

## Original Article

# Investigation on healthcare services for both rural pregnant and puerperal women in Luzhou area and countermeasures

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**Abstract:** Objective: This study was designed to investigate the healthcare services for both rural pregnant and puerperal women in Luzhou area and determine the application effect of relevant countermeasures. Methods: From October 2017 to June 2019, 892 pregnant and puerperal women in Luzhou area were enrolled into a control group. The influencing factors of utilization rate of healthcare services for women during pregnant or puerperal period were analyzed by referring to the statistical data of medical services for both rural pregnant and puerperal women from the health administrative department, and corresponding countermeasures were formulated. In addition, 843 rural pregnant and puerperal women between December 2019 and August 2020 were enrolled into an observation group, and intervened by corresponding measures. The two groups were compared in the proportion of women with more than 5 times of prenatal examination, rate of prenatal examination, rate of three times of follow-up or more after delivery, rate of delivery in hospital, and cesarean section rate. Results: There was no significant difference among pregnant women during the two different study periods in the rate of delivery in hospital and cesarean section rate (both  $P > 0.05$ ), but after relevant countermeasures, indexes related to rural pregnant and puerperal healthcare (coverage of prenatal examination, proportion of women with more than 5 times of prenatal examination, rate of prenatal examination, coverage of postpartum follow-up, and rate of three times of postpartum follow-up or more) in the observation group were all higher than those in the control group (all  $P < 0.05$ ). Conclusion: Analysis of the rural prenatal services in rural areas reveals that targeted measures can help improve the perinatal healthcare and the utilization rate of public resources.

**Keywords:** Rural areas, healthcare services for pregnant and puerperal women, times of prenatal examination, postpartum follow-up

## Introduction

Healthcare services for women during pregnant and puerperal period is an important part of maternal and children healthcare. The services can effectively help minimize the mortality rate of pregnant and puerperal women and perinatal infants, and they are a crucial index for the evaluation of the regional health level [1-3]. The latest research shows that the levels of healthcare services for both pregnant and puerperal women are different in different countries and regions, namely, the levels in developed countries are higher than those in underdeveloped areas, and the levels in cities and towns are higher than those in rural areas [4-6]. Rural

areas in China have achieved sustained and rapid economic development in recent years, but they still lag behind cities. In addition, the relative scattered distribution of rural population and vast rural area result in slow and inefficient construction of healthcare network for pregnant and puerperal women in rural areas, which is manifested in the low coverage of healthcare for pregnant women, low service level, and poor compliance with prenatal examination [7-9].

Although health administrative departments understand increasing importance to the construction of rural prenatal diagnosis and treatment service network, the current priority is still

given to the investment of funds and the optimal allocation of resources. Financially, it is not such a big problem, but due to the relatively small number of healthcare workers in rural areas and heavy workload, it is impossible to take the initiative to go door to door to complete follow-up, and higher-level hospitals are also unable to complete knowledge popularization related to pregnant and puerperal period. Therefore, there is still a long way to go before fundamentally ameliorating the relatively low efficiency in healthcare for pregnant and puerperal women [10, 11]. Effectively encouraging grass-roots healthcare personnel to shoulder responsibility can realize the importance of accurate follow-up based on on-site service and improve the coverage of knowledge propaganda carried out by higher-level hospitals, thus improving the awareness of pregnant and puerperal women on perinatal healthcare and the utilization rate of perinatal healthcare services to a certain extent [12]. Therefore, our research group investigated and analyzed the rural prenatal diagnosis and treatment services by empirical investigations with all districts and counties of Luzhou City as examples to summarize problems and reasons. Our group also explored corresponding targeted countermeasures to improve the supply capacity of rural prenatal diagnosis and treatment services in the city and bolster the healthcare for rural pregnant women.

### Materials and methods

#### *General data*

From October 2017 to June 2019, pregnant and puerperal women from a group of representative village clinics, service stations, and areas under the jurisdiction of town and township-level health centers in 7 districts and counties of Luzhou area were enrolled into a control group. The utilization rate of healthcare services for women during the pregnant and puerperal period and the related influencing factors were analyzed by referring to the statistical data of medical services for rural pregnant and puerperal women from the health administrative department. In addition, rural pregnant and puerperal women between December 2019 and August 2020 were enrolled into an observation group. The inclusion criteria of the study: Women of childbearing age with local

rural household registration. The exclusion criteria of the study: (1) Women who had not aborted; (2) Women who received termination of pregnancy due to various complications during the perinatal period; (3) Women who left the study area after delivery; (4) Women with poor expected compliance and unwilling to cooperate with the study; (5) Women with household registration of other places; (6) Women who had pregnancy in violation of the family planning policy. Patients included in this study and their family members had signed informed consent. This study was approved by the Ethics Committee of The Affiliated Hospital of Southwest Medical University.

#### *Methods*

The development, supply, and demand of services for rural pregnant and puerperal women were analyzed by referring to statistical data regarding prenatal diagnosis and treatment services for rural pregnant and puerperal women in a group of representative village clinics, service stations, and areas under the jurisdiction of town and township-level health centers in 7 districts and counties of Luzhou area. In addition, the persons in charge of county, township, or village health services were interviewed, and health administrative departments, town and township hospitals, village clinics, and health and family planning stations were invited to hold symposiums. The medical staff, nurses, medical technicians, and pregnant and puerperal women were investigated by questionnaires, and introduction and suggestions of relevant grass-roots personnel on the prenatal diagnosis and treatment services were required and encouraged, and then relevant countermeasures were taken against the existing problems. The specific method was as follows: A working group composed of a healthcare worker from a village clinic, a village female healthcare worker, and higher-level specialist healthcare workers was set up. The main working contents were as follows: (1) Since the registration of each pregnant woman, the woman healthcare worker was arranged to regularly notify the pregnant woman or her families by telephone in advance to remind her/them of regular prenatal examination. (2) During the perinatal period of the pregnant woman, it was required to communicate with higher-level healthcare personnel and make a suggestion

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**Table 1.** Comparison of baseline data of pregnant women in the two groups ( $\bar{x} \pm sd, n$ )

Group	Control group (n=892)	Observation group (n=843)	t/ $\chi^2$	P
Age (years)	28.5 $\pm$ 3.1	29.3 $\pm$ 3.9	1.164	0.244
Maternity history			1.044	0.307
First pregnancy	480	432		
Second child and above	412	411		
occupation			1.982	0.371
Farming	400	377		
Staff	320	323		
other	172	143		
Education			0.196	0.907
Illiteracy*	36	33		
Undergraduate	739	705		
Bachelor degree and above	117	105		

Note: \*: individual whose educational background ending at the primary school level was considered to be illiterate.

to the delivery mode of the pregnant woman according to her prenatal examination. (3) The healthcare worker from a village clinic and the village woman healthcare worker were arranged to carry out door-to-door postpartum follow-up. This study invited a third-party research institution to supervise the whole process and complete the telephone follow-up.

### Outcome measures

*Primary outcome measures:* According to the data about prenatal examination and postpartum follow-up data obtained by phone, the two groups were compared in the coverage of prenatal examination, number of prenatal examination, rate of prenatal examination, coverage of postpartum follow-up, rate of three times of postpartum follow-up or more, and the main factors influencing the healthcare services for pregnant and puerperal women [13, 14].

*Secondary outcome measures:* The two groups were compared in the rate of delivery in hospital and cesarean section rate.

### Statistical analyses

SPSS 22.0 was adopted for analyses. Measurement data were tested to conform to normal distribution, and they were expressed as the mean  $\pm$  standard deviation ( $\bar{x} \pm sd$ ), and compared between groups using the indepen-

dent-samples t test. Enumeration data were expressed as cases (percentage) (n (%)), and analyzed using the chi-square test. P<0.05 indicates a significant difference.

### Results

#### *Comparison of general data between the two groups of pregnant and puerperal women*

The results of this study showed that there was no significant difference between the two groups in age, educational level, occupation, pregnant and pu-

erperal history (all P>0.05), so they were comparable (**Table 1**).

#### *Main influencing factors of healthcare services for pregnant and puerperal women and targeted intervention measures*

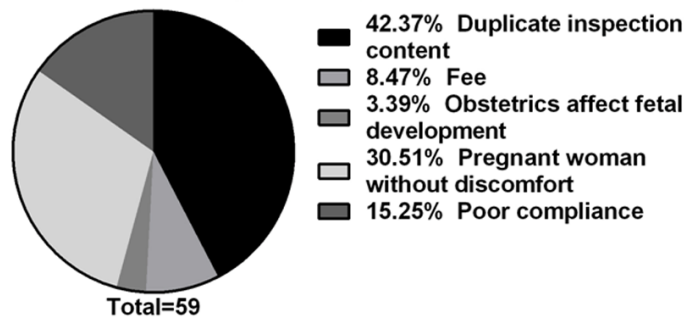
According to the questionnaire survey on 892 pregnant and puerperal women in this study, 59 cases did not complete the relevant established healthcare services, including 32 cases who received prenatal examination less than 5 times. They failed to receive enough prenatal examinations mainly due to the following reasons: No need to receive repeated examinations with similar contents (25 women), high cost (5 women), and negative effect of excessive prenatal examinations on fetal development (2 women). In addition, 27 women were lost to follow up or followed up by less than 3 times. In terms of reasons, 18 women suffered from physical discomfort after delivery and 9 women showed poor compliance. The specific influencing measures and countermeasures are summarized in **Figure 1** and **Table 2**, respectively.

#### *Rate of delivery in hospital and cesarean section rate of the two groups*

There was no significant difference between the two groups in the rate of delivery in hospital and cesarean section rate (both P>0.05), indi-

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**Factors of health care during pregnancy and childbirth**



**Figure 1.** Main influencing factors of healthcare services for pregnant and puerperal women.

cating that there was no change in the choice of delivery in hospital and cesarean section for pregnant women in rural areas (Table 3).

*Comparison of the proportion of women with more than 5 times of prenatal examination and rate of prenatal examination between the two groups*

The rate of prenatal examination and the proportion of women with more than 5 times in the observation group were higher than those in the control group (both  $P < 0.01$ ), which indicated that active targeted intervention measures can improve the utilization rate of maternal and child healthcare services (Table 4).

*The coverage of postpartum follow-up and rate of three times of postpartum follow-up or more in the two groups*

The coverage of postpartum follow-up and the rate of three times of postpartum follow-up or more in the observation group were significantly higher than those in the control group (815/828 vs. 714/850;  $\chi^2 = 15.345$ ,  $P < 0.001$ ; 801/815 vs. 649/714;  $\chi^2 = 40.877$ ,  $P < 0.001$ ), suggesting that effective targeted measures can improve the utilization rate of healthcare services for women after delivery (Figures 2, 3).

### Discussion

Healthcare for women during pregnant and puerperal period is an important part of women's healthcare [15, 16]. Women's healthcare is affected by economy to a certain extent. Although healthcare for pregnant and puerperal women has been carried out in rural areas for many years, there are obvious differences

among different regions, especially between the central and western regions. Therefore, it is of great importance to study the maternal and child healthcare in the region for improving the overall healthcare in rural areas.

According to the investigation results of maternal and child healthcare services in rural areas of Luzhou, Sichuan Province, the utilization rate of healthcare services for pregnant

and puerperal women was low, which was mainly manifested by insufficient prenatal examination and insufficient coverage of postpartum follow-up. Ensuing sufficient prenatal examination is the primary measure to reduce perinatal adverse events, and improving the rate of postpartum follow-up is an effective method to reduce neonatal adverse events, so it is of great practical significance to improve the quantitative indicators of the two [17, 18]. The results of this study showed that active targeted measures could effectively increase the number of prenatal examinations and the rate of postpartum return visits in pregnant and puerperal women. The completion of previous healthcare target of pregnant and puerperal women can be mainly explained by the following aspects: In the past, pregnant and puerperal women passively went to healthcare institutions for inspection, while at present, relevant health service personnel come to the door to publicize prenatal knowledge and take the initiative to follow up with patients after their delivery. A three-dimensional structure network has been constructed with the three-dimensional participation of the government, enterprises, and relevant associations. As a result, those measures improves the efficiency of maternal and child healthcare services. There were also similar research reports in the past [19, 20].

The rate of delivery in hospital and cesarean section rate are also the main indicators reflecting the regional healthcare efficiency [21]. One study has pointed out that there is a correlation between the rate of delivery out of hospital and perinatal mortality of pregnant women [22]. It is mainly due to the relatively high infection rate

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**Table 2.** Influencing factors and intervention measures of healthcare during pregnancy

Influencing factors	Corresponding intervention measures
No need to receive repeated prenatal examinations with similar contents	A local health worker is arranged to give one-to-one content explanation to pregnant and puerperal women in their homes, and inform them of the importance and particularity of regular prenatal examination.
High cost	The government, local enterprises, and industry associations can cooperate to solve it in a diversified way. The government can include the cost of prenatal examination into the coverage of medical insurance about outpatient. Local enterprises are encouraged to participate in the establishment of local healthcare hospitals, and improvement of town and township-level hospitals, which helps pregnant women undergo prenatal examination in places close to their homes and can reduce the pressure on healthcare work in higher-level hospitals. Industry associations can contribute to the propaganda by higher-level hospitals in the countryside.
Negative effect of excessive prenatal examinations on fetal development	Local specialized maternal and child health hospitals regularly can go deep into rural areas to publicize the knowledge about the relationship between prenatal examination and fetal development.
Low rates of postpartum follow-up and return visit	Local healthcare personnel can go to the home of the pregnant woman to follow her up at night.

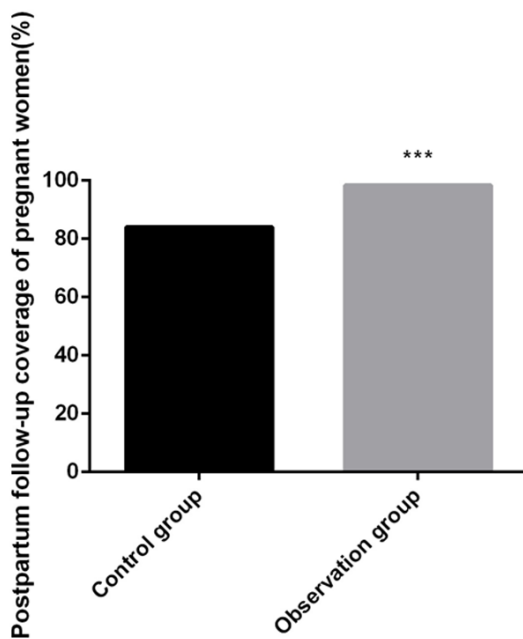
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**Table 3.** Comparison of hospital delivery rates and cesarean section rates between the two groups (n)

Group	Hospital delivery	Cesarean section
Control group (n=892)	846	312
Observation group (n=843)	822	290
$\chi^2$	7.567	0.040
P	0.060	0.840

**Table 4.** Comparison of the proportion of women with more than 5 times of prenatal examination and rate of prenatal examination between the two groups (n)

Group	Rate of prenatal examination	More than 5 times of prenatal examination
Control group (n=892)	850	835
Observation group (n=843)	828	819
$\chi^2$	10.800	11.442
P	0.001	0.000



**Figure 2.** Comparison of postpartum follow-up coverage of pregnant women in the two groups. Compared with the control group, \*\*\*P<0.001.

during delivery and puerperium in delivery out of hospital. On the other hand, delivery out of hospital also reduces the timely rescue rate of high-risk women and increases the incidence of adverse events in perinatal period. Therefore, improving the rate of delivery in hospital is a main effective measure to improve the perinatal healthcare level. Additionally, the results of

this study showed that the hospitalization rate of pregnant women in the observation group was higher than that in the control group, but the difference was insignificant. It indicated that active effective measures at the national level improved the rate of delivery in hospital in China to the first-class level in the world (over 90%), which supported the previous research conclusions [23]. As for the cesarean section rate, the International Health Organization suggests that the rate should be kept at about 20%, and relatively high cesarean section rate will also increase the incidence of perioperative complications of parturients and newborns. In addition, reducing unnecessary cesarean section is a main

measure to save healthcare resources and improve the function of healthcare services [24, 25]. However, the cesarean section rate in both rural and urban areas of China is higher than the international level, partly because pregnant women and their families take the initiative to choose cesarean section. The results of this study showed that because of the active popularization of knowledge of natural delivery, the cesarean section rate in the observation group was lower than that in the control group, but the difference was insignificant. It can be seen that further reducing unnecessary cesarean section is also the focus of healthcare of pregnant and puerperal women. To sum up, active targeted intervention measures taken based on reference to relevant data of pregnant and puerperal women and analysis of relevant factors affecting the utilization rate of maternal and child healthcare services can improve the functional coverage rate of perinatal maternal and child healthcare system and its work efficiency.

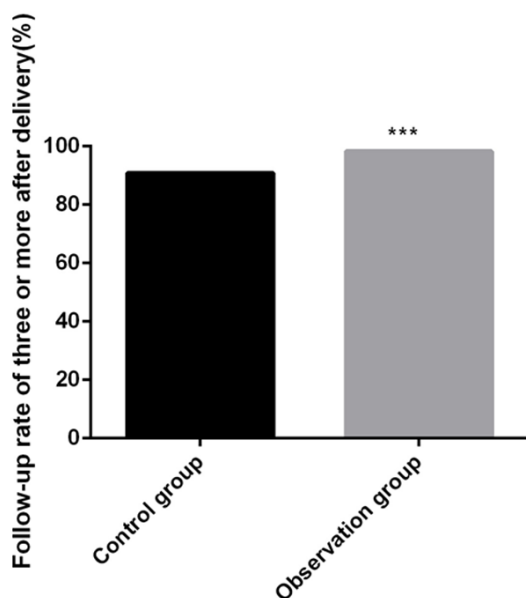
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### Disclosure of conflict of interest

None.

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**Figure 3.** Comparison of three or more return visits rates of pregnant women in the two groups. Compared with the control group, \*\*\* $P < 0.001$ .

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