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Original Research

Application of an Outpatient Multidisciplinary Collaborative Diagnosis and Treatment Model in the Management of Critically Ill Obstetric Patients

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Abstract

Background: To analyze the impact of a multidisciplinary collaborative diagnosis and treatment (MDT) management in obstetric outpatient departments on the outcome of high-risk pregnancies, and to summarize the experience and to improve the diagnosis and treatment ability of for critically ill obstetric patients. **Method**: Two hundred sixty-six pregnant and lying-in women with multidisciplinary treatment were selected for retrospective analysis. According to the criteria, 176 high-risk pregnant women were included, including 83 cases of outpatient MDT and 93 cases of inpatient MDT. The classification of pregnancy diseases and pregnancy risk was carried out. The source of high-risk pregnant women, the distribution and number of collaborative clinics, the classification of major diseases, the classification of pregnancy risk, the mode of delivery, the condition of labor, and pregnancy outcome were all analyzed to determine the impact of participating in MDT timing on adverse pregnancy outcomes through logistic regression analysis. **Result**: (1) The top 3 diseases in high risk pregnant women undergoing MDT were pregnancy with cardiac disease 42.6% (75/176), pregnancy with hypertension 14.2% (25/176), and pregnancy with immune system disease 11.9% (21/176). Among pregnant women with cardiac disease, 38 (50.7%) were mainly congenital cardiac disease. (2) The number of high-risk pregnant women with MDT in the hospital was more than that in the outpatient department ($p < 0.05$), and the number of departments involved in MDT in the hospital was more than that in the outpatient department ($p < 0.05$). The proportion of pregnant women with pregnancy risk grade of I–III in outpatient MDT cardiac disease was higher than that in inpatient MDT ($p < 0.05$), while the pregnant women with pregnancy risk grade of IV–V were all inpatient MDT cardiac disease with the majority being in late pregnancy (12/16). (3) The high-risk pregnant women who received MDT in the late pregnancy had a red risk level, which was higher than that then in early and middle pregnancy ($p < 0.05$). There was a higher rate of premature delivery, multiple organ damage, intensive care unit (ICU) monitoring, cesarean section, and neonatal asphyxia in high-risk pregnant women with later MDT gestational age ($p < 0.05$). The late timing of participating in MDT was a risk factor for ultimately developing adverse pregnancy outcomes ($p < 0.05$). **Conclusions**: Outpatient MDT management can effectively improve the pregnancy outcome of high-risk pregnant women, early outpatient MDT mode management should be actively promoted, and a comprehensive and professional MDT team should be utilized to reduce adverse pregnancy outcomes.

Keywords: multidisciplinary care teams; pregnancy; high-risk; pregnancy outcome

1. Introduction

Maternal and child health is one of the elements reflecting the health, economic and cultural status of a country or region. One of the sustainable development goals of World Health Organization (WHO) is reducing the maternal mortality rate (MMR). With the economic and medical level improvement, China's MMR has declined yearly [1]. However, with the opening of the fertility policy, the number of older pregnant women and the development of assisted reproductive technology have increased, and the number of high-risk pregnant women with multiple medical complications has increased significantly [2].

The multidisciplinary collaborative diagnosis and treatment (MDT) model was initially applied to the management of tumor patients and was later widely applied in various disciplines. The research of Chen *et al.* [3] in 2019 and Yang *et al.* [4] in 2021, found that treating critically ill pregnant women is one of the most necessary areas for MDT. MDT can effectively integrate obstetrics, surgery and anesthesiology. Medical resources such as neonatology give full play to the advantages of various disciplines, and establish interdisciplinary cooperative intervention for pregnancy health care, perinatal care, nursing, neonatal diagnosis and treatment in order to maximize the prevention and treatment effect of critical diseases of pregnant and postpartum women [5].

The application of MDT in obstetrics has gradually increased, and multidisciplinary joint diagnosis and treatment can improve the success rate of maternal care. Most relevant reports focus on a certain disease during pregnancy, and there are few reports related to comprehensive health care for high-risk pregnant women. When our hospital carried out MDT for hospitalized pregnant and postpartum women with critical illness, we also initiated outpatient

MDT for high-risk pregnant women. All achieved good results in improving pregnancy outcomes. The relevant clinical data are summarized and analyzed as presented.

2. Materials and Methods

2.1 General Information

A total of 266 pregnant and lying women who received MDT in the Affiliated Hospital of Southwest Medical University from June 2020 to July 2022 were collected. Inclusive criteria: (1) MDT was carried out in the obstetrics department of the Affiliated Hospital of Southwest Medical University due to high-risk factors of pregnant and postpartum women; (2) Pregnancy was terminated in our obstetrics department after MDT; (3) Those who were compliant and able to complete follow-up. Exclusion criteria: (1) The pregnancy was not terminated; (2) Voluntary termination of pregnancy due to non-disease factors; (3) The pregnancy was not terminated in our hospital or the medical history was incomplete.

We excluded 40 cases of MDT due to fetal factors, 19 secondaries to nonhospital termination or incomplete medical history, 22 cases not terminated as of the study time, and 9 cases of MDT after the termination of pregnancy. Finally, 176 cases were included in the analysis. The average age of the pregnant women was 29.37 $\pm$ 5.64 years, the average number of pregnancies was 2.60 $\pm$ 1.58, and the average number of births was 1.52 $\pm$ 1.08. This research was approved by the Ethics Committee of our hospital.

2.2 Observation Target

These were sources of high-risk pregnant women, gestational weeks, departments involved in MDT, disease classification, pregnancy risk classification, pregnancy outcomes, labor conditions and delivery methods.

Outpatient MDT refers to high-risk pregnant women who visited the clinic and seen by a doctor with a deputy senior professional title to evaluate them. The physician then determined the relevant departments to participate in MDT, communicated with the patient and their families in writing, completed relevant procedures, conducted MDT consultations, developed diagnosis and treatment options, informed the patient and their families in writing of the conclusions, and implemented the management of high-risk outpatient services. Inpatient MDT refers to the MDT for high-risk pregnant and postpartum women who were hospitalized. After discussion in the department or ward round by deputy high physician or above, a diagnosis and treatment plan was developed, the patients and their families informed, and the plan was implemented.

The classification of maternal diseases was carried out according to the Work Standards for Risk Assessment and Management of Pregnancy and Maternity issued by the National Health and Family Planning Commission of the People's Republic of China in 2017 [6]. Red risk refers to the high risk of pregnancy and childbirth, including severe internal and external diseases, hepatitis, and placenta previa. Orange risk refers to the higher risk of pregnancy and childbirth, including preeclampsia, central placenta previa, mild complications, and comorbidities. According to the Expert Consensus on Diagnosis and Treatment of Pregnancy Complicated with Heart Disease (2016) [7] published by the obstetric group of the Branch of the Society of Obstetrics and Gynecology of the Chinese Medical Association, the pregnancy risk of heart disease was graded.

2.3 Evaluation Method

WPS excel 2022 (Kingsoft Corp., Beijing, China) was used to complete data collection and develop pivot tables for analysis. SPSS 22.0 software (IBM Corp., Armonk, NY, USA) was used for statistical analysis of the data, and the measurement data were ($\bar{x} \pm s$) means; the counting data were expressed in %. χ^2 test was used for comparison between groups, and $p < 0.05$ was considered statistically significant. Logistic regression analysis was used to investigate the impact of timing of MDT participation on adverse pregnancy outcomes, with a statistically significant difference being $p < 0.05$.

3. Result

3.1 Source of High-Risk Pregnant Women

The number of high-risk pregnant women with MDT from primary hospitals was more than that from outpatient clinics ($p < 0.05$). Among the 15 registered pregnant patients in our hospital, 4 were early pregnancy terminated after MDT, and the other 11 cases were not examined regularly in our hospital (Table 1).

3.2 Distribution and Number of MDT Departments in High-Risk Pregnant Women

The average number of departments involved in outpatient high risk pregnant women undergoing MDT was 4.61 $\pm$ 1.537, and the average number of departments involved in inpatient high risk pregnant women undergoing MDT was 6.11 $\pm$ 1.536. The number of departments involved in MDT during hospitalization was more than that of outpatient high risk pregnant women undergoing MDT ($p < 0.05$). In addition to obstetrics, the top three participants in MDT were cardiology, anesthesiology, and neonatology, followed by intensive care unit (ICU), nutrition department, and hematology department. Among them, the departments involved in outpatient MDT mainly included cardiology, nutrition department, and neonatology, while the departments involved in inpatient MDT mainly include cardiology, anesthesiology, and ICU (Table 2).

3.3 Classification of Main Diseases of High-Risk Pregnant Women

Among high-risk pregnant women undergoing MDT, the top three diseases were heart disease 42.6% (75/176), hypertension 14.2% (25/176), and immune system disorders 11.9% (21/176) (Table 3).

Table 1. Comparison of the sources of high-risk pregnant women between the two groups (n (%)).

MDT time	Outpatient Department	Hospitalization	χ^2	p
Total	83	93		
Pregnant women registered in our hospital	65 (78.3)	15 (16.1)	68.4026	<0.001
Pregnant women transferred from primary hospitals	13 (15.7)	59 (63.4)	41.4159	<0.001
Transferred from other tertiary hospitals	5 (6)	19 (20.4)		

MDT, multidisciplinary collaborative diagnosis and treatment.

Table 2. Main consultation departments of outpatient and inpatient high-risk pregnant women (times).

Outpatient Department	Internal Medicine-Cardiovascular Department	51
	Nutrition Department	46
	Neonatology	27
	Department of Hematology	21
	Endocrine Department	21
	Cardiac Surgery	21
	Rheumatology Immunology Department	19
	Department of Anesthesiology	18
Hospitalization	Internal Medicine-Cardiovascular Department	74
	Department of Anesthesiology	72
	ICU	67
	Neonatology	48
	Cardiac Surgery	25
	Department of Hematology	25
	Respiratory Medicine	25
	Endocrine Department	20

ICU, intensive care unit.

For high-risk pregnant women with pregnancy complicated by heart disease, the main cardiovascular diseases were classified as congenital heart disease 38 cases (50.7%), arrhythmias without cardiac structural abnormalities 15 cases (20%), perinatal cardiomyopathy 7 cases (9.3%), valvular heart disease 6 cases (8%), hyperthyroid heart disease 4 cases (5.3%), hypertensive heart disease 3 cases (4%), rheumatic heart disease 1 case (1.3%), and infectious endocarditis 1 case (1.3%). The pregnancy risk grade of outpatient MDT with heart disease was I–III, which was higher than that of inpatient MDT (χ^2 = 20.724; $p < 0.05$). The patients with heart disease pregnancy risk grade IV–V were all (100%) hospitalized with MDT, most being in late pregnancy (12/18), serious valvular heart disease (6/18) and non-operated congenital heart disease (4/18). Pregnancy was terminated immediately after MDT due to this serious condition (Table 4).

There were 25 cases of pregnancy-induced hypertension. These included 5 cases of outpatient MDT (20%) and 20 cases of inpatient MDT (80%). Among the hospitalized MDT patients with pregnancy-induced hypertension, 15 (75%) had serious complications.

3.4 Comparison of Pregnancy Risk Classification, Outcome, and Delivery Time of High Risk Pregnant Women Undergoing MDT at Different Gestational Ages

The proportion of high risk pregnant women undergoing MDT with red pregnancy risk grade in late pregnancy was higher than that during early and middle pregnancy ($p < 0.05$) (Table 5).

Table 3. Distribution of major diseases in high-risk pregnant women (n).

Classification of main diseases	n
Pregnancy with heart disease	75
Hypertensive disorder of pregnancy	25
Pregnancy with immune system diseases	21
Pregnancy with hematological diseases	15
Pregnancy with renal disease	15
Pregnancy with digestive system diseases	11
Pregnancy with nervous system diseases	6
Pregnancy with respiratory diseases	4
Pregnancy with endocrine diseases	4

Table 4. Risk grade of pregnancy with heart disease in pregnant women with severe heart disease (n (%)).

MDT time		Outpatient Department			Hospitalization			χ^2	p
Total		35			40				
MDT gestational trimester		First	Mid	Third	First	Mid	Third		
Heart disease pregnancy risk classification[a]	I–III	7 (20)	12 (34.3)	16 (45.7)	2 (5)	3 (7.5)	17 (42.5)	20.724	0.00001
	IV–V	0	0	0	3 (7.5)	3 (7.5)	12 (30)		

Note: 'a' is the percentage of the total number of MDT cases.

There were 68 cases of red risk in late pregnancy, 63 cases of live birth, and 5 cases of adverse pregnancy outcomes. All of them were MDT pregnant women with severe pregnancy-induced hypertension and multiple organ dysfunction. Because of this critical condition, 2 cases were delivered by cesarean section and induced labor with the other 3 cases having fetal death and stillbirth.

There were 33 cases of pregnant women with MDT in early and middle pregnancy, of which 28 cases terminated their pregnancy in time, and the remaining 5 cases and their families who had MDT in the outpatient department insisted on continuing their pregnancy. Under the management of outpatient MDT, 1 case of chronic hypertension had a premature cesarean section due to pulmonary hypertension at 35^{+6} weeks of pregnancy; 1 case with thrombocytopenia was delivered by cesarean section at 35^{+4} weeks due to a progressive decrease in platelet count; 1 case of poliomyelitis complicated with hydrocephalus delivered at 37^{+5} weeks by cesarean section; 1 case with chronic renal failure gave birth at 38 weeks; 1 case with chronic renal insufficiency had an inevitable abortion due to cervical insufficiency at 23^{+2} weeks.

There was a higher the rate of premature delivery, multiple organ damage, and ICU monitoring in high-risk pregnant women with a later gestational age of MDT ($p < 0.05$) (Tables 5,6). Two pregnant women who underwent MDT in late pregnancy died. One patient with congenital heart disease complicated by pulmonary hypertension spontaneously gave birth at 33^{+4} weeks. She underwent emergency cesarean section and died of total heart failure after delivery. One patient with congenital heart disease complicated by complete placenta previa was delivered by cesarean section at 29^{+3} weeks due to vaginal hemorrhage and died of acute pulmonary embolism and total heart failure postoperatively.

3.5 Comparison of Delivery Mode and Neonatal Asphyxia (1 min Apgar ≤7) of High Risk Pregnant Women Undergoing MDT at Different Gestational Ages

The later the gestational week of MDT, the higher the proportion of cesarean section ($p < 0.05$). In the late pregnancy group, the cesarean section rate and neonatal asphyxia rate of hospitalized MDT pregnant women were higher than those of the outpatient group ($p < 0.05$) (Table 7,8).

3.6 Logistic Multivariate Analysis of Adverse Pregnancy Outcomes in High-Risk Pregnant Women

We constructed a multivariate logistic regression equation for gestational age and hospital admission at the time of inclusion in MDT. The results showed that the later the gestational age during MDT, the higher the risk of adverse pregnancy outcomes being statistically significant (odds ratio (OR) = 2.903, 95% confidence interval (CI): 1.743–4.836, $p < 0.001$). Pregnant women who underwent MDT after hospitalization had a higher risk of adverse pregnancy outcomes, which was statistically significant (OR = 4.876, 95% CI: 2.395–9.925, $p < 0.001$) (Table 9).

4. Discussion

4.1 Management of Pregnancy with Cardiovascular Disease

In this review, the classification of high-risk maternal diseases for MDT is mainly pregnancy with heart disease and pregnancy induced hypertension. Therefore, the multidisciplinary consultation departments were concentrated in cardiology, anesthesiology, ICU, and neonatology. This indicates that there are many high-risk pregnant women with a complicated by cardiovascular disease, who are seriously ill, whose disease may have a greater impact on their newborn, and who deliver predominately by cesarean section [8].

Congenital heart disease is a major cause of maternal death. In this study, 2 pregnant women who expired were affected by congenital heart disease. They were transferred to our hospital from the primary institution due to pulmonary artery hypertension and massive hemorrhage from placenta previa. Most health care providers agree on the importance of multidisciplinary treatment of pregnancy with heart disease [7,9]. In 2021, the Journal of the American Heart Association (JACC) suggested in the management of women with congenital heart disease that such pregnant women should be identified by asking for medical history in the outpatient department or by conventional electrocardiogram and color Doppler echocardiography. When the patient is identified in the early pregnancy period, MDT management should be initiated for pregnant women with low risk of heart disease from early pregnancy to the delivery. For pregnant women with a high risk of heart disease or pulmonary hypertension, the association suggested that pregnancy should be terminated promptly [10]. If there is

Table 5. Pregnancy outcome of high-risk pregnant women at different MDT gestational ages (n (%)).

MDT gestational age			First	Mid	Third	χ^2	p
Total			28	41	107		
Pregnancy risk classification[a]	Yellow		14 (50)	20 (48.8)	1 (0.9)		
	Orange		0	2 (4.9)	38 (35.5)		
	Red		14 (50)	19 (46.3)	68 (63.6)	4.242	0.039
Pregnancy outcome[a]	Iatrogenic fetal loss	Induced abortion	10 (35.7)	12 (29.3)	1 (0.9)		
		Fetus delivered by cesarean section	2 (7.1)	3 (7.3)	1 (0.9)		
	Non iatrogenic fetal loss	Inevitable abortion	0	1 (2.4)	/		
		Stillbirth	0	0	3 (2.8)		
	Childbirth	Premature delivery	4 (14.3)	7 (17.1)	53 (49.5)	7.506	0.023
		Term birth	12 (42.9)	18 (43.9)	49 (45.8)		

Note: 'a' is the percentage of the total number of cases at the same MDT gestational age.

Table 6. Maternal status of high-risk pregnant women at different MDT gestational ages (n (%)).

MDT gestational age	First	Mid	Third	χ^2	p
Total	28	41	107		
Multiple organ injury[a]	8 (28.6)	13 (31.7)	57 (53.3)	8.931	0.012
ICU monitoring	3 (10.7)	8 (19.5)	54 (50.5)	22.02	0.004
Death	0	0	2 (1.7)		

Note: 'a' is the percentage of the total number of cases at the same MDT gestational age.

a strong desire to have children, MDT assessment or treatment can be prior to pregnancy, and pregnancy can be resumed after the condition improves.

Hypertensive disorders of pregnancy are characterized by rapid deterioration in the third trimester of pregnancy. In this study, 5 cases of pregnancy induced hypertension with adverse pregnancy outcomes were treated with MDT after hospitalization, and multiple organ function damage had occurred prior to transfer to our hospital. The International Federation of Obstetricians and Gynecologists (FIGO) recommends that all pregnant women should pass the early pregnancy joint test at $11–13^{+6}$ weeks and be screened for preeclampsia by maternal high-risk factors, mean arterial pressure, uterine artery pulsation index, and placental growth factor [11]. FIGO proposed that high-risk pregnant women be informed of the need to adhere to treatment, and their compliance should be evaluated at each antenatal visit. In addition, the International Society for the Study of Pregnancy Hypertension (ISSHP) management recommendations for pregnant women with pregnancy hypertension [12] mentioned that early prediction of pre-eclampsia can be included in the routine health care for women of childbearing age. Finally, we desire to be able to predict and identify the onset of preeclampsia by early diagnosis, early MDT management, and early treatment in order to reduce perinatal complications.

4.2 Build a Comprehensive Obstetric MDT Team

The obstetric MDT team should be led by the obstetrics department, with the participation of senior doctors or experts from other relevant departments. It should examine pregnant women, formulate diagnosis and treatment plans, and participate in their treatment. According to the changes in the condition of the patient, new expert members may be added at any time, and the plan can be updated. The statistical results of this study demonstrate that the main departments involved in MDT include obstetrics, cardiology, anesthesiology, ICU, and neonatology. In addition, the nutrition department, endocrinology department, and hematology department have a high frequency of participation in outpatient MDT. It is apparent that there are many internal medicine departments involved in the treatment of high-risk pregnant women, all playing a very important role in the management and treatment of pregnancy complications [13,14]. This viewpoint has been affirmed multiple times in past reports. In a study by Piani *et al.* [15], it was demonstrated that if a professional internist intervenes in prenatal care, the pregnancy outcomes of high-risk pregnant women will be significantly improved.

Nutrition management has a decisive impact for high-risk pregnant women with diabetes, heart disease, pregnancy induced hypertension, kidney disease and rheumatic immune disease. In 2014, Brantsæter *et al.* [16] found in the study of maternal-infant cohort (MoBa) of mater-

Table 7. Live birth mode of high-risk pregnant women in different MDT gestational weeks (n (%)).

MDT gestational age		First	Mid	Third	χ^2	p
Live birth		16	25	102		
Mode of delivery[b]	Vaginal delivery	5 (31.3)	6 (24)	7 (6.9)		
	Cesarean section	11 (68.7)	19 (76)	95 (93.1)	11.062	0.004

Note: 'b' is the percentage of total cases in each group.

Table 8. Neonatal status of live birth of high-risk pregnant women with different MDT group in late pregnancy (n (%)).

Group		Outpatient Department	Hospitalization	χ^2	p
Live birth		34	68		
Mode of delivery[b]	Vaginal delivery	6 (17.6)	1 (1.5)		
	Cesarean section	28 (82.4)	67 (98.5)	9.28	0.002
Asphyxia neonatorum[b]		1 (2.9)	14 (20.6)	5.628	0.018

Note: 'b' is the percentage of total cases in each group.

Table 9. Logistic multifactorial analysis of adverse pregnancy outcomes among high-risk pregnant women.

Factor	β	S.E	Wald	p	OR	95% CI
Gestational week	1.066	0.260	16.750	0.000	2.903	1.743–4.836
Hospitalization or not	1.584	0.363	19.088	0.000	4.876	2.395–9.925

OR, odds ratio; CI, confidence interval; S.E, standard error.

nal diet, that a healthy and balanced diet can reduce pregnancy complications, reduce the incidence of preeclampsia, preterm birth, and fetal growth restriction. Most *et al*. [17] pointed out that compliance with nutrition management in early pregnancy can ensure normal fetal development and reduce the risk of adverse consequences for the mother and baby. An online survey report on local pregnant women by Brown *et al*. [18] found that less than half of pregnant women have enough knowledge about nutrition intake, and obstetricians and nurses are not able to provide professional and perfect nutrition guidance [19]. The participation of the nutrition department in this study greatly benefited the pregnant women.

The disease classification of this study revealed that 19 pregnant women with blood system diseases and endocrine diseases participated in MDT 46 times and 41 times respectively in the departments of hematology and endocrinology. This suggests that some basic diseases may develop into serious pregnancy complications, which requires the participation of relevant departments. Many studies have shown that endocrine imbalance is significantly related to maternal and infant outcomes [20,21]. In a practice guide [22] issued by the Network for the Advancement of Patient Blood Management, Haemostasis and Thrombosis (NATA), a multidisciplinary team composed of obstetrics, anesthesiology, blood transfusion, and hematology departments made recommendations based on existing research evidence. High-risk pregnant women should maintain adequate hemoglobin levels, strengthen hemostasis and reduce bleeding, to ensure the safety of both mothers and children. In addition, Alfirevic *et al*. [23] found that using Doppler ultrasound to screen umbilical arteries in high-risk late pregnancy can reduce the risk of perinatal death. Sharma *et al*. [24] pointed out that a complete MDT team should improve the outcome of high-risk pregnant women as much as possible, and balance the risks and benefits of pregnancy treatment and postpartum recovery. Anesthesiology, blood transfusion, and ultrasound use are also essential. In addition to the relevant clinical departments, the MDT team needs the joint participation of imaging, testing, blood transfusion, pharmacy, and other auxiliary disciplines as needed. Therefore, it can be stated that the establishment of an obstetric MDT team is similar to an expert pool, including experts from clinical departments and auxiliary departments. The MDT team should be able to be constituted at any time on short notice to participate in consultation and treatment of the patient.

4.3 Necessity of Early Outpatient MDT

According to the statistical data from this study, early and middle pregnancy outpatient MDT can timely assess, diagnose and treat high-risk pregnant women, and provide adequate pregnancy supervision to achieve a satisfactory outcome. However, most of the pregnant women with MDT in late pregnancy, or MDT after hospitalization when their condition is critical, are transferred from primary hospitals when their condition deteriorates, resulting in a high rate of cesarean section, premature delivery, neonatal asphyxia, stillbirth, and maternal death. The reasons may be the lack of an MDT team, the delay in identification and referral of the patient by the primary medical institution, insufficient perinatal health care and risk awareness by the pregnant women and their families. All of these events can lead to the failure of timely and accurate intervention for these high-risk pregnant women, leading to adverse preg-

nancy outcomes. Therefore, it is necessary to strengthen the recognition ability and MDT awareness of high-risk pregnant women in primary medical institutions. Training can be conducted in primary hospitals through network meetings and lectures, so that patients can receive MDT treatment in primary hospitals or qualified hospitals during early and middle pregnancy. Media publicity and health education on obstetric critical diseases for women of childbearing age should be provided through the Internet, television, community activities and other channels [25], in order to improve the medical awareness and compliance for high-risk pregnant women.

For high-risk pregnant women, early outpatient MDT intervention is beneficial in order to improve pregnancy outcomes. Health care providers should actively promote outpatient MDT in obstetrics, include high-risk pregnant women in MDT management as early as possible, provide them with timely, comprehensive, and continuous diagnosis and treatment. This approach has the potential to improve pregnancy outcomes, reduce complications, and ensure the health of mothers and infants.

5. Conclusions

Outpatient MDT management can effectively improve the pregnancy outcome of high-risk pregnant women, and this mode of management should be actively promoted. A comprehensive and professional MDT team should be established to improve the rescue rate of critically ill pregnant women and reduce adverse pregnancy outcomes.

Availability of Data and Materials

The data that support the findings of this study are available from the Affiliated Hospital of Southwest Medical University but restrictions apply to the availability of these data, which were used under license for the current study and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the Affiliated Hospital of Southwest Medical University.

Author Contributions

JL undertook conceptual design, data collection, data analysis and interpretation, statistical analysis, and manuscript drafting. LB and QS participated in data collection and data analysis. HL and YZ mainly provided management technology and material support. XF undertakes research method design and data analysis, critically revised manuscripts, provided financial support, and supervised the entire process. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Written informed consent was obtained from the subject and/or guardian. The study was approved by the Ethics Committee of the Affiliated Hospital of Southwest Medical University (Ky2022237).

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Conflict of Interest

The authors declare no conflict of interest.

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