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# ENHANCING RISK PERCEPTIONS AND KNOWLEDGE IN WOMEN WITH RISK PREGNANCIES: EDUCATIONAL INTERVENTION

## RİSKLİ GEBELERDE RİSK ALGISINI VE BİLGİ DÜZEYİNİ ARTIRMAK: BİR EĞİTİM MÜDAHALESİ ÇALIŞMASI

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### ABSTRACT

**Objective:** We aimed to determine the risk perceptions of women with risky pregnancies. This study aimed to enhance and reevaluate their risk perceptions after providing education about their risks.

**Material and Methods:** This educational intervention study aimed to engage 336 pregnant women out of a 2,664 population with high-risk pregnancies in Adıyaman, Türkiye. In total, 444 pregnant women participated in the study. Participants completed the sociodemographic questionnaires, a pregnancy risk perception assessment, and a knowledge assessment related to pregnancy risks. The questionnaires were administered twice: once before the educational intervention and again 2-4 weeks after the intervention, allowing us to measure the effectiveness of the education.

**Results:** After the educational intervention, pregnant women demonstrated a significant increase in both their risk knowledge and risk perception scores ($p<0.001$). Furthermore, we observed a positive correlation between knowledge scores and age ($p<0.001$) as well as first gestational age ($p<0.001$), while a negative correlation was found with gestational age ($p=0.003$). Additionally, a positive correlation emerged between the risk perception score and age ($p=0.008$) and the number of obstetrician visits ($p=0.024$).

**Conclusion:** To enhance the risk perception, it is crucial to provide them with specialised education on this subject. This is imperative because every woman with a high-risk pregnancy is not only vulnerable to maternal mortality but also places her infant at a higher risk of infant mortality.

**Keywords:** Risk perception, risky pregnancy, educational intervention, maternal health

### ÖZET

**Amaç:** Bu çalışmada riskli gebelerin risk algılarını belirleme amaçlandı. Çalışma, verilecek eğitim sonrasında risk algısını tekrar değerlendirmeyi ve risk algısını geliştirmeyi amaçlamıştır.

**Gereç ve Yöntem:** Bu eğitim müdahale çalışmasında, Adıyaman'da riskli gebeliği olan 2.664 kadından en az 336'sına ulaşmak amaçlandı. Toplamda 444 kadın çalışmaya katıldı. Katılımcılara, sosyodemografik bilgilerini içeren anket ile birlikte gebelik risk algısı ve riskleri ile ilgili anketler uygulandı. Anketler, eğitim müdahalesinden önce ve müdahaleden 2-4 hafta sonra olmak üzere iki kez uygulanarak eğitimin risk algısı üzerinde etkinliği değerlendirildi.

**Bulgular:** Eğitim müdahalesinden sonra, katılımcıların risk bilgisi ve risk algısı puanlarında anlamlı bir artış görüldü ($p<0.001$). Ayrıca, bilgi puanları ile yaş ($p<0.001$) ve ilk gebelik yaşı ($p<0.001$) arasında pozitif bir korelasyon gözlemlendi, buna karşın gebelik haftası ile negatif bir korelasyon bulundu ($p=0.003$). Ek olarak, risk algısı puanı ile yaş ($p = 0.008$) ve obstetrik ziyaret sayısı ($p=0.024$) arasında pozitif bir korelasyon saptandı.

**Sonuç:** Gebe kadınların risk algısını artırmak için bu konuda onlara özel eğitim sağlamak çok önemlidir. Bu, yüksek riskli gebeliği olan her kadının sadece anne ölümlerine karşı savunmasız olmakla kalmayıp, aynı zamanda bebeğini de bebek ölümleri riski altında bırakması nedeniyle gereklidir.

**Anahtar kelimeler:** Risk algısı, riskli gebelik, eğitim müdahalesi, anne sağlığı

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## INTRODUCTION

Risk is the presence of variables that elevate the likelihood of adverse outcomes. Risk perception, on the other hand, refers to an individual's anticipation of the occurrence of an event associated with risk (1). From an alternative perspective, risk perception assesses the likelihood of harm in the absence of precautions (2). Risk perception plays a pivotal role in shaping individuals' health-related decisions and behaviours. Typically, individuals tend to perceive themselves as being at a lower risk than others in similar risk circumstances (1).

Pregnancy and childbirth inherently pose risks due to the physiological changes that affect a woman's body during this period. A pregnancy is considered high-risk if any medical or obstetric condition arises that threatens the health of either the mother or the fetüs (3). Globally, around 20 million women experience high-risk pregnancies, and tragically, over 800 of these women lose their lives to perinatal complications every day (4). The incidence of high-risk pregnancies varies from 6% to 33% worldwide and is influenced by regional factors (5). In Turkey, approximately one-third of pregnancies fall into this high-risk category (6).

Among the complications that can arise during pregnancy, preeclampsia affects 5%–10% of all pregnancies worldwide. The primary objective for women with high-risk pregnancies is to mitigate maternal and infant mortality through comprehensive antenatal care, timely management, treatment, and specialised care during childbirth and the postpartum period (5). Recent studies in Turkey have revealed a shift in age-specific fertility rates, with the highest rates now occurring in the 25-29 age group, signifying an increase in maternal age as a notable risk factor (6, 7). Even with essential information from healthcare professionals, individual and social factors can alter a pregnant woman's perception of risk (7). Early-stage education to enhance risk perception among women with high-risk pregnancies can help prevent complications for the mother and baby during pregnancy and the postpartum period.

In this study, our objective was to visit the pregnant women mentioned earlier in their residences. During these visits, we aimed to provide information about potential risks, conduct diagnostic procedures such as blood pressure and blood glucose measurements, and, in cases of non-compliance (for those not attending regular appointments or failing to follow healthcare professionals' guidance), involve a family member to the follow-ups. The study's primary focus was to assess the risk perceptions of pregnant women with high-risk conditions and examine how their risk perceptions changed after the receipt of educational interventions.

## MATERIAL AND METHODS

This educational intervention study took place in Adıyaman province and its districts within the southeast Anatolia region of Turkey from October to December 2022.

### Sample size

High-risk pregnancies are reported to the Provincial Health Directorate by family physicians. In Adıyaman province, which includes its districts, 5,790 pregnant women were found. Of these, 2,664 (46%) were classified as high-risk. This study focused on the population of 2,664 pregnant women who were considered high-risk due to factors such as comorbid diseases (hypertension, asthma, heart conditions, etc.), economic status, history of miscarriage, multiparity, or having had their last pregnancy within the last 2 years.

Sample size was determined using a specific universe sampling method. Based on this formula, we assumed that 50% of pregnant women had a certain level of risk perception, with a target of 336 pregnant women with high-risk pregnancies. In this study, we successfully enrolled 464 pregnant women who volunteered to participate. Unfortunately, no second visit could be conducted for 20 women due to the conclusion of their pregnancies or a change of residences. The sampling method was a stratified simple sampling method, with districts serving as strata, and the number of high-risk pregnant women in each district was considered.

### Study design and procedures

In this study, pregnant women at risk were diagnosed, and researchers, all of whom were physicians, conducted residential visits to these women. After obtaining their consent, a questionnaire developed by the researchers following a literature review was administered to the at-risk pregnant women via face-to-face interviews. Following the questionnaire, a 30-minute educational session on pregnancy risks was provided. An informative document summarising content from the Ministry of Health's Pregnancy Information Class Training Book was also given to pregnant women during the visits. Each participant was revisited approximately 2-4 weeks after the initial visit, and the questionnaire was completed once again by each participant.

### Data collection tools

#### Personal information form

The personal information form, designed by the researchers following a literature review, encompassed inquiries related to both sociodemographic characteristics (such as age, occupation, educational status, area of residence, family type, duration of marriage, etc.), obstetric characteristics about previous pregnancies (including the total number of pregnancies, total number of births, number of living children, incidents of stillbirth), and current pregnancy (folic acid use, and history of miscarriage).

**Perception of pregnancy risk questionnaire (PPRQ)**
The risk perception scale, initially developed by Heaman and Gupton, was adapted to Turkish by Evcili and Dağlar (8, 9). While the original scale comprises 11 items, the Turkish version comprises nine items. This visual analog scale employs a linear range from 0 to 100 mm, with the descriptors "no risk at all" to "extremely high risk" for each item. The Cronbach's alpha coefficient for the entire scale was 0.84 in the original version and 0.87 in the current study. The scale is structured into two factors: the perception of risk to baby,' consisting of 5 items, and the perception of risk to self,' consisting of 4 items.

The total scale scores and their factors were calculated by summing the item scores and dividing by the respective number of items. There are no specific cut-off points on the scale. An increase in the scale score indicates an elevated risk perception for both the pregnant woman and her baby (9).

**Risk knowledge of pregnant women**
The questionnaire, developed by the researchers, included questions about various medical conditions that may arise during pregnancy. Participants were asked seven short-answer questions related to hypertension, high blood glucose, anaemia, cardiac arrhythmia, dyspnoea, extremity oedema, and proteinuria. Each correct answer was assigned a score of 1 point, while incorrect answers received 0 points. The total score for these questions ranged from 0 to 8, with no specific cut-off point; a higher score indicated greater knowledge. The Cronbach's alpha value for this study was 0.78.

**Ethical approval**
Ethical approval for the study was obtained from the Non-Interventional Research Ethics Committee of Fırat University (Date: 01.09.2022, No:2022/10-25). Written administrative permission was obtained from Adıyaman Provincial Health Directorate with the date 21.09.2022 and the number E-13389845-771. The study followed the principles outlined in the Declaration of Helsinki.

**Statistical analysis**
Analysis of the data was performed using the Statistical Package for Social Sciences 22 package program (IBM SPSS Corp., Armonk, NY, USA). In this study, descriptive data were presented as n and percentile values for categorical data, while they were shown as mean±standard deviation (Mean±SD) values for continuous data. Chi-square analysis (Pearson Chi-square) was used to compare categorical variables between groups. The Kolmogorov-Smirnov test was used to evaluate whether the continuous variables had a normal distribution. Student's t-test was used for normally distributed variables, and the Mann–Whitney U test was used for non-normally distributed variables for comparison of the paired groups. The Pearson correlation test was used for normally distributed variables and the Spearman's correlation test for non-normally distributed variables to examine the relationship between continuous variables. The paired samples t-test was used for those with normal distribution and the Wilcoxon test for those without normal distribution to compare scores before and after education. A Linear Regression analysis was conducted to identify the predictors of the Perception of Pregnancy Risk Questionnaire (PPRQ) score and the Risk Knowledge of the Pregnant Women scale score. The Enter method was used to construct the model, and variables that showed significant differences in previous analyses were included in the model. The statistical significance level in the analysis was set as $p<0.05$.

## RESULTS

A total of 444 pregnant women at high risk, with an average age of 31.8±6.5 years (range: 18-53), participated in the study. Among them, 60.8% were under 35 years of age. The majority (84.2%) of these women were housewives, and 58.1% had at least a secondary school education. In terms of residence, 58.3% of the pregnant women lived in the city centre, and 86.5% were from nuclear families. More than half (55%) of the pregnant women reported income below the minimum wage. Regarding obstetric history, 4.5% had experienced infant loss, 5.9% had a history of stillbirth, 34.9% had suffered a miscarriage, and 14.6% had an abortion. The participants' healthcare practices included tetanus vaccination (59.5%), folic acid use (87.2%), iron supplementation (87.2%), and vitamin D intake (82.2%). Of the participants, 79.1% received information about high-risk pregnancies from family physicians, midwives, or obstetricians, and 84.3% considered this information during their pregnancies. Notably, 66.9% of the women reported that their pregnancies were planned (Table 1).

The mean age at the time of the first pregnancy was 24.1±5.0 years, with a range of 18–42 years. The current mean gestational week was 22.6±9.6. For prenatal care, the women made an average of 2.3±1.5 visits to their family physician and 4.5±2.7 visits to the gynaecologist.

Among participants, those who were 35 years or older, employed other than as housewives, had a high school education or higher, resided in the province, had an income at or above the minimum wage, who were married for more than five years, experienced infant deaths, had stillbirths, received tetanus vaccination, used folic acid, iron, and vitamin D, were informed about high-risk pregnancies, and had planned pregnancies exhibited significantly higher knowledge scores and PPRQ total scores ($p<0.05$). Additionally, participants from nuclear families had a higher PPRQ total score ($p=0.008$), while no significant difference was found in terms of knowledge scores ($p=0.854$) (Table 2).

**Table 1:** Characteristics of women with high-risk pregnancies.

| | | Number | % |
|---|---|---|---|
| Age | <35 | 270 | 60.8 |
| | ≥35 | 174 | 39.2 |
| Occupation | Housewife | 374 | 84.2 |
| | Other | 70 | 15.8 |
| Educational status | Secondary school or below | 258 | 58.1 |
| | High school or above | 186 | 41.9 |
| Living place | City centre | 259 | 58.3 |
| | Town/village | 185 | 41.7 |
| Family type | Nuclear family | 384 | 86.5 |
| | Extended family | 60 | 13.5 |
| Total family income | Minimum wage | 244 | 55.0 |
| | Minimum wage or above | 200 | 45.0 |
| Duration of marriage(years) | ≤5 | 174 | 39.2 |
| | >5 | 270 | 60.8 |
| Infant death | Yes | 20 | 4.5 |
| | No | 424 | 95.5 |
| Number of pregnancies | ≤2 | 176 | 39.6 |
| | >2 | 268 | 60.4 |
| Number of births | ≤2 | 323 | 72.7 |
| | >2 | 121 | 27.3 |
| Has a child | Yes | 352 | 79.3 |
| | No | 92 | 20.7 |
| Stillbirth | Yes | 26 | 5.9 |
| | No | 418 | 94.1 |
| Miscarriage | Yes | 155 | 34.9 |
| | No | 289 | 65.1 |
| Abortion | Yes | 65 | 14.6 |
| | No | 379 | 85.4 |
| Tetanus vaccination status | Yes | 264 | 59.5 |
| | No | 180 | 40.5 |
| Folic acid use | Yes | 387 | 87.2 |
| | No | 57 | 12.8 |
| Iron use | Yes | 361 | 87.2 |
| | No | 53 | 12.8 |
| Use of vitamin D | Yes | 336 | 82.2 |
| | No | 73 | 17.8 |
| The status of being briefed about a risky pregnancy by a family doctor. midwife or obstetrician) | Yes | 351 | 79.1 |
| | No | 93 | 20.9 |
| Status of the following advice regarding these risks | Yes | 296 | 84.3 |
| | No | 55 | 15.7 |
| Planned pregnancy | Yes | 297 | 66.9 |
| | No | 147 | 33.1 |

**Table 2:** Comparison of pre-educational knowledge and PPRQ scale scores among women with risky pregnancies according to various parameters.

| | | Knowledge score | | PPRQ-risk to baby | | PPRQ risk to self | | PPRQ-total | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean±SD | p* | Mean±SD | p** | Mean±SD | p** | Mean±SD | p** |
| Age | <35 | 5.2±2.9 | <0.001 | 27.6±16.4 | 0.399 | 33.8±17.9 | 0.003 | 30.3±15.4 | 0.043 |
| | ≥35 | 6.3±2.5 | | 29.0±18.4 | | 39.0±18.7 | | 33.5±16.6 | |
| Occupation | Housewife | 5.4±2.9 | 0.012 | 27.3±15.7 | 0.066 | 34.6±17.6 | 0.001 | 30.5±14.6 | 0.015 |
| | Other | 6.8±1.9 | | 32.7±23.2 | | 42.4±21.1 | | 37.0±20.9 | |
| Educational status | Secondary school or below | 5.3±3.0 | 0.009 | 26.2±14.7 | 0.008 | 33.5±17.2 | 0.002 | 29.5±13.8 | 0.002 |
| | High school or above | 6.1±2.5 | | 30.8±19.9 | | 39.0±19.5 | | 34.4±18.1 | |
| Living place | City centre | 5.9±2.5 | 0.025 | 30.0±18.2 | 0.008 | 38.3±19.0 | 0.001 | 33.7±16.9 | 0.001 |
| | Town/village | 5.2±3.1 | | 25.6±15.5 | | 32.4±16.9 | | 28.6±14.0 | |
| Family type | Nuclear family | 5.6±2.8 | 0.854 | 28.7±17.6 | 0.062 | 36.8±18.5 | 0.003 | 32.3±16.2 | 0.008 |
| | Extended family | 5.6±3.0 | | 24.3±14.4 | | 29.3±15.8 | | 26.5±12.8 | |
| Total family income | < Minimum wage | 5.4±2.9 | 0.037 | 25.9±16.3 | 0.003 | 34.0±18.1 | 0.021 | 29.5±15.4 | 0.003 |
| | ≥ Minimum wage | 5.9±2.6 | | 30.8±17.9 | | 38.1±18.5 | | 34.0±16.3 | |
| Duration of marriage (years) | ≤5 | 4.9±3.1 | <0.001 | 25.4±13.7 | 0.004 | 32.5±17.3 | 0.002 | 28.6±13.3 | 0.001 |
| | >5 | 6.1±2.5 | | 29.9±18.9 | | 38.0±18.8 | | 33.5±17.1 | |
| Infant death | Yes | 6.8±2.2 | 0.041 | 44.1±29.4 | 0.02 | 51.9±25.9 | 0.009 | 47.6±26.7 | 0.011 |
| | No | 5.6±2.8 | | 27.4±16.1 | | 35.1±17.6 | | 30.8±14.9 | |
| Stillbirth | Yes | 6.2±2.5 | 0.026 | 39.0±28.3 | 0.004 | 46.2±25.3 | 0.005 | 42.2±25.4 | 0.003 |
| | No | 5.6±2.8 | | 27.5±16.1 | | 35.2±17.7 | | 30.9±14.9 | |
| Tetanus vaccination status | Yes | 6.0±2.5 | 0.008 | 30.5±18.0 | 0.001 | 37.7±18.6 | 0.009 | 33.7±16.5 | 0.001 |
| | No | 5.1±3.1 | | 24.7±15.4 | | 33.1±17.8 | | 28.4±14.6 | |
| Folic acid use | Yes | 5.8±2.7 | 0.005 | 29.1±17.5 | 0.001 | 36.7±18.4 | 0.012 | 32.4±16.0 | 0.002 |
| | No | 4.5±3.3 | | 21.9±13.5 | | 30.1±17.6 | | 25.5±13.8 | |
| Iron use | Yes | 5.7±2.7 | <0.001 | 29.6±17.7 | 0.023 | 37.1±18.7 | 0.005 | 32.9±16.3 | 0.005 |
| | No | 3.9±3.0 | | 23.8±13.7 | | 29.5±15.5 | | 26.3±13.2 | |
| Use of vitamin D | Yes | 5.7±2.8 | <0.001 | 29.7±17.9 | 0.04 | 37.4±19.0 | 0.006 | 33.1±16.5 | 0.008 |
| | No | 4.3±2.8 | | 25.2±14.0 | | 30.8±15.5 | | 27.7±13.4 | |
| Briefed on risky pregnancy | Yes | 5.9±2.6 | 0.007 | 29.9±17.6 | <0.001 | 38.2±18.0 | <0.001 | 33.5±15.9 | <0.001 |
| | No | 4.7±3.3 | | 21.6±13.9 | | 27.0±17.0 | | 24.0±13.6 | |
| Planned pregnancy | Yes | 6.1±2.5 | <0.001 | 30.1±18.4 | <0.001 | 37.5±19.2 | 0.004 | 33.4±16.9 | <0.001 |
| | No | 4.7±3.2 | | 24.2±13.8 | | 32.5±16.1 | | 27.9±13.0 | |

*:Mann–Whitney U test, **:Student's t-test was used, PPRQ: Perception of pregnancy risk questionnaire

According to the multiple linear regression analysis results, the predictors of the Knowledge scale score were as follows: not being a housewife (β=0.785, p=0.042), having a high school education or higher (β=0.678, p=0.023), being married for more than five years (β=0.935, p=0.002), having a planned pregnancy (β=1.048, p<0.001), and receiving a tetanus vaccination during pregnancy (β=0.880, p=0.002) (Table 3).

The predictors of the PPRQ total score were being briefed by healthcare professionals about high-risk pregnancy (β=5.737, p=0.003), having a planned pregnancy (β=3.244, p=0.048), and experiencing stillbirth (β=10.759, p=0.005) (Table 4).

There were positive and negative significant correlations between knowledge score and age and first gestational age, and a significant negative correlation between knowledge score and gestational week. A positive significant relationship was found between the PPRQ-risk to baby score and the PPRQ-risk to self-score, gestational age, and number of visits to the obstetrician for pregnancy follow-up. A significant positive correlation was found between PPRQ risk and self-score and age. There was a low significant positive correlation between the PPRQ-total score and age and the number of visits to the obstetrician for pregnancy follow-up (Table 5).

The scores of Knowledge, PPRQ-risk for babies, PPRQ-risk for self-factors, and the PPRQ-total scale of women with risky pregnancies increased significantly after the education (p<0.001) (Figure 1). When evaluating the levels of increase, after the training, the scores showed an increase of 12.5% in Knowledge, 92.8% in PPRQ-risk for the baby, 64.5% in PPRQ-risk for the self, and 78.1% in the PPRQ-total scale.

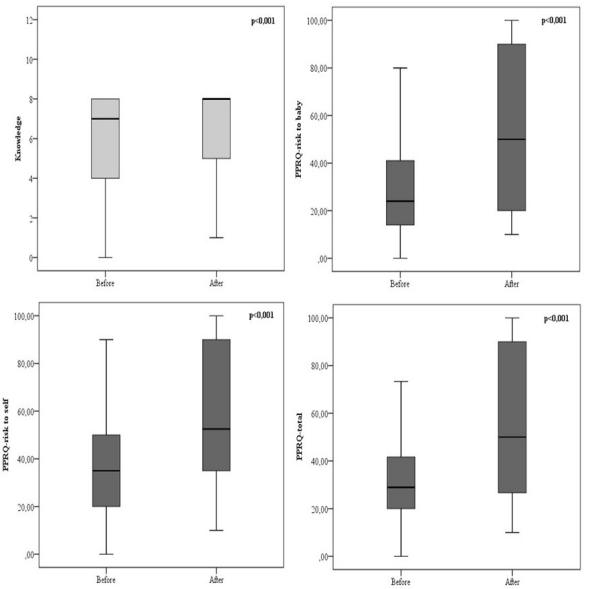



**Figure 1:** Knowledge and PPRQ scale scores of women with risky pregnancies before and after education.
PPRQ: Perception of the pregnancy risk questionnaire

**Table 3:** Linear regression analysis of the pre-educational Knowledge Score according to various parameters.

| | Knowledge score ($R^2$=0.205; F=6.730; p<0.001) | | | | |
|---|---|---|---|---|---|
| | **β** | **SE** | **Standart β** | **t** | **p** |
| Over 35 years old | 0.535 | 0.298 | 0.092 | 1.798 | 0.073 |
| Employed | 0.785 | 0.385 | 0.102 | 2.042 | **0.042** |
| High school or above | 0.678 | 0.298 | 0.119 | 2.275 | **0.023** |
| Resided in city centre | 0.445 | 0.276 | 0.078 | 1.615 | 0.107 |
| Income exceeding the minimum wage | 0.095 | 0.277 | 0.017 | 0.343 | 0.732 |
| Had an infant death | -0.022 | 0.745 | -0.002 | -0.030 | 0.976 |
| Married for over 5 years | 0.935 | 0.293 | 0.162 | 3.196 | **0.002** |
| Use of iron supplements | 0.508 | 0.512 | 0.060 | 0.992 | 0.322 |
| Folic acid used | 0.227 | 0.407 | 0.027 | 0.557 | 0.578 |
| Vitamin D | 0.287 | 0.437 | 0.039 | 0.658 | 0.511 |
| Briefed about risky pregnancy | 0.312 | 0.331 | 0.045 | 0.941 | 0.347 |
| Had a planned pregnancy | 1.048 | 0.285 | 0.176 | 3.678 | **<0.001** |
| Had a stillbirth | 0.246 | 0.667 | 0.021 | 0.368 | 0.713 |
| Tetanus vaccination | 0.880 | 0.278 | 0.151 | 3.162 | **0.002** |

$R^2$: Coefficient of Determination, F: F-statistic, β: Unstandardised Coefficient, SE: Standard Error, Standard β: Standardised Beta Coefficient

**Table 4:** Linear Regression Analysis of the pre-educational Total PPRQ Score according to various parameters.

| | PPRQ total score ($R^2$=0,199; F=6.491; p<0.001) | | | | |
|---|---|---|---|---|---|
| | **β** | **SE** | **Standart β** | **t** | **p** |
| Over 35 years old | 1,431 | 1,708 | 0.043 | 0.838 | .403 |
| Employed | 1,354 | 2,206 | 0.031 | 0.614 | .540 |
| High school or above | 2,461 | 1,709 | 0.075 | 1.440 | .151 |
| Resided in the province | 2,164 | 1,583 | 0.066 | 1.367 | .172 |
| Nuclear family | 2,998 | 2,177 | 0.064 | 1.377 | .169 |
| Income exceeding the minimum wage | 2,057 | 1,587 | 0.064 | 1.296 | .196 |
| Had an infant death | 5,597 | 4,276 | 0.073 | 1.309 | .191 |
| Married for over 5 years | 3,237 | 1,678 | 0.098 | 1.929 | .055 |
| Use of iron supplements | 1,288 | 2,939 | 0.027 | 0.438 | .661 |
| Folic acid used | 3,598 | 2,335 | 0.074 | 1.541 | .124 |
| Vitamin D | 0,470 | 2,505 | 0.011 | 0.188 | .851 |
| Briefed about risky pregnancy | 5,737 | 1,901 | 0.145 | 3.019 | **.003** |
| Had a planned pregnancy | 3,244 | 1,634 | 0.095 | 1.986 | **.048** |
| Had a stillbirth | 10,759 | 3,826 | 0.160 | 2.812 | **.005** |
| Tetanus vaccination | 1,446 | 1,597 | 0.043 | 0.905 | .366 |

PPRQ: Perception of the pregnancy risk questionnaire, $R^2$: Coefficient of Determination, F: F-statistic, β: Unstandardised Coefficient, SE: Standard Error, Standard β: Standardised Beta Coefficient

**Table 5:** Correlation between pre-educational knowledge score and PPRQ scale scores of women with risky pregnancies with the measurement parameters.

| | | **Knowledge** | **PPRQ-risk to baby** | **PPRQ risk to self** | **PPRQ-total** |
|---|---|---|---|---|---|
| **PPRQ-risk to baby** | r* | -0.074 | | | |
| | P** | .0120 | | | |
| **PPRQ risk to self** | r | -.0019 | **0.548** | | |
| | p | 0.683 | **<0.001** | | |
| **PPRQ-total** | r | -0.050 | **0.876** | **0.872** | |
| | p | 0.297 | **<0.001** | **<0.001** | |
| **Age** | r | **0.237** | 0.040 | **0.189** | **0.125** |
| | p | **<0.001** | 0.401 | **<0.001** | **0.008** |
| **First gestational age** | r | **0.112** | -0.047 | 0.078 | 0.014 |
| | p | **0.018** | 0.319 | 0.100 | 0.765 |
| **Gestational week** | r | **-0.142** | **0.096** | 0.038 | 0.075 |
| | p | **0.003** | **0.042** | 0.430 | 0.115 |
| **Number of visits to the Family Physician for pregnancy follow-up** | r | 0.013 | 0.067 | 0.030 | 0.064 |
| | p | 0.789 | 0.161 | 0.527 | 0.182 |
| **Number of visits to the Obstetrician and Gynaecologist for pregnancy follow-up** | r | -0.029 | **0.123** | 0.066 | **0.107** |
| | p | 0.541 | **0.010** | 0.167 | **0.024** |

*: Spearman Correlation Analysis Test were used, r*: Correlation coefficient, p**: Statistical significance, PPRQ: Perception of the pregnancy risk questionnaire

## DISCUSSION

This study looked into what affects how women with high-risk pregnancies perceive the risks they face. Earlier research shows that many pregnant women tend to underestimate these risks and may not have all the necessary information, emphasising the need for better education programs (10). Research shows that when healthcare professionals provide detailed and thorough information, women with high-risk pregnancies tend to have a clearer understanding of the risks they face (11-13). Additionally, regular physician visits tend to reduce anxiety, foster trust between patients and healthcare providers, and potentially induce changes in patient behaviours (13). In our study, we found a positive correlation between the number of visits to Obstetrics and Gynaecology Specialists and both risk perception and knowledge scores. This suggests that pregnant women who perceive a higher risk tend to visit specialists more frequently. Conversely, there was no observed relationship between family physician visits and either risk perception or knowledge scores. This indicates that primary care follow-ups might not be effectively providing the necessary information to women with high-risk pregnancies. Therefore, targeted interventions are needed to improve the awareness and competence of primary care professionals in managing high-risk pregnancy issues. In Turkey, pregnant women typically have four follow-up appointments with their family physician, whereas those with high-risk pregnancies attend seven. However, studies show that there is no link between the number of family physician visits and women's risk perception—an area that clearly warrants further research.

Studies conducted by Gerend et al. in 2004, focusing on pregnant women with chronic diseases, and by Kim et al. in 2007, involving pregnant women with a history of gestational diabetes, revealed no significant correlation between knowledge scores and risk perception (14, 15). Our study yielded similar findings, reinforcing the need for tailored educational content, particularly addressing risk perception, for women facing high-risk pregnancies.

According to the American CDC, the rate of pregnancies among women aged over 35 years increased to 23% in 2014, compared with 9% in 2000. A study that compared risk perception between pregnant women aged 18 years and those aged 18 to 35 found that those under 18 had a significantly higher risk perception than their older counterparts (16). Another study involving nulliparous women revealed a correlation between age, knowledge scores, and risk perception (10). In the present study, we found that the knowledge scores and risk perceptions of pregnant women older than 35 years were higher than those of women younger than 35 years. Given that being under 18 years old and over 35 years old are recognised as risk factors for pregnancy, it appears that the risk status of pregnant women and their risk perceptions are interlinked.

In a study conducted in Nepal, the risk perception of pregnant women with a history of infant death and those with complicated obstetric histories was found to be higher (1). Similarly, Silva et al. conducted a study in 2021, which revealed higher risk perceptions among pregnant women who had experienced an incomplete pregnancy, had infants in the neonatal intensive care unit, or experienced infant loss (12). The present study found that knowledge scores and risk perceptions were higher among pregnant women who had experienced a previous miscarriage or infant loss than among those who had not.

In their study, Bayrampour et al. also observed a decrease in risk perception as the gestational age progressed, a trend consistent with our current findings (10). However, another study conducted in Turkey in 2024 found that risk perception increased as the week of pregnancy progressed (17). This observation may be associated with the increasing belief and optimism among pregnant women who tend to become more confident in their pregnancy as their pregnancy advances towards a positive outcome.

Studies conducted in Nepal in 2021 and by Papiernik et al. in 1997 identified a correlation between socioeconomic status and risk perception and knowledge scores (1, 18). Our study yielded similar results. However, in Heaman and Gupton's 2009 study, no such correlation was found (8). Despite the increased accessibility to information, risk perception may require specific interventions tailored to enhance this perception rather than mere access to information.

Although research on pregnant women's risk perceptions is relatively limited, the findings in the existing literature are mixed. For instance, a 2024 study in Turkey found that pregnant women's risk perception decreased following health literacy training (19). In contrast, a 2020 study in the United States demonstrated a significant increase in pregnant women's risk perception after training compared to those who did not receive any training (20). Similarly, a 2015 study in Iran reported a substantial increase in pregnant women's risk perception post-training (21). In this study, we observed a significant increase in the pregnant women's perceived risk for themselves and their babies after the training. However, their level of knowledge did not significantly predict their risk perception before the training, nor did it show a noteworthy increase afterward. These findings suggest that pregnant women's risk perception may not be directly influenced by the amount of knowledge they possess and underscore the need for targeted educational interventions explicitly aimed at enhancing risk perception.

Due to the educational sessions being conducted at the participants' residences, creating an ideal learning environment is not always possible. Additionally, there may have been a potential recall bias in the study because the participants were asked to provide retrospective survey responses. Lastly, the lack of a control group in the study is a limitation.

## CONCLUSION

In developing countries, a significant proportion of pregnancies are classified as high risk, primarily due to factors like advancing maternal age and the increasing prevalence of chronic diseases. Despite improved access to information, the correlation between knowledge scores and risk perception remained modest. Therefore, comprehensive monitoring of women with high-risk pregnancies during both the pregnancy and postpartum phases is crucial for the well-being of both mothers and their infants. Expanding education and awareness regarding risk perception is essential to empower pregnant women to actively engage in risk perception.

**Ethics Committee Approval:** Ethical approval for the study was obtained from the Non-Interventional Research Ethics Committee of Fırat University (dated 01.09.2022 and numbered 2022/10-5). Written administrative permission was obtained from Adıyaman Provincial Health Directorate with the date 21.09.2022 and the number E-13389845-771. The study followed the principles outlined in the Declaration of Helsinki.

**Informed Consent:** Consent was obtained from all participants who participated in the study.

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