Central European Journal of
Nursing and Midwifery

ORIGINAL PAPER

ANALYSIS OF HIGH RISK PREGNANCIES IN THE REGION OF RIMAVSKÁ SOBOTA

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Abstract

Aim: The analysis of high-risk pregnancy, in order to determine what demographic and other factors are most commonly reported in women with high-risk pregnancy, and what relationships are among the variables recorded. *Design:* The method used was a retrospective observational study of cases. *Methods*: The study included 1,256 women at the Rimavská Sobota obstetrics and gynaecological unit hospitalized with a high-risk pregnancy in the two years. The method used was a retrospective observational study of cases. For processing were used statistic methods. *Results*: The average age of the sample was 24.45 years. 584 respondents (46.50%) were without education. 316 respondents (25.16%) did not go to prenatal counselling at all, or irregularly. The most significant dependences were demonstrated within the following variables – between the time of onset of respondents' problems and the presence of associated diseases, the time of onset of the problems and the number of spontaneous abortions suffered in the past, between termination of current pregnancy by abortion in respondents and prenatal counselling visits and between termination of current pregnancy by abortion and previous high-risk pregnancies. *Conclusion*: The results of the study confirmed the importance of prenatal care for women during pregnancy. Effective education focusing on reproductive health for girls of school-age, implemented by nurses, could also help to solve the problems identified.

Keywords: birth, complications, high risk pregnancy, prenatal counselling, risk factors.

Introduction

According to the *Czech and Slovak Obstetrical Gynaecological Society*, physiological pregnancy is defined as a low-risk pregnancy when the woman has no history-based risk factors, and the results of all clinical and laboratory tests are negative throughout her pregnancy (Korbeľ et al., 2010). Most pregnancies are physiologically uncomplicated. However, between a quarter and a third of all pregnant women have risk factors (RF) that can turn a physiological pregnancy into a high-risk, even pathological one (Hájek et al., 2004). A physiological pregnancy becomes a high-risk to pathological pregnancy when risk factors manifest themselves as a high-risk to pathological condition for the mother or child (James et al., 2011). According to Holomáň et al. (2007), a pregnancy during which the health or life of the pregnant woman or her foetus may be endangered is considered a high-risk pregnancy.

In practice, we observe only a 20% incidence of high-risk pregnancies, but the highest threat of premature birth, perinatal morbidity and mortality is in this group, according to Hájek et al. (2004). The problem of reproductive and sexual health persists, regarded as a problem mainly due to the high number of associated abortions. According to the *Health Statistics Yearbook of the Slovak Republic 2014*, 65,469 pregnant women were registered in the Slovak Republic in 2014, of which a third had a high-risk to pathological pregnancy. In a high-risk pregnancy, the most frequent threats are premature birth and abortion. 22% of pregnancies were terminated by abortion. Of the total of 15,628 abortions, 7,501 (48 %) were artificial interruptions of pregnancy (AIP) and 5,042 were spontaneous abortions. Under "Other", 2,705 abortions were reported.

In 2014, 55,033 children were born alive in Slovakia, most in the Prešov and Košice regions. There were 6,059 births in the Banská Bystrica region, of which most were in the Banská Bystrica (1,006) and Rimavská Sobota (976) districts. According to the Statistical Office of the Slovak Republic, there were 84,752 inhabitants in the district of Rimavská Sobota (RS) in 2014; the total number of births was 976 and the number of abortions 369 (Abortion Index 37.58%) (Health yearbook of the Slovak Republic

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2014). Statistical data from the 2015 *Gynaecological outpatient activity report of the Rimavská Sobota district*, which is part of the *State Statistical Surveys Program 2015-2017*, indicate a high proportion of high-risk pregnancies (34.5%). Compared to 2014, this marks a decrease of 1.5%. Nevertheless the number is high.

In 2015, there were 15,647 abortions in the Slovak Republic, i.e., 22% of all pregnancies, which is consistent with the proportion of abortions in 2014. The configuration of abortions altered in terms of an increase in spontaneous abortions and a decrease in AIP. Spontaneous abortions were most frequently in the eighth week of pregnancy and in primiparas. The highest abortion rate was in the Banská Bystrica region: 2,205 abortions (13.9%), most of which were in the district of Rimavská Sobota (416 abortions), representing an increase in abortions compared to 2014.

According to experts, there are many risk factors for pregnancy. Most of them are revealed during the first visit to a prenatal counselling centre (hereinafter PC). To cite what are probably the most common: age (less than 17 and over 35), height (up to 150 cm), pathological pelvis, or cephalopelvic disproportion, multiparity (five or more), psychosocial burden, Morbus Down in the family, hypertensive conditions before pregnancy or during previous pregnancies, hypotonic bleeding after previous births, perinatal loss (death of a child during pregnancy or early postpartum), preterm or postterm delivery, birth of a hypotrophic, preterm infant or infant with a congenital developmental defect, inappropriate lifestyle (smoking, alcohol, use of drugs), low education, broken family, unemployment, low financial income, and polluted environment (Čech et al., 2006; Holomáň et al., 2007; Platt et al., 2009; Urbanová, 2010). The authors also report Rh negative blood, asymptomatic bacteriuria, urine sugar, foetus in the breech position, increased cervix score, morbus hemolyticus neonati, pyelonephritis, gestational diabetes, previous preterm delivery, and postpartum complications.

In addition, according to Vašut, Anděl, Šaloun (2007) and Hájek et al. (2004), gestational diabetes mellitus (DM), and other types of DM, mean high risk of spontaneous abortion, premature birth, congenital malformations, preeclampsia, and traumatism in childbirth. Most births are therefore terminated by Caesarean section.

Aim

To determine, based on an analysis of the medical documentation of women hospitalized with high-risk pregnancies, what demographic and other factors are most commonly reported in women with high-risk pregnancies, and what relationships are among the variables recorded.

The aim of the research is a detailed, multifaceted description of the cases studied and a logical explanation of the nature of the operative factors from all perspectives.

Research questions:
1. Which demographic factors are more commonly reported in women with a high risk pregnancy?
2. Which factors of sexual and reproductive health are more commonly reported in women with a high-risk pregnancies?
3. Is there a statistically significant relationship between the recorded variables?
4. Which of the operative factors can be considered to be preventable?

Statistical relationships were verified between the following variables:
1. The number of hospitalizations during the current high-risk pregnancy and:
   - the number of previous spontaneous abortions
   - the presence of associated diseases
   - the number of children
2. The number of spontaneous abortions and:
   - associated diseases
3. The onset of problems in the monitored pregnancy and:
   - associated diseases
   - the number of spontaneous abortions
4. Termination of pregnancy by abortion and:
   - previous high-risk pregnancies,
   - visits to prenatal counselling.

Methods

Design

The method used was a retrospective observational study of cases.

Sample

The study included women hospitalized in the high-risk pregnancy department of the Rimavska Sobota obstetrical gynaecological unit, with a diagnosis of high-risk pregnancy, regardless of age and week of pregnancy, in the two years monitored: 2014 and 2015. Every woman was entered into the sample only once, and repeated hospitalizations during one pregnancy were monitored. The Rimavská Sobota

district was chosen deliberately because of the higher number of births and abortions compared to other districts of Banská Bystrica region.

Data collection

Data collection was carried out on the basis of identification of high-risk pregnancies from the documentation of the obstetrical gynaecological unit of the hospital Rimavská Sobota between August and December 2016.

We analyzed the selected medical records of hospitalized women from this department during the two years 2014 and 2015. In the analysis, the following data were recorded:

1. Demographic data – age, education, status, residence (town vs. village), employment.
2. Anamnesis aimed at the reproductive and sexual health of the woman; number of previous pregnancies, number of children, number of AIPs, number of spontaneous abortions, assisted reproduction, reason for admission and complications of the current pregnancy, presence of associated diseases, and prenatal care (attendance of prenatal counselling).
3. Termination of pregnancy.

Data analysis

The results of the retrospective study were analyzed using absolute and relative frequencies. The following statistical methods were used: Chi-quadrate test, Kruskal-Wallis test, and Mann-Whitney test.

Results

Number of respondents: n = 1,256. Total number of births of the obstetrical gynaecological unit at the hospital Rimavská Sobota: in 2014 – 1,103 births and in 2015 – 1,119 births.

In the two years monitored: 2014 and 2015, 1,256 women were hospitalized in the obstetrical gynaecological unit in Rimavská Sobota due to high-risk pregnancy. Their average age was 24.45 years. The composition of respondents by age is presented in Table 1.

Table 1 Age of respondents

Age	n	%	mean	min.	max.
> 14	3	0.24			
> 14; 17 >	112	8.92			
> 18; 30 >	722	57.48			
> 31; 40 >	391	31.13			
> 40	28	2.23			
total	1,256	100.00	24.45	> 14	45

min. – minimum; max- maximum

In terms of level of education, the largest group was of women who had completed elementary education (584, i.e. 46.50%), followed by those who had completed secondary education (516, i.e. 41.08%). 12.42% of women (156) had attended university. Regarding marital status, the majority of respondents were single (61.70%), married (34.32%), divorced (3.58%), and widowed (0.40%).

Residentially, 66.80% of the respondents lived in a village, while 33.20% lived in a town.

Almost half (49.28%) of the respondents were unemployed, 14.65% were on maternity leave, 13.77% worked in the service sector, 11.46% worked in administration, 6.61% were manual workers, 3.74% were students, and 0.48% were on a disability pension.

The highest number of respondents were in their first pregnancy (i.e. childless): 57.01%. 40.53% had 1–4 children; 2.31% had had 5–10 children; and 0.16% had had more than 10 children.

While 29.46% of respondents had had a high-risk pregnancy in the past, the majority were in high-risk pregnancy for the first time.

In terms of fertilisation, 1,232 respondents (98.09 %) had been fertilised naturally. Only 24 respondents (1.91%) were hospitalized after artificial insemination.

For the respondents with in-vitro fertilisation, the method of termination was checked. As many as 50% had delivery terminated by Caesarean section, more than double the percentage of women fertilized naturally who had a Caesarean (23.54%). We checked the statistical significance of this finding (p) at the significance level α = 0.01. The result was significant. Following artificial insemination, delivery was terminated by Caesarean section more commonly than in women fertilised naturally p = 0.0014.

An overview of the reasons for hospitalization at the high-risk pregnancy department is presented in Table 2. During their current pregnancy, 67.04% of respondents were hospitalized only once, 31.53% two-four times, 1.35% five-ten times, and 0.08% of respondents were hospitalized more than ten times.

In terms of total number of pregnancies, the largest group consisted of respondents with primigravidity (46.89 %), two to four pregnancies were recorded for 567 respondents (45.14%) and five to ten pregnancies were recorded for 89 respondents (7.09%). In addition, there were 11 respondents with more than ten pregnancies (0.88%).

Table 2 Reason for hospitalization

Reason for admission	n	%
contractile activity	516	41.08
premature discharge of amniotic fluid	79	6.29
colporrhagia	253	20.14
induction of labour	313	24.92
adverse vaginal finding	106	8.44
affection (pre-eclampsia, DM, IUGR)	280	22.29
other	29	2.31

DM – Diabetes melitus; IUGR – Intrauterine Fetal Growth Retardation

Artificial interruption of pregnancy had been experienced by 114 respondents. Spontaneous abortion had been experienced by 240 respondents. An overview is shown in Table 3.

We observed a recurrence of problems during the monitored pregnancies expressed by repeated hospitalizations in respondents who had previously had spontaneous abortions. Using the Chi-square test (p), we found that the number of spontaneous abortions statistically significantly affected the number of hospitalizations during the current high-risk pregnancy ($p = 0.0251$) (Table 4).

The respondents who had not aborted had statistically significantly fewer re-hospitalizations during their high-risk pregnancy than the respondents who had aborted. The average number of hospitalizations in women who had not aborted was 1.7156 per woman, while in respondents who had aborted,

the average number of hospitalizations was 1.7479 per woman.

We examined whether the number of hospitalizations during the current high-risk pregnancy was influenced by the total number of children each respondent had borne. A very significant result was demonstrated ($p < 0.0001$) (Table 4). The number of children respondents had borne had an impact on the number of hospitalizations. The average number of hospitalizations (per respondent) decreased as the number of children increased. Using the Kruskal-Wallis test, we checked the statistical significance of this decline and found a very significant difference in the average number of hospitalizations between the number-of-children groups of the respondents ($p = 0.0098$; $\alpha \leq 0.01$).

Table 3 Number of AIPs and spontaneous abortions

	Number of AIPs		Number of spontaneous abortions	
	n	%	n	%
0	1,142	90.92	1,016	80.89
1 to 4	113	8.99	238	18.95
5 to 10	0	0	2	0.16
more than 10	1	0.08	0	0.00
total	1,256	100.00	1,256	100.00

Table 4 Overview of statistical relationships between the variables under review

	α	test	test statistics	p
number of hospitalizations vs. number of spontaneous abortions	0.05	χ^2 df (2)	χ^2 7.3701	0.0251
number of hospitalizations vs. associated diseases	0.01	M-W	z 2.8901	0.0019
number of hospitalizations vs. number of children	0.01	χ^2 df (1)	χ^2 23.2344	< 0.0001
number of spontaneous abortions vs. associated diseases	0.05	M-W	z 0.1578	0.4364
onset of problems vs. associated diseases	0.01	χ^2 df (2)	χ^2 35.7956	< 0.0001
onset of problems vs. number of spontaneous abortions	0.01	M-W	z -2.4254	0.0076
termination of pregnancy by abortion vs. high risk pregnancies	0.01	equality of two proportions	z 3.7841	< 0.0001
termination of pregnancy by abortion vs. prenatal care	0.01	equality of two proportions	z 16.6534	< 0.0001

χ^2 *– Chi-quadrate test; M-W – Mann–Whitney test; α – significance level; df – degree of freedom*

The impact of associated diseases

Associated diseases were reported in 69.03% of the respondents, while 30.97 % of the respondents with high-risk pregnancy had no associated diseases. The most common associated diseases were preeclampsia, (453 women: 36.07%) and increased

blood levels of IgG, (323 respondents: 25.72%). ToxoRVK was reported in 201 women (16.00%); antiHIV in the blood in 0.88%; and HBsAG in the blood in 1.19% of the respondents.

Of the 867 respondents with other diseases associated with high-risk pregnancy, 166 had a case history

of spontaneous abortion. Of 389 respondents who did not have other diseases associated with high-risk pregnancy, 74 women had aborted spontaneously.

Using the Mann-Whitney test, we checked the significance of this difference. However, the number of spontaneous abortions in respondents with associated diseases was not statistically different from the number of spontaneous abortions in respondents without associated diseases ($p = 0.4364$; $\alpha > 0.05$).

The relationship of spontaneous abortions to associated Toxoplasmosis was tested separately.

Of the 1,256 respondents, 201 respondents had toxoplasmosis (approximately every sixth). The incidence of toxoplasmosis was higher among respondents who had spontaneously aborted compared to women who had not aborted. However, it was not statistically significant ($p = 0.1296$).

We checked the impact of associated diseases on the frequency of problems during the pregnancy, expressed by the number of hospitalizations. The number of hospitalizations in women with associated diseases was higher than in women with no associated diseases ($p = 0.00192$) (Table 4).

The average number of hospitalizations in the group of respondents who had other diseases: associated with high risk pregnancy – 1.7999; no associated diseases – 1.5655.

The respondents were most commonly hospitalized in 25th-38th week of pregnancy (37.90%); and fewest pregnant women were hospitalized in the first-sixth week (3.90%).

We examined whether or not associated diseases influenced the week of pregnancy in which the respondent experienced the onset of problems, expressed by the first hospitalization during the pregnancy. A very significant difference was demonstrated ($p < 0.0001$), see Table 4.

Moreover, we checked whether or not the number of previous pregnancies experienced by respondents had an effect on the onset of problems during the current pregnancy. However, this was not confirmed. The week when respondents' problems commenced was not influenced by the number of previous pregnancies ($p = 0.1710$; $\alpha \geq 0.05$).

The number of spontaneous abortions and the onset of respondents' problems (number of weeks without problems).

The respondents who had not spontaneously aborted were, on average, 29.48 weeks without problems.

The respondents who had spontaneously aborted were, on average, 27.15 weeks without problems.

Statistically, it was confirmed that the respondents who had previously spontaneously aborted tended to have problems during pregnancy, in contrast to those who had not aborted $p = 0.0076$ (Table 4).

Termination of pregnancy

Besides spontaneous birth, Caesarean section is the predominant form of termination of pregnancy in the group of women who had previously had a high-risk pregnancy (370), and women who had not had a high-risk pregnancy (886). In the respondents who had previously had a high-risk pregnancy, 25.68 % of births were terminated by Caesarean section, and in respondents who had not had a previous high-risk pregnancy, 23.36%. The termination of pregnancy by abortion was 11.35% in the respondents with a previous high-risk pregnancy. In respondents with a previous high-risk pregnancy, the pregnancy under review was terminated by abortion statistically significantly more frequently than in the respondents without a previous high-risk pregnancy ($p < 0.0001$) (Table 4).

Also significant was the result of abortion as termination of pregnancy set against previous abortion/abortions in respondents. The percentage of pregnancies terminated by abortion was statistically significantly lower in the women who had not had any previous spontaneous abortions compared to the percentage of women who had spontaneously aborted ($p = 0.0054$, $\alpha < 0.05$). For respondents whose pregnancy was terminated by abortion, previous spontaneous abortions was a risk factor.

Table 5 shows an overview of the absolute and relative frequencies of the respondents in view of pregnancy termination versus prenatal counselling visits.

We speculated that the termination of pregnancy was affected by prenatal care. We focused on abortion as a way of terminating pregnancy.

From the calculated values in the table, it is clear that the greater the number of counselling visits, the lower the number of terminations of pregnancy by abortion.

The percentage of pregnancy termination by abortion is statistically significantly higher in women who did not report counselling visits than in women who attended counselling ($p < 0.0001$) (Table 4).

The respondents who visited counselling fewer than eight times aborted in 11.17 % of cases, which is significantly higher than the percentage of women who were counselled at least eight times. Prenatal care significantly affects the course and termination of pregnancy.

Table 5 Frequencies of respondents by pregnancy termination and prenatal care

Prenatal care	at least 8x		less than 8x		not even once		total	
Termination of pregnancy	n	%	n	%	n	%	n	%
spontaneous birth	551	58.62	127	48.29	8	15.09	686	54.62
vacuumextractor	82	8.72	10	3.80	0	0.00	92	7.32
forceps	7	0.74	3	1.14	1	1.89	11	0.88
sectio caesaraea	246	26.17	52	19.77	4	7.55	302	24.04
abortion	17	1.81	37	14.07	34	64.15	88	7.01
birth of a dead neonate	5	0.53	4	1.52	0	0.00	9	0.72
gemini birth	4	0.43	1	0.38	0	0.00	5	0.4
artificial interruptions of pregnancy	1	0.11	2	0.76	0	0.00	3	0.24
not identified	27	2.87	27	10.27	6	11.32	60	4.78
total	940	100.00	263	100.00	53	100.00	1,256	100

Discussion

Pregnancy, being a dynamic process, may become complicated at any time, thus changing the physiological course of pregnancy. In the conducted study, we analyzed 1,256 women at the Rimavská Sobota obstetrical gynaecological unit hospitalized with high risk pregnancy.

The reasons for hospitalization varied (Table 2). The Rimavská Sobota district was chosen deliberately to conduct a study of this type. RS is one of the districts with the highest birth rates in the Banská Bystrica self-governing region. This is also confirmed by the total number of births in the two years monitored in our study. An overview of the incidence of previous abortions and high risk pregnancies is presented in Table 3. According to Vaňo and Mészáros (2004), the total fertility rate in Slovakia is 1.275. In populations with a very low standard of living, it is 4.529. According to Hanákova, Chvílová Weberová and Volná (2015), the optimum age for pregnancy is from 21 to 28 years. According to Holomáň et al. (2007), the age of pregnant women is very important in primary care. Ages of 18 years or under, or over 30 years are non-optimal for primipara, whereas ages over 40 are non-optimal for multipara. The average age of our sample was ideal from the expert point of view. Composition of the sample by age is presented in Table 1. Regular visits to prenatal counselling, or absence from prenatal counselling, also affects termination of pregnancy. In our study, a dependence between abortion as a way of terminating the monitored pregnancy and prenatal counselling visits was confirmed (Tables 4 and 5). We consider this unfavourable factor to be fully preventable.

Pregnant women with a large family do not have the time or the right means for an optimal lifestyle, and avoid hospitalization even in the case of high-risk pregnancy. This fact could have influenced the statistically significant result of the dependence between the number of children per woman and the number of hospitalizations during the monitored pregnancy (Table 4), with the number of hospitalizations decreasing as the number of children increases in respondents.

It is optimal for pregnancy to be put on record and monitored by specialist doctors from the early stages. Every woman who suspects she is pregnant should visit her gynaecologist, who will then supervise the pregnancy. It is necessary not only to attend regular examinations, according to doctors' instructions, but also to observe doctors' recommendations and, in indicated cases, treatment, between examinations. It has been proven that such a procedure contributes to better results with regard to reducing morbidity and mortality in newborns (Bielik, 2013).

Experts highlight risk factors for pregnancy, i.e., associated diseases. Čech et al. (2006) report that high-risk conditions in pregnancy include: Rh negative blood, gestational diabetes, premature birth, hypertensive conditions before pregnancy or during previous pregnancies, and postpartum complications. Elenga et al. (2016), describe cases of high-risk pregnancies associated with sickle-cell anaemia. Associated diseases in the monitored sample adversely affected the onset of problems, as well as the frequency of problems during the examined pregnancies (Table 4). For respondents who had illnesses associated with high-risk pregnancy, problems started in an earlier week of pregnancy, and they were statistically significantly more likely to be hospitalized during pregnancy.

Conclusion

Revealing possible determinants of high-risk pregnancy is an important contribution, and a prerequisite for further observation and comparison of the occurrence of risk factors for the targeted elimination of possible risk factors, for the dissemination of knowledge of problematic areas of pregnancy, especially for socially weak and

excluded populations, but also for all pregnant women. The aim is to improve pregnancy, eliminate potential risk factors, and to prevent abortions and premature births.

The results of the study confirmed assumptions about high-risk pregnancies and the absence of future mothers from prenatal counselling, associated with high-risk pregnancies and abortions. The following risk determinants were determined in the sample: associated diseases, more AIPs, or spontaneous abortions in the respondents, births at a very low or high age, but also a higher total childbirth rate per woman.

According to Kopáčiková (2009), care during physiological pregnancy includes, an increased need for education focusing on the lifestyle of pregnant women, and the need for prenatal counselling. Education should focus on the sexual and reproductive health of women before and during pregnancy. The target group should be young girls of school age.

Practice recommendations

On the basis of the findings, we propose the following recommendations for practice:
1. In primary care, to educate girls and women about the appropriate biological period of a woman for conception and childbirth, and to inform them about possible complications related to high or extremely low age at pregnancy
2. Increased attention to the sexual education of girls in elementary schools
3. Greater emphasis on the importance of prenatal counselling visits during pregnancy, which prevent complications before, during and after the birth of a child
4. Attention to the lifestyle of future mothers with an emphasis on abstinence from smoking, and the use of alcohol and drugs during pregnancy
5. Increased attention to prenatal prophylaxis

Ethical aspects and conflict of interest

The authors are not aware of any conflict of interest. The implementation of the research followed approval by the hospital management. Respondents' personal data was strictly protected and ethical aspects of the research were respected.

Author contribution

Conception and design (MŠ, GS), data analysis and interpretation (MŠ, GS), writing the manuscript (MŠ), critical revision of the manuscript (MŠ, GS), final manuscript (MŠ).

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