

# Do demographic and obstetric characteristics affect fetal health locus of control among high-risk pregnancies? A Turkish sample

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## ABSTRACT

### Objectives

Fetal health locus of control has been indicated to effect how mothers approach their health beliefs and health-related decisions. The purpose of this study was to determine the fetal health locus of control (FHLC) level in high-risk pregnancies and to evaluate the factors affecting FHLC in high-risk pregnancies.

### Materials and methods

The descriptive cross-sectional study was conducted with high-risk pregnant women. A total of 221 participants were included.

### Results and Discussion

It was shown that The Internality Locus of Control was low and The Chance-Based Locus of Control was high in high-risk pregnant women. The current age of women and the age of their first pregnancy had a positively relationship with Powerful Others Locus of Control (FHLC-P). Although FHLC scores of multigravidas were higher than primiparous, no significant difference was found. Besides, there was a significantly higher FHLC-C score in women who did not change their exercise habits during pregnancy ( $p=0.008$ ). Although the FHLC-I score was higher in women, who made changes in nutrition habits, it was determined that it was not significant.

### Conclusion

The results of fetal health locus of control in high-risk pregnancies will lead to women who have high-risk pregnancies taking responsibility for adapting to the treatment process, taking into account the controls and making lifestyle changes, rather than leaving the situation to fate.

### Keywords

Fetal health; locus of control; high-risk pregnancies.

## INTRODUCTION:

When a woman cannot adapt to pregnancy period, certain crises may occur. In particular, if high risk pregnancy conditions are added to this process, it may become quite complicated. The concept that can be used in managing this crisis is Fetal Health Locus of Control concept. Fetal health locus of control (FHLC) is a concept that defines the health beliefs of pregnant women.<sup>1</sup> The internal locus of control in women shows that they have control over fetal health. The chance control over fetal health shows the existence of external locus of control.<sup>2</sup> This difference in the locus of control affects the pregnant women for taking/not taking the responsibility for their babies.<sup>3</sup> In a study conducted by Ashford and Rayen comparing smoker and nonsmoker women, it was determined that the women who smoke did not accept that smoking is among the negative health behaviors for preterm birth, and it was stated that they took a fatalistic approach

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by showing similar examples around themselves (e.g.: my friend is a smoker and her baby is healthy).<sup>4</sup> Additionally, in another study, it was reported that preeclamptic pregnant women, who had internal locus of control, adapted to the antihypertensive diet better than others.<sup>5</sup> In the study conducted by Moshki and Cheravi (2016), it was stated that the risk of prenatal depression can be reduced by increasing the social support levels of pregnant women and by reducing the chance-based locus of control.<sup>6</sup> In different studies, it was found that health promotion behaviors such as the not smoking, desire for breastfeeding and taking vitamin/iron supplements and oral health status were affected by internal locus of control.<sup>7,8</sup> Also it was found prenatal depression was affected by external locus of control.<sup>6</sup>

Diseases occurring for the first-time during pregnancy cause concern in women, initially for the health of the baby and subsequently for their own health. Although each disease requires different follow-up and lifestyle changes, all of them create similar concerns in the mother. Evaluation of the FHLC in high-risk pregnancy groups is an important step to reduce disease complications. At the same time, the determination of the factors affecting locus of control will provide data for the health personnel to empower pregnant women in the antenatal process. Therefore, this study aimed to determine the fetal health locus of control (FHLC) level in high-risk pregnancies and to evaluate the factors affecting FHLC in high-risk pregnancies.

## METHODS AND MATERIALS:

### *Study design, participants and procedures*

In this study, a descriptive cross-sectional design was used. A total of 221 participants were included in the study. The inclusion criteria were as follows: (1) being at the age of 18 and over, (2) having a risky pregnancy diagnosis for any trimester (diabetic pregnancy, gestational hypertension, preeclampsia, preterm labor risk, placenta previa, hyperemesis gravidarum, cholestasis, multiple pregnancies). The exclusion criterion was failing to fill out the data collection forms. The post hoc statistical power analysis was performed at the end of the study and indicated 97% sufficient statistical power with 221 women. Data were collected in the perinatology clinics in a university hospital.

## *Instruments*

### Personal Information Form

This form, which was developed by the researchers, consisted demographic characteristics and obstetric characteristics.

### Fetal Health Locus of Control (FHLC) Scale

The FHLC scale was developed by Labs and Wurtele (1986).<sup>1</sup> Questions assess the mother's perception of influential factors relative to her infant's health. Three distinct concepts are measured (each comprising of six questions): Internality FHLC (FHLC-I) measures a mother's belief that she is directly responsible for the health of her infant; Chance FHLC (FHLC-C) assesses degree of the belief that the infant's health is based on chance/fate; and Powerful Others FHLC (FHLC-P) measures the belief that the responsibility for perinatal outcomes belongs to health professionals.<sup>1</sup> The validity and reliability study of the scale for our country was performed by Duyan et al., (2012). Therefore, the scores of each subscale ranged from 0 to 54, and the highest score indicated the strong belief in that control.<sup>9</sup> In the present study, Cronbach's alpha values of FHLC-I, FHLC-C, FHLC-P sub-dimensions, and total scale were calculated as 0.77, 0.83, 0.67 and 0.85, respectively.

### *Statistical analysis*

Data were analyzed using the Statistical Package for Social Sciences (SPSS, IBM version 22, Chicago, IL, USA) at a significance level of 0.05. Number (n), percentage (%), mean, and standard deviation ( $\bar{X} \pm SD$ ) were used for descriptive statistics. The Kolmogorov-Smirnov test was used for normality testing. The independent samples Mann Whitney U test, Kruskal-Wallis test procedures were employed to compare means for the groups of cases. Spearman correlation coefficients were also employed in order to determine the relationship between variables. The report of this study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).<sup>10</sup>

## ETHICAL CONSIDERATIONS:

The study was approved by an ethics committee (Date: 14.09.2017, No: 2017/22-26). Participation was voluntary. Written consent was obtained from those who agreed to participate.

**Table 1.** Demographic and obstetric characteristics of the participants

	<i>n</i>	%	$\bar{x}$	$\pm SD$	Min	Max
<b>Age</b>	221		29.50	4.15	17	45
<b>Educational Status</b>						
Literate	18	8.1				
Primary School	56	25.3				
Secondary School	68	30.8				
High School	50	22.6				
University and above	29	13.1				
<b>Employed</b>						
Yes	43	19.5				
No	178	80.5				
<b>Social Security</b>						
Yes	206	93.2				
No	15	6.8				
<b>Monthly mean income (Turkish lira)</b>	221		2160.18	1644.709	0	15000
<b>Educational status of spouse</b>						
Primary School	74	33.5				
Secondary School	47	21.3				
High School	74	33.5				
University and above	26	11.8				
<b>Family Type</b>						
Nuclear family	167	75.6				
Extended family	54	24.4				
<b>High-risk pregnancies group</b>						
Diabetic pregnancy	63	28.5				
Hypertensive problems during pregnancy	44	19.9				
Preterm birth risk	55	24.9				
The other high-risk pregnancies (cholestasis, multiple pregnancies, etc.)	59	26.7				
<b>Gestational week</b>	221		30.80	6.787	7	41
<b>First gestational age</b>	221		24.11	5.31	13	39

	<i>n</i>	%	$\bar{x}$	$\pm SD$	Min	Max
<b>First prenatal visit (week)</b>	221		6.00	3.483	1	24
<b>Gravida</b>						
Primigravida	78	35.3				
Multigravida	143	64.7				
<b>History of abortion</b>						
Yes	69	31.2				
No	152	68.8				
<b>Planned pregnancy</b>						
Yes	161	72.9				
No	60	27.1				
<b>Conception shape</b>						
Spontaneous	195	88.2				
Assisted Reproduction Techniques	26	11.8				
<b>Changes feeding habits in present pregnancy</b>						
Yes	141	63.8				
No	80	36.2				
<b>Change exercise habits in present pregnancy</b>						
Yes	62	28.1				
No	159	71.9				
<b>Exercise restriction in present pregnancy</b>						
Yes	60	27.1				
No	161	72.9				
<b>Problems in previous pregnancies*</b>						
Yes	84	58.7				
No	59	41.3				
<b>Treatment situation in the previous pregnancy*</b>						
Yes	60	42.0				
No	83	58.0				

\* Analysis was performed on women who have a history of pregnancy. (n=143)

**RESULTS:*****Demographic and obstetric characteristics***

The participants were grouped into diabetic pregnancy (28.5%), hypertensive problems during pregnancy (19.9%), preterm birth risk (24.9%), and the other risky pregnancy status (cholestasis, multiple pregnancies, placenta previa, hyperemesis gravidarum) (26.7%) (Table 1).

***FHLC scores of high-risk pregnancies***

The FHLC total scale score of high-risk pregnancies was  $114.81 \pm 24.69$  (min-max = 38-160). The FHLC-I score was  $41.20 \pm 9.20$  (min-max = 9-54) and 53.8% of the participants scored above the average. The average FHLC-C subscale score was  $34.97 \pm 12.90$  (min-max = 2-54) points. Among all participants, 78.2% received

above-average points from FHLC-C. On the other hand, it was determined that they received  $38.63 \pm 9.05$  (min-max = 14-54) points from FHLC-P, and 51.8% scored higher than the average score.

***Factors Affecting FHLC in high-risk pregnancies*****Demographic characteristics and FHLC**

When the effect of demographic characteristics on FHLC score was evaluated, it was found that with increasing age, FHLC-P increased ( $r = 0.179$ ,  $p = 0.008$ ). In addition, it was found that FHLC-I increased and FHLC-C decreased as the education status increased. It was found that FHLC-C decreased as income level increased. The FHLC-I ( $p = 0.026$ ) and FHLC-P ( $p = 0.047$ ) were found to be higher in women living in nuclear families than those living in extended families (Table 2).

**Table 2.** Demographic characteristics and Fetal Health Locus Control

	FHLC-I	FHLC-C	FHLC-P	Total FHLC
<b>Age</b>	$r=0.086$	$r=0.031$	$r=0.179^*$	$r=0.122$
<b>Educational Status</b>				
Literate	$42.61 \pm 5.12$	$52.77 \pm 3.81$	$41.27 \pm 4.08$	$136.66 \pm 10.21$
Primary School	$40.60 \pm 10.02$	$34.46 \pm 12.82$	$40.07 \pm 9.32$	$115.14 \pm 24.76$
Secondary School	$39.58 \pm 9.37$	$33.36 \pm 12.84$	$36.64 \pm 9.53$	$109.60 \pm 26.97$
High School	$41.30 \pm 8.31$	$34.20 \pm 11.15$	$37.52 \pm 9.12$	$113.02 \pm 21.93$
University and above	$45.10 \pm 9.85$	$30.00 \pm 11.28$	$40.79 \pm 8.68$	$115.89 \pm 23.67$
	$p=0.046^*$	$p=0.000^*$	$p=0.082$	$p=0.000^*$
<b>Employed</b>				
Yes	$40.97 \pm 40.97$	$30.02 \pm 12.13$	$38.51 \pm 9.24$	$109.51 \pm 26.21$
No	$41.25 \pm 8.71$	$36.16 \pm 12.83$	$38.66 \pm 9.03$	$116.08 \pm 24.21$
	$p=0.745$	$p=0.003$	$p=0.866$	$p=0.205$
<b>Monthly mean income (Turkish Lira)</b>	$r=0.126$	$r=-0.158^*$	$r=0.036$	$r=-0.016$
<b>Social Security</b>				
Yes	$41.14 \pm 9.31$	$34.49 \pm 12.75$	$38.44 \pm 9.20$	$114.08 \pm 24.95$
No	$42.06 \pm 7.75$	$41.53 \pm 13.60$	$41.20 \pm 6.43$	$124.80 \pm 18.59$
	$p=0.844$	$p=0.022^*$	$p=0.320$	$p=0.096$
<b>Educational Status of Spouse</b>				
Primary School	$40.43 \pm 9.04$	$37.56 \pm 13.19$	$39.27 \pm 8.19$	$117.27 \pm 23.83$
Secondary School	$40.48 \pm 8.44$	$35.74 \pm 12.95$	$37.31 \pm 9.37$	$113.55 \pm 25.59$

	FHLC-I	FHLC-C	FHLC-P	Total FHLC
High School	41.48±8.94	33.35±12.22	37.78±9.21	112.62±23.34
University and above	43.88±11.49	30.80±12.88	41.61±10.03	116.30±29.54
	p=0.142	p=0.069	p=0.144	p=0.477
<b>Family Type</b>				
Nuclear family	41.98±9.09	35.18±13.04	39.38±8.77	116.56±24.09
Extended family	38.77±9.21	34.31±12.58	36.29±9.60	109.38±25.95
	p=0.026*	p=0.711	p=0.047*	p=0.078

\*p<0.05

#### Previous obstetric characteristics and FHLC

The FHLC-P score was higher in women with advanced age of first pregnancy ( $r = 0.160$ ,  $p = 0.017$ ). Although FHLC scores of multigravidas were higher, no significant difference was found. The existence of abortion in obstetric history did not affect FHLC (Table 3).

**Table 3.** Previous obstetric characteristics ve Fetal Health Locus Control

	FHLC-I	FHLC-C	FHLC-P	Total FHLC
<b>First gestational age</b>	$r=0.094$	$r=0.050$	$r=0.160^*$	$r=0.120$
<b>Gravida</b>				
Primigravida	40.78±9.24	34.84±13.42	38.35±9.14	113.98±25.43
Multigravida	41.43±9.21	35.04±12.66	38.78±9.03	115.25±24.35
	p=0.559	p=0.778	p=0.635	p=0.702
<b>Abortion history</b>				
Yes	42.56±8.59	34.49±12.23	40.08±8.76	117.14±23.53
No	40.58±9.43	35.19±13.23	37.97±9.14	113.75±25.20
	p=0.136	p=0.848	p=0.111	p=0.314
<b>Problems in previous pregnancies</b>				
Yes	42.72±8.19	35.17±12.68	39.84±8.70	117.75±22.11
No	39.53±10.28	34.84±12.74	37.27±9.36	111.71±27.03
	p=0.083	p=0.899	p=0.109	p=0.291
<b>Treatment situation in the previous pregnancy</b>				
Yes	42.33±8.40	35.00±12.71	39.55±8.90	116.88±23.07
No	40.78±9.75	35.07±12.70	38.22±9.14	114.08±25.31
	p=0.407	p=0.922	p=0.393	p=0.656

\* p<0.05

#### Present obstetric characteristics and FHLC

Women with a planned pregnancy had higher FHLC-I, no significant difference was found among locus of control and having planned pregnancy ( $p=0.646$ ). Although the women conceived through assisted reproductive technique had higher FHLC-I and FHLC-P, the difference was not statistically significant (Table 4).

**Table 4.** Present obstetric characteristics ve Fetal Health Locus Control

	FHLC-I	FHLC-C	FHLC-P	Total FHLC
<b>Gestational week</b>	0.046	-0.001	0.086	0.036
<b>First prenatal visit (week)</b>	r=-0.018	r=0.015	r=0.037	r=0.013
	p=0.793	p=0.826	p=0.588	p=0.842
	p=0.619	p=0.245	p=0.361	p=0.763
<b>Planned pregnancy</b>				
Yes	41.49±9.05	35.29±12.64	38.60±9.34	115.39±24.39
No	40.41±9.64	34.11±13.65	38.70±8.30	113.23±25.61
<b>Conception shape</b>				
Spontaneous	40.97±9.10	34.94±12.60	38.50±8.97	114.43±24.24
Assisted Reproduction Techniques	42.88±9.99	35.15±15.25	39.61±9.79	117.65±28.17
	p=0.211	p=0.862	p=0.432	p=0.337

\* p&lt;0.05

## Changes in health behaviors in the antenatal period and FHLC

Although FHLC-I and FHLC-P scores of women, who make changes in nutritional habits due to pregnancy risks, were higher, no significant difference was found (p=0.727). Pregnant women who did not change exercise habits during pregnancy had significantly higher FHLC-C scores (p=0.008) (Table 5).

**Table 5.** Changes in health behaviors in the antenatal period and Fetal Health Locus Control

	FHLC-I	FHLC-C	FHLC-P	Total FHLC
<b>Changes feeding habits in present pregnancy</b>				
Yes	41.82±8.77	34.34±12.60	39.36±8.90	115.53±24.01
No	40.11±9.88	36.08±13.42	37.33±9.24	113.53±25.95
	p=0.292	p=0.299	p=0.129	p=0.727
<b>Change exercise habits in present pregnancy</b>				
Yes	39.48±10.21	31.61±12.64	37.90±9.00	109.00±25.75
No	41.87±8.72	36.28±12.80	38.91±9.09	117.07±23.97
	p=0.116	p=0.008*	p=0.410	p=0.033*
<b>Exercise restriction in present pregnancy</b>				
Yes	40.11±9.04	35.83±13.32	38.85±9.40	114.80±25.53
No	41.60±9.26	34.65±12.77	38.55±8.95	114.81±24.45
	p=0.250	p=0.381	p=0.653	p=0.929

\* p&lt;0.05



## DISCUSSION

The most participants had FHLC-C in this study. Two-thirds of women with preeclampsia had external locus of control in Egypt, and it was stated that the majority of them had higher FHLC-P scores than others.<sup>5</sup> Additionally, in some other studies conducted in Iran examining the relationships among demographic characteristics<sup>11</sup> and self-care behaviors<sup>11</sup> and fetal health control focus with gestational diabetes, it was found that pregnant women had powerful perceptions about external factors (doctors)<sup>12</sup>. Parenting approaches of women who are growing in Muslim societies as in our country where the fatalistic approach is common may also develop in this direction. This belief, that the risks exist in their fate, may prevent pregnant women from taking responsibility and it can be harmful.

It was found that as the age of women and age at first pregnancy increased, FHLC-P also increased in the present study. When the results of different studies were evaluated, it was found that age did not have any effect on the fetal locus of control, but similarly, with the advanced first pregnancy age, external locus of control increased.<sup>2,13</sup> In Zaky's (2016) study, that it was reported that the external locus of control increased in women with preeclampsia over 30 years of age.<sup>5</sup> As the age of women increases, awareness and responsibility perception are expected to increase. In our culture, women are less questioning about their health. It thought that the level of internality locus of control decreased due to the transfer of responsibility to the health personnel.

In this study, the FHLC-I was found to be higher in women with a higher education level. In contrast, it was found that the education level of the spouse did not affect locus of control. In studies conducted in Turkey and world, the pregnant women with lower educational levels and lower health literacy levels, the FHLC-C and FHLC-P were also determined to be higher.<sup>2,5,14</sup> It is known that the quality of education is not equal in all regions in our country. Therefore, with the frequent use of resources such as neighbors, friends, and family instead of experts, the level of misinformation increases as the education level decreases. In addition to education, increasing awareness in women, can provide thinking realistically by increasing the internality locus of control and taking responsibility for themselves and their babies.

In the results of current study, it was determined that working status of the pregnant women did not affect the FHLC scores. However, the increase in family income levels decreased FHLC-C. In the study of Ozcan and Duyan (2015), in which the FHLC scores of healthy pregnant women were evaluated, it was determined that FHLC-C was high in low-income and unemployed women.<sup>2</sup> Similarly, in Egypt, preeclampsia pregnant women who have enough economic income have higher internality health locus of control, increasing adherence to anti-hypertensive diet.<sup>5</sup> Working status may have not affected the locus of control in the current study due to the fact that the majority of women do not have a profession. But, the social environment of working women can facilitate their access to information and can have a positive impact taking responsibility for themselves and their babies. Therefore, it is thought that educated women who have economic freedom are going to take responsibility for themselves and their babies, and they are going to demand to be involved in the care process.

Among the pregnant women who live in a nuclear family, it was found that FHLC-I and FHLC-P were stronger. Male domination in some communities reduces the internality locus of control due to ignoring individual choices in extended family.<sup>15</sup> In the extended family, women are more limited in taking responsibility and making decisions about themselves and their babies. The internality locus of control can weaken due to experiences of guiding family elders and women's inability to make individual decisions.

Surprisingly, the number of pregnancies did not affect FHLC in the current study. In previous study conducted on healthy pregnant women in Turkey, it was determined that multipartite women take less responsibility related to their health and had higher chance-based control.<sup>2</sup> Additionally, in a study conducted in Egypt on high and low-risk pregnant women in Egypt, it was determined that increased number of pregnancies was associated with lower internality locus of control.<sup>12</sup> However, we can interpret this that each woman's pregnancy is different and it is a unique process with varying effects on FHLC. Therefore, it may not have an effect in general in the current study.

It was found that the abortion history of the women and receiving treatment in the hospital in previous pregnancies did not have a significant effect on the FHLC score. Similarly, in the studies conducted by

Özcan and Duyan with healthy pregnant women, it was stated that the history of abortion had no effect on FHLC.<sup>2</sup> However, contrary to these results, it is stated that by the increased number of abortions, FHLC-I increases.<sup>12</sup> Experiencing perinatal loss is considered to be an important factor for the development of anxiety and depression symptoms in subsequent pregnancies.<sup>16</sup> However, by focusing more on the health of infants, FHLC-I can be strengthened.

According to our results, which are similar to other study results, there was no relationship between gestational week, the first prenatal visit time and FHLC score of high-risk pregnancy.<sup>2,13</sup> But, in a study conducted by Zaky (2016), it was found that FHLC-P increased with regular prenatal visits in pregnant women with preeclampsia.<sup>5</sup> This was explained by the fact that women wanted to leave their unborn baby's health responsibility to health care personals and want to behave in a controlled manner. It is an expected result that as the gestational weeks' increases the commitment of mothers to their babies' increases and internality locus of control increase while externality locus of control decreases.

In our study, it was determined that the planning and spontaneity of pregnancy or the use of assisted reproductive techniques did not affect FHLC. Contrary to the results, preeclampsia pregnancies had higher FHLC-P and unplanned pregnancies had higher FHLC-C.<sup>5</sup> The existence of a risky condition may be seen as more important than a planned or unplanned pregnancy. It is thought that FHLC-I and FHLC-P can be increased by raising awareness of women in a pregnancy that is determined to be risky.

According to the results of the study, it was determined that the change in the nutritional habits of high-risk pregnant groups did not affect FHLC. Contrary to this situation, it was determined that FHLC-C increased at women within the high-risk pregnancy group who did not change their exercise habits. In our culture, the pregnant women want to regulate her nutrition in a way that increasing the number of portions and want to rest

constantly because they think it will affect negatively. This thought is also increasing in risky pregnancy situations. In this way, it is thought that the belief that the babies will be healthier can neutralize locus of control.

### Limitations

The design of the study can be accepted as a limitation, in that it did not evaluate the causal and time-dependent changes. Also, future studies should include variables be related to health locus of control such as social support and anxiety in addition to the variables evaluated in this study.

### Conclusions:

As a result, mother-baby death rates that are affected by health beliefs, attitudes and health locus of control are important criteria for developing the health level of the community. The findings from this study of fetal health locus of control in high-risk pregnancies will lead to women who have high-risk pregnancies taking responsibility for adapting to the treatment process, taking into account the controls and making lifestyle changes, rather than leave to fate. The internality locus of control needs to be strengthened to ensure that the mothers take responsibility. Also, all health personnel are responsible to identify high-risk pregnant women with high levels of FHLC-C and to reduce these levels. Individuals who have a high FHLC-P should be directed to the right sources and their belief in healthcare professionals should be strengthened.

### Conflicts of Interest and Source of Funding

The authors declare that they have no conflicting interests. No funding was received for this study.

### Authors's contribution:

Data gathering and idea owner of this study: All authors

Study design: All authors

Data gathering: NNAA, GU

Writing and submitting manuscript: All authors

Editing and approval of final draft: All authors



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