth in obstetric care during the COVID-19 pandemic. Semin. Perinatol. 44 (6), 151300. doi:10.1016/j.semperi.2020.151300.