TÜBİTAK

Turkish Journal of Medical Sciences

http://journals.tubitak.gov.tr/medical/

Research Article

Turk J Med Sci
(2015) 45: 714-722

doi:10.3906/sag-1405-20

Fetal health locus of control in a sample of pregnant Turkish women

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Received: 07.05.2014 • **Accepted/Published Online:** 25.08.2014 • **Printed:** 30.06.2015

Background/aim: To examine the relationship between sociodemographic and pregnancy features and fetal health locus of control (FHLC) in a sample of pregnant Turkish women.

Materials and methods: The study was conducted with 256 pregnant women. Data were collected by demographic questionnaire and the FHLC Scale consisting of 3 components: 1) Internality Scale (FHLC-I), 2) Powerful Others Scale (FHLC-P), and 3) Chances Scale (FHLC-C).

Results: The age of marriage was found to have a positive relation with FHLC-I (r = 0.141) and a negative relation with FHLC-C (r = –0.145) (P < 0.05). The age of first pregnancy was found to have a positive relation with FHLC-I (r = 0.127). Those who have a low educational level (r = –0.258) and income (r = –0.149), who are unemployed (r = –2.839), whose number of pregnancies is high (r = 0.152), who get pregnant unplanned (r = 3.839), and who come to their first prenatal examination late (r = –0.142) have a significantly high score of FHLC-C (P <0.05).

Conclusion: It may be helpful for better outcomes of prenatal care to identify pregnant women who believe that their behavior has little effect on the health of their fetus and that it is controlled by chance.

Key words: Pregnancy, fetal health, locus of control

1. Introduction

Despite the decrease in mother and infant mortality rates in recent years, which is regarded to be an important criterion showing the health status of societies, it has not reached the desirable level (1–4). Even though there seems to be an improvement in the data related with getting help before and/or during delivery and infant mortality rates in Turkey, it is below the required levels (5). In the antenatal care guideline published by the Ministry of Health of the Republic of Turkey, it is stated that it is becoming increasingly difficult to reach better levels in mother-infant mortality than the current level, and more should be done in a better manner (6).

One of the factors affecting mother and infant health is the expectant mothers' health beliefs and attitudes. In various studies, it is indicated that pregnant women's health-related behaviors influence infant health (7–11). Therefore, understanding expectant mothers' health beliefs and behaviors and proceeding appropriately should be considered in order to boost the quality of antenatal care.

The "locus of control", one of the concepts in understanding and explaining health beliefs and behaviors, was used first by Rotter in social learning theory (11). People vary in their general tendencies to believe they have control over things that occur in their lives. Those who believe that they personally have control over their lives have been described as having an internal locus of control, whereas those who believe their lives are controlled by something else (such as other people, fate, luck, chance, or God) have been described as having an external locus of control (11,12). According to Wallston's modification of Rotter's social learning theory, a person's health locus of control orientation is one of several factors determining which health-related behaviors a person will perform. These health-related behaviors, in turn, partially determine a person's health status. Thus, the health locus of control orientation is theoretically an indirect determinant of health status (13).

Labs and Wurtele suggested that women lacking strong internal beliefs may place the health of their unborn children at risk (14). Subsequent studies found that people with external beliefs take more risks during pregnancy, and pregnant women with internal beliefs are more likely to change their lifestyle and adopt positive health

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behaviors (15–22). However, their number is few and no study conducted in Turkish society had been encountered. Considering that culture influences health beliefs and attitudes, this study aims to fill this gap.

The aim of this study is to evaluate the fetal health locus of control (FHLC) in a sample of pregnant Turkish women. The research questions are as follows:

1. Is there a relationship between sociodemographic characteristics and FHLC?
2. Is there a relationship between previous pregnancy experiences and FHLC?
3. Is there a relationship between the history of the current pregnancy and FHLC?
4. Is there a relationship between the intake of iron/vitamin and folic acid and FHLC?
5. Is there a relationship between smoking, nutrition, and exercise habits and FHLC?

2. Materials and methods

2.1. Design

Women who consulted with primary, secondary, and tertiary institutions in the Adana city center due to pregnancy follow-up and who agreed to participate in the study were included in the research. Pregnant women were informed about the study and were told that their participation should be voluntary and would not affect the service they would receive. The self-report questionnaires were completed with the option of anonymity. Two hundred and seventy pregnant women agreed to participate in the study. Fourteen of them were excluded since they left the questionnaire unfinished.

2.2. Participants

The study was carried out with 256 pregnant women aged between 17 and 41 (27.68 ± 5.72), who had relatively low educational levels (illiterate 7.8%, primary education 34.4%, secondary education 17.6%, high school level 27.3%, and university degree 12.9%), who generally had low and medium economic status (94.5%), who had social security (85.2%), and who did not work (78.5%) (Table 1).

2.3. Instruments

2.3.1. Fetal Health Locus of Control Scale

The Fetal Health Locus of Control Scale (FHLCS) was developed by Labs and Wurtele and adapted to Turkish by Duyan et al. (23). The FHLCS is an 18-item questionnaire with 3 components: 1) the Internality Scale (FHLC-I), which measures the extent to which a woman believes that her behaviors influence the health of her fetus, where a high score indicates a belief of having a high level of control; 2) the Powerful Others Scale (FHLC-P), which concerns the belief that other people (mostly health professionals) control/influence the health of her fetus, where a high score indicates belief in others' control; and 3) the Chances Scale (FHLC-C), which indicates the respondent's belief that chance or fate affects the health of her fetus, where a high score indicates a stronger belief in chance.

2.3.2. Questionnaire

The questionnaire was composed of 5 parts. There were questions about the pregnant women's sociodemographic characteristics (age, education, work, income, social security, age of marriage) in part 1; previous pregnancy experiences (age of first pregnancy, number of pregnancies, number of living children, miscarriage and abortion histories) in part 2; current pregnancy history (gestational age, diseases to influence pregnancy process, planned pregnancy, first prenatal visit) in part 3; intake of iron/vitamin and folic acid in part 4; and smoking, nutrition, and exercise habits in part 5.

2.4. Data analysis

The data were analyzed using SPSS 16.0. The FHLC scale scores of participants were used as dependent variables. Sociodemographic characteristics of the pregnant women and some characteristics related to pregnancy were used as independent variables. Descriptive statistics, namely frequency, percentage, standard deviation, and mean, were employed to describe the participants. The independent samples t-test, Kruskal–Wallis test, and one-way ANOVA procedures were employed to compare means for the groups of cases. Pearson correlation coefficients (r statistics) were also employed in order to determine the relationship between dependent and independent variables. The minimum acceptable level of significance was set at 0.05. The data file is available for further analysis if additional questions arise.

3. Results

Demographic and obstetrical features of the participants are shown in Table 1.

3.1. Sociodemographic characteristics and FHLCS

There was no relationship between FHLC-I ($r = 0.025$), FHLC-C ($r = 0.012$), and FHLC-P ($r = 0.022$) and the age variable ($P > 0.05$).

Educational status had a positive relationship ($r = 0.167$, $P < 0.01$) with an internal locus of control and a negative relationship ($r = -0.258$, $P < 0.01$) with a chance-based locus of control, but it did not have a relationship with a powerful others locus of control ($r = 0.000$, $P > 0.05$).

While the difference in the mean scores of internal locus of control between employed and unemployed women was significantly different in favor of the employed ($r = 2.400$, $P < 0.05$), the difference in the mean score of chance-based locus of control was significantly different in favor of the unemployed ($r = -2.839$, $P < 0.01$). In addition, there was no significant difference between groups in

Table 1. Demographic and obstetrical features of the participants (n = 256).

		N (%)
Education	Illiterate	20 (7.8)
	Primary	88 (34.4)
	Secondary	45 (17.6)
	High school	70 (27.3)
	University	33 (12.9)
Perceived economic status	Low	41 (16.0)
	Medium	201 (78.5)
	High	14 (5.5)
Social security	Yes	218 (85.2)
	No	38 (14.8)
Working	Yes	55 (21.5)
	No	201 (78.5)
Miscarriage history	Yes	54 (21.1)
	No	202 (78.4)
Abortion history (n = 254)	Yes	46 (17.9)
	No	208 (81.3)
Any disease that may affect pregnancy	Yes	54 (21.1)
	No	202 (78.4)
Planned pregnancy (n = 254)	Yes	185 (72.3)
	No	69 (26.9)
Iron/vitamin usage	Only iron	50 (19.5)
	Only vitamin	18 (7.03)
	Iron + vitamin	144 (56.3)
	No	42 (16.4)
Folic acid usage	Before pregnancy	78 (30.4)
	After pregnancy	78 (30.4)
	No	100 (39.2)
Smoking	Yes	29 (11.3)
	No	195 (76.2)
	Stopped smoking due to pregnancy	32 (12.5)
Changes in nutrition habits (n = 250)	Yes	103(40.2)
	No	147 (57.4)
Doing exercise (n = 255)	Yes	66 (25.8)
	No	189 (73.8)

terms of health locus of control mean for powerful others (r = 1.768, P > 0.05).

Income did not have a relationship with internal (r = 0.109, P > 0.05) and powerful others (r = 0.046, P > 0.05) health locus of control, whereas it had a negative relationship with chance-based health locus of control (r = –0.149, P < 0.05).

Differences in the mean score of internal (r = –1.370), chance-based (r = –0.532), and powerful others (r = –0.229) locus of control between women with and without social security was not statistically significant (P > 0.05).

The mean age of marriage was 21.91 ± 4.19 (range: 14–35) years. Age of marriage had a positive relationship (r = 0.141, P < 0.05) with internal locus of control and a negative relationship (r = –0.145, P < 0.05) with chance-based locus of control, while it had no relationship with powerful others locus of control (r = 0.063, P > 0.05).

3.2. History of previous pregnancy and FHLCS

Differences in the mean scores of internal, chance-based, and powerful others locus of control between women with and without a history of miscarriage and abortion was not statistically different (Table 2).

The mean age of first pregnancy was 23.0 ± 4.6 (range: 16–39) years. Whereas age at first pregnancy had a positive relationship (r = 0.127, P < 0.01) with internal locus of control, it had no relationship with chance-based (r = –0.112, P > 0.05) and powerful others locus of control (r = 0.050, P > 0.05).

The mean number of pregnancies was 2.2 ± 1.4 (range: 1–10). While the number of pregnancies had a positive relationship with chance-based locus of control (r = 0.152, P < 0.05), it had no relationship with internal (r = –0.080, P > 0.05) and powerful others locus of control (r = –0.046, P > 0.05).

The mean number of living children was 1.1 ± 1.1 (range: 0–8). The number of living children had no relationship with internal (r = –0.096, P > 0.05), chance-based (r = 0.127, P > 0.05), or powerful others locus of control scores (r = –0.051, P > 0.05).

3.3. History of current pregnancy and FHLCS

Mean gestational age was 24.1 ± 9.8 (range: 1–41) weeks. Gestational age had no relationship with internal (r = –0.021), chance-based (r = –0.071), and powerful others locus of control scores (r = –0.060) (P > 0.05).

The mean time of first prenatal visit was 6.6 ± 4.5 (range: 0–28) weeks. The first prenatal visit had no relationship with internal (r = –0.052, P > 0.05) and powerful others locus of control (r = –0.047, P > 0.05), whereas it had a positive relationship with chance-based locus of control (r = –0.142, P < 0.05).

For planned pregnancies, there was no statistically significant difference in terms of internal (r = –1.049, P

Table 2. Relationship between miscarriage/abortion history and FHLC scores.

		Mean score ± SD	Statistics
Miscarriage history			
FHLC-I	No	45.39 ± 8.48	0.337
	Yes	44.96 ± 7.58	
FHLC-C	No	34.99 ± 12.59	–0.110
	Yes	35.20 ± 13.04	
FHLC-P	No	42.78 ± 8.84	0.658
	Yes	41.89 ± 8.91	
Abortion history			
FHLC-I	No	45.33 ± 8.45	0.277
	Yes	44.96 ± 7.69	
FHLC-C	No	34.67 ± 12.39	–1.052
	Yes	36.85 ± 13.99	
FHLC-P	No	42.64 ± 9.01	0.142
	Yes	42.43 ± 8.22	

*P < 0.05

> 0.05) and powerful others health locus of control score (r = 0.490, P > 0.05), while chance-based locus of control scores were significantly different in favor of women getting pregnant unplanned (r = 3.839, P < 0.001) (Table 3).

For the diseases influencing the pregnancy process, internal (r = 2.348, P < 0.05) and powerful others (r = 1.949, P < 0.05) health locus of control scores were significantly different in favor of women with disease, whereas there was no statistically significant difference in terms of chance-based locus of control (r = 1.261, P > 0.05) (Table 3).

3.4. Intake of iron/vitamin and folic acid and FHLCS

While the difference in the mean score of internal (r = 0.780, P > 0.05) and powerful others (r = 1.067, P > 0.05) locus of control among the women who did not use iron/vitamin, who used only iron or only vitamins, and who used both was not statistically significant, the difference in the mean score of chance-based locus of control (r = 3.334, P < 0.05) was statistically significant (Table 4).

Whereas the difference in the mean score of internal (r = 10.005, P < 0.001) and powerful others (r = 5.454, P < 0.01) locus of control among the women who did not use folic acid before or after pregnancy was statistically significant, the difference in the mean score of chance-based locus of control (r = 0.528, P >0.05) was not statistically significant (Table 4).

3.5. Smoking, nutrition, and exercise habits and FHLCS

The relationships of FHLC with smoking, nutrition, and exercise are presented in Table 4. The difference in the mean score of internal (r = 0.434, P > 0.05), chance-based (r = 0.434, P > 0.05), and powerful others (r = 0.434, P > 0.05) locus of control between the smokers, nonsmokers, and ex-smokers was not statistically significant (Table 5).

For the nutrition variable, there was no statistically significant difference in terms of internal locus of control (r = –1.527, P > 0.05) and powerful others health locus of control score (r = 0.040, P > 0.05), while chance-based locus of control score (r = 2.560, P < 0.01) was significantly different in favor of the women who did not make a change in their nutritional habits (Table 5).

There was no statistically significant difference in the internal health locus of control (r = –1.846, P > 0.05), powerful others health locus of control (r = 0.561, P > 0.05), and chance-based health locus of control (r = 0.519, P > 0.05) scores between the women who did and did not exercise (Table 5).

4. Discussion

The aim of the present study was to evaluate the fetal health locus of control among a sample of pregnant Turkish women. The discussion is organized in accordance with the research questions.

Table 3. Relationship between current pregnancy history and FHLC scores.

		Mean score ± SD	Statistics
Any disease that may affect pregnancy			
FHLC-I	Yes	47.67 ± 6.54	2.348*
	No	44.67 ± 8.59	
FHLC-C	Yes	36.96 ± 11.98	1.261
	No	34.52 ± 12.81	
FHLC-P	Yes	44.67 ± 7.43	1.949*
	No	42.04 ± 9.12	
Planned pregnancy			
FHLC-I	No	44.42 ± 7.99	–1.049
	Yes	45.64 ± 8.37	
FHLC-C	No	39.93 ± 10.95	3.839***
	Yes	33.23 ± 12.86	
FHLC-P	No	43.07 ± 8.29	0.490
	Yes	42.46 ± 8.97	

*P < 0.05, ***P < 0.001.

Table 4. Relationships between iron, vitamin, and folic acid usage and FHLC scores.

		Mean score ± SD	Statistics
Iron/vitamin usage			
FHLC-I	No	43.60 ± 7.50	0.780
	Only iron	45.02 ± 8.34	
	Only vitamin	45.83 ± 11.73	
	Iron + vitamin	45.76 ± 8.03	
FHLC-C	No	35.71 ± 11.50	3.334*
	Only iron	39.10 ± 12.84	
	Only vitamin	38.50 ± 12.14	
	Iron + vitamin	33.17 ± 12.67	
FHLC-P	No	40.95 ± 7.21	1.067
	Only iron	43.34 ± 9.58	
	Only vitamin	45.06 ± 7.95	
	Iron + vitamin	42.48 ± 9.15	
Folic acid usage			
FHLC-C	No	35.97 ± 12.12	0.528
	Before pregnancy	34.85 ± 11.28	
	After pregnancy	34.03 ± 14.56	
FHLC-P	No	42.32 ± 9.13	5.454**
	Before pregnancy	45.05 ± 7.91	
	After pregnancy	40.49 ± 8.87	

*P < 0.05, **P < 0.01.

4.1. Is there a relationship between sociodemographic characteristics and FHLC?

In line with a previous study, no relationship was identified between maternal age, gestational age, and FHLC in the present study (22). However, the age of marriage was found to have a positive relation with FHLC-I and a negative relation with FHLC-C; a positive relationship was determined between the age of first pregnancy and FHLC-I. This was thought to stem from the roles and responsibilities changing with marriage and first pregnancy.

A positive relationship was discovered between educational status and internal locus of control, consistent with Haslam et al., who reported that those with an internal locus were more likely to have finished formal education later, have more or higher qualifications, and be of higher socioeconomic status (18). Furthermore, employed women's internal locus of control scores were significantly higher than unemployed women's. Low education level, low income, and unemployment were found to be associated with FHLC-C, as well. It can be concluded that individuals with an internal locus take more responsibility for their educational and occupational life.

No relationship was determined between social security and FHLC. This was considered to be the case on the basis of the fact that many of the participants had social security and that the services presented to the pregnant women were free.

4.2. Is there a relationship between previous pregnancy experiences and FHLC?

Interestingly, no differences in the scores of FHLC between women who had previous miscarriages/abortions and those without previous miscarriages/abortions were found in the current study. Previous research has found a belief in the role of chance to be significantly higher among women who have experienced miscarriages,

Table 5. Relationship between smoking, nutrition, and exercise status and FHLC scores.

		Mean score ± SD	Statistics
Smoking			
FHLC-I	No	45.18 ± 8.36	0.648
	Yes	44.76 ± 7.72	
	Stopped smoking	46.53 ± 8.47	
FHLC-C	No	35.85 ± 12.62	0.175
	Yes	32.93 ± 12.49	
	Stopped smoking	31.97 ± 12.72	
FHLC-P	No	43.03 ± 8.32	0.406
	Yes	41.52 ± 10.13	
	Stopped smoking	41.06 ± 10.73	
Changes in nutrition habits			
FHLC-I	No	44.56 ± 7.91	–1.527
	Yes	46.18 ± 8.80	
FHLC-C	No	36.91 ± 12.20	2.560**
	Yes	32.81 ± 12.88	
FHLC-P	No	42.45 ± 9.15	–0.040
	Yes	42.50 ± 8.58	
Doing exercise			
FHLC-I	No	44.70 ± 8.56	–1.846
	Yes	46.88 ± 7.27	
FHLC-C	No	35.29 ± 12.64	0.519
	Yes	34.35 ± 12.86	
FHLC-P	No	42.74 ± 8.61	0.561
	Yes	42.03 ± 9.54	

**P < 0.01.

delivery complications, or medical complications during pregnancy than among those who have not (15–17,22). In line with a study conducted with pregnant Egyptian women, we found that FHLC-C was positively correlated with the number of pregnancies but not with the number of living children (22).

4.3. Is there a relationship between history of current pregnancy and FHLC?

The first prenatal visit is an important event, particularly if the woman has not had preconception care. We found that FHLC-C was positively correlated with first prenatal visit, and FHLC-C was found to be significantly higher in women who got pregnant unplanned. Shieh et al. found that internal FHLC was significantly correlated with health information-seeking in low-income pregnant woman. In this study, health literacy was negatively correlated with FHLC-P. This means that women with low health literacy were more likely to believe that health professionals were responsible for their baby's health (21).

In a prior study, the number of prenatal visits was found to be negatively correlated with internal maternal locus of control and positively correlated with external/powerful others maternal locus of control among a sample of impoverished women. The authors argued that these

findings were congruent with the notion that people who are unable to escape poverty may, in reality, face a lack of personal control over their environment, and, therefore, their only source of control is through the influence of powerful others (11,17).

Pregnant women with disease were found to have significantly higher FHLC-I and FHLC-P scores in the current study. Eswi and Khalil found that FHLC differed between high- and low-risk pregnancies; women with high-risk pregnancies experienced a higher level of fetal health locus of control than woman with low-risk pregnancies (22). Sprito et al. found that pregnant women with overt diabetes obtained higher scores on the powerful others subscale of FHLC than nondiabetic controls (19). Turriff-Jonasson stated that perhaps people at first face and deal with disease by themselves, and if they are unable to control it, their only source of control is through the influence of powerful others (11).

4.4. Is there a relationship between FHLC and the intake of iron/vitamin and folic acid?

Haslam et al. found those who scored higher on the FHLC-I were more likely to take vitamin/iron supplements and increase their folic acid intake (18). In the present study, even though it was not statistically significant, those who scored higher on the FHLC-I were more likely to take vitamin/iron supplements. The reason for it being statistically insignificant could be due to the fact that iron preparations are provided free in prenatal visits in Turkey. Those who used folic acid before pregnancy were found to have a higher mean score of internal and powerful others locus of control than those who did not use and those who used it after pregnancy in the current study. It was thought that those using it before pregnancy received preconception care, and the powerful others could be the health professionals. Internal control was regarded as enabling them to receive preconception care.

4.5. Is there a relationship between smoking, nutrition, and exercise habits and FHLC?

The FHLC-C score was higher in those who did not change their nutritional habits. This means that pregnant women who do not change their nutritional habits believe that their behavior has little effect on the health of the fetus, and rather that it is controlled by chance. In accordance with our result, Webb identified that women who were categorized as having reported high beliefs in chance factors gained a considerably higher than anticipated proportion of weight during pregnancy than women who were less likely to attribute fetal health to chance. The association between FHLC-C and gestational weight gain was further modified by the level of adequacy as indicated by observed risk ratios. Women who gained weight below clinical expectations based on pregravid body mass index reported stronger beliefs in chance factors relative to women who gained within the recommended ranges (20).

No association was detected between smoking and FHLC in the present study. Even though it was not statistically significant, those who stopped smoking due to pregnancy were more likely to have scored higher on the FHLC-I. In previous studies those with higher internal FHLC were also found to be less likely to smoke (7,14,18,19).

No association was detected between exercise and FHLC in the present study. Only one study was found that investigated the relationship between FHLC and exercise (24). In that study, it was found that women who continued to exercise during pregnancy scored significantly lower on the internal dimension of the FHLC scale. The authors suggested that women may view exercise during pregnancy as a negative health behavior. However, it is obvious that more studies evaluating other factors in the FHLC and exercise relationship are needed.

There are some limitations of this study. First, all of our data were self-reported, and the extent of under-reporting or over-reporting cannot be determined. There may be other factors, such as ethnicity or religion, that could affect FHLC orientation. An examination of these parameters would increase the power of the study. Finally, larger series are needed for generalization of the results to the greater population.

Consequently, our results are generally congruent with the extant literature. Important differences between our results and the literature are that there was no relationship that could be detected between FHLC and previous miscarriages/abortions, smoking, and exercise. Other factors (e.g., knowledge, perception, ethnicity, religion) that could be associated with FHLC orientation may affect these results. Moreover, a result of ours that can be considered as a contribution to the literature was that the age of marriage was found to have a positive relation with FHLC-I and a negative relation with FHLC-C. Additionally, the age of first pregnancy was found to have a positive relation with FHLC-I, meaning that as the marriage age and first pregnancy age increase, pregnant women take a greater sense of personal responsibility for the health of their unborn infant.

Educational interventions may be particularly important for women who are likely to have lower internal control. However, this may not be enough for a woman who believes that her behavior has little effect on the health of her fetus and rather that it is controlled by chance. It would be helpful if different techniques and approaches could be used to modify these beliefs. For example, Martins and Carvalho explored patients' preferences for models of communicating bad news and how such preferences relate with the patients' health locus of control. Results show

differences in patients' preferences according to the locus of control. Those who scored higher in internal locus of control and lower in powerful others prefer 'the empathic professional'. The others prefer either a more distant or a more emotional professional (25). Looking from this perspective, determining pregnant women who are likely to have a high score of FHLC-C (according to our study, those who have low educational level and income, who are unemployed, whose number of pregnancies is high, who got pregnant unplanned, or who come to the first prenatal examination late) and taking appropriate action to modify their beliefs may be helpful for better outcomes of mother and child health.

Acknowledgments
We would like to thank Dr. Erdal Özcan, Dr. Haluk Ballı, and the Department of Obstetrics for their contributions in data collection.

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