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Investigation of the relationship between body image, orthorexia nervosa, and cyberchondria in pregnant women

Gebelerde beden imajı, ortoreksiya nervoza ve siberkondri arasındaki ilişkinin incelenmesi

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ABSTRACT

***Aim*:** The study aimed to determine the relationship between body image, orthorexia nervosa, and cyberchondria in pregnant women.
Methods: The correlational-cross-sectional-descriptive study was conducted with 288 pregnant women between 06.12.2022 and 01.12.2023. Data was analyzed with SPSS 25.0, G*Power 3.1, and R programming language 4.1.3.
Results*:* The statistical results of the hierarchical regression model in our study showed that the model was significant and usable (F(2.285)= 7.457, p=0.001). The analysis of the regression model's t-test results regarding the regression coefficient's significance revealed that a statistically significant decrease in the participants' level of "orthorexia nervosa" (score increase decreasing orthorectic attitude) was caused by an increase in their body image (t=3.856, p< 0.001). Regression analysis revealed that there was no relationship between "orthorexia nervosa" level and cyberchondria level (t=-0.450, p=0.653). In our study, it was determined that Random Forest made the best prediction in determining the most important variable in the prediction of orthorexia nervosa. According to Shapley values, the most important variable in the prediction of orthorexia nervosa was body image. In our study, 95.35% of pregnant women with orthorexia nervosa were correctly predicted by machine learning.
Conclusion: In our study, it was found that the level of orthorexia nervosa decreased as the level of body image appreciation of pregnant women increased, and cyberchondria levels did not affect the level of orthorexia nervosa.

Keywords*:* anxiety; body image; pregnancy; orthorexia nervosa; cyberchondria

ÖZ

Amaç: Bu araştırma, gebelerde beden imajı, ortoreksiya nervoza ve siberkondri arasındaki ilişkinin belirlenmesi amacıyla yapıldı.
Yöntem: İlişkisel-kesitsel-tanımlayıcı tipteki çalışma 06.12.2022-01.12.2023 tarihlerinde 288 gebe ile yürütülmüştür. Veriler SPSS 25.0, G*Power 3.1 ve R programlama dili 4.1.3 programları kullanılarak analiz edilmiştir.
Bulgular: Çalışmamızda hiyerarşik regresyon modeline ilişkin istatistiksel sonuçlar, modelin anlamlı ve kullanılabilir olduğunu göstermektedir (F(2.285)= 7.457, p=0.001). Regresyon modelinde, regresyon katsayısının anlamlılığına ilişkin t testi sonuçları incelendiğinde; katılımcıların, beden imajı düzeyinin artması (t=3.856, p< 0.001); "ortoreksiya nervoza" düzeyinin istatistiksel olarak azalmasına sebep olduğu belirlenmiştir (Puan artışı ortorektik tutumu azaltmaktadır). Regresyon analizi sonucunda siberkondri düzeyinin "ortoreksiya nervoza" düzeyine etkisinin olmadığı belirlenmiştir (t=-0.450, p=0.653). Çalışmamızda ortoreksiya nervoza tahmininde en önemli değişkenin belirlenmesinde Random Forest en iyi tahmini yaptığı belirlenmiştir. Shapley değerlerine göre ortoreksiya nervoza tahmininde en önemli değişken beden imajı olmuştur. Çalışmamızda makine öğrenmesiyle ortoreksiya nervosa olan gebelerin % 95.35'i doğru tahmin edilmiştir.
Sonuçlar: Çalışmamızda gebelerin beden imajını beğenme düzeyi arttıkça ortoreksiya nervoza düzeylerinin azaldığı, siberkondri düzeylerinin ortoreksiya nervoza düzeyini etkilemediği saptanmıştır.

Anahtar kelimeler*:* anksiyete; beden imajı; gebelik; ortoreksiya nevroza; siberkondri

Introduction

The female body changes rapidly during pregnancy, making it a crucial time. According to Fuller et al. (2013), women's perceptions of their bodies may be impacted by these sudden and distinct physical changes in weight and size. According to Roomruangwong et al. (2017), body image refers to an individual's internal representation of their outward look, which encompasses their thoughts, attitudes, and opinions about their appearance. Such body changes, which are different from those in the pre-pregnancy period, may cause dissatisfaction with body image because some women have difficulty adapting to the new body weight and concept. Therefore, it is necessary to evaluate body image and factors affecting body image during pregnancy (Linde et al., 2022; Skouteris et al., 2005). There are many factors affecting body image and are included in the relevant literature. Current literature discusses the relationship between body image and orthorexia nervosa (ON) (He et al., 2021; Messer et al., 2022; Pauzé et al., 2021). ON is defined as an obsessive focus on a healthy diet (Cena et al., 2019). Although it is not defined as a psychiatric disorder according to ICD-11, its specific criteria are listed as follows: (i) adherence to a restrictive diet consisting of inflexible rules regarding the consumption of only healthy foods; (ii) experiencing intense emotional distress following a perceived dietary violation; and (iii) functional impairment resulting from obsessive eating patterns and mental preoccupation (Messer et al., 2022). Orthorexia is a cluster of symptoms that manifest as a parody of awareness of healthy living. Individuals are bombarded with advice and counseling about diet and health, with a sharp increase in propaganda

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about healthy lifestyles through books, magazines, and the internet, and a rapid exchange of ideas with the increasing power of social media. These influences of popular culture increase the tendency toward orthorexia (Koven et al., 2015).

It is emphasized that exaggerated online health information-seeking behavior, a phenomenon called 'cyberchondria,' increases health anxiety (Muse et al., 2012). In a review reporting current information on cyberchondria, it is mentioned that cyberchondria is difficult to define and is generally defined in two ways. First, as excessive and/or repetitive online health research (OHR) linked to increased health anxiety or distress; second, as a broader definition reflecting compulsive elements and anxiety with multiple components (distress or negative situations) (Starcevic et al., 2020). The first definition emphasizes the connection with health anxiety.

Studies have reported that body image is affected during pregnancy. Current literature discusses the relationship between orthorexia and body image. On the other hand, although there are many studies focusing on the relationship between health anxiety and cyberchondria, there is no study focusing on the relationship between orthorexia nervosa and cyberchondria because it is a current term. It is thought that this study will contribute to the literature.

Hypotheses

H1: There is an effect of body image perception on the level of orthorexia nervosa in pregnant women.

H2: There is an effect of cyberchondria level on the level of orthorexia nervosa in pregnant women.

Material and Methods

Type of research

This study, which was designed in a relational-intersectional-descriptive model, was conducted with 288 pregnant women living in Türkiye between 06.12.2022 and 01.12.2023.

Population and sample

The people in a Turkish province who were pregnant made up the study's population (Pregnant women applying to the private Igdir Medlife hospital). Pregnant women who gave their consent to participate in the study were all included. No sampling strategy was used. The study included 288 individuals after the responses from the participants were approved for inclusion in the data analysis during the data collection phase, in accordance with the eligibility criteria. The power of our study was determined to be 99% with a medium effect size at a 95% confidence level in the post hoc power analysis carried out with the G*Power 3.1 statistical package program in accordance with the data obtained from these 288 individuals (Cohen, 1992). The STROBE guideline was used in the reporting of this research article (Vandenbrouckel et al., 2007).

Inclusion criteria

Pregnant women who volunteered to participate in the study who were pregnant and 18 years of age or older were included in the study.

Exclusion criteria

The data of the researchers who filled out the data collection forms incompletely were excluded.

Data collection tools

Data were collected using the personal information form, cyberchondria severity scale, orthorexia nervosa scale, and body image scale.

Personal information form

It consists of questions such as age, gender, marital status, and level of education, including the descriptive characteristics of the pregnant women.

Body Image Scale (BIS)

This scale was created in 1953 by Secord and Jourard with the intention of gauging people's level of satisfaction with different body parts and functions. Hovardaoğlu (1993) conducted the scale's validity investigation in our nation in 1993. The 40 items on the scale are rated from 1 to 5, where 1 means I don't like it at all, 2 means I don't like it very much, 3 means I'm not sure, 4 means I like it quite a lot and 5 means I like it very much. This scale has a 40 as the lowest possible score and a 200 as the maximum. A higher score corresponds to a more positive assessment of one's body image. Cronbach's alpha value of the scale was found to be 0.91 (Hovardaoğlu, 1993). In our study, the Cronbach's alpha value of the scale was found to be 0.96.

ORTO-15 Scale

Donini et al. developed this 15-item Likert-type scale in 2005 to assess the likelihood of developing orthorexia nervosa. A validity and reliability research was carried out by Arusoğlu (2006). The questions explore people's compulsive behaviors in choosing, buying, preparing, and consuming meals that they believe to be healthful. Responses are provided in the present tense on a 4-point Likert scale that reads "always, often, sometimes, and never." For each answer that meets the requirements for orthorexia, a score of "1" is assigned; for replies that show a propensity toward normal eating behavior, a score of "4" is assigned; a total of at least 15 and up to 60 points can be earned. ORTO-15 scale score ≤40 was considered orthorexic, and those with >40 points were considered normal (Arusoğlu, 2006). In our study, the Cronbach's alpha value of the scale was found to be 0.73.

Cyberchondria Severity Scale (CSS)

CSS is a psychometric tool that was created in 2014 by McElroy and Shevlin to assess cyberchondria, a type of anxiety characterized by an excessive amount of online research on health (McElroy & Shevlin, 2014). Turkish validity and reliability studies were carried out by Uzun (2022). The SCS was created for cyberchondria and is a continuous scale rather than a categorized one. The questionnaire asks about the methods people use to conduct online health research, how much these studies worry them, and how much these studies influence their online and offline actions. With 33 propositions (1-never, 2-rarely, 3-occasionally, 4-frequently, 5-always) and five subscales, the SCC is a 5-point Likert-type scale. The total cyberchondria score of the person is calculated by summing the scores obtained from each question. The higher the score, the higher the level of cyberchondria. The Cronbach alpha value of the whole scale is 0.94 (Uzun, 2022). In our study, the Cronbach's alpha value of the scale was found to be 0.91.

Data collection process

Face-to-face interviews were conducted to collect the research data. During data collection, no personal data was requested from the participants. Participants were asked to approve this form before starting the study.

Data analysis

Data were analyzed using SPSS 25.0, G*Power 3.1, and R programming language 4.1.3 programs. Necessary normality tests were performed with kurtosis and skewness -1.5 to +1.5

(Tabachnick et al., 2013). For all analyses, p<0.05 was determined as the significance level. In our study, the ROC curve and estimation were performed with the R 4.1.3 program. In the application and comparison process of machine learning and deep learning methods, the 10-fold cross-validation method offered by the caret package was preferred. K nearest neighbor classification (KNN), Support vector machine classification (SVM), Model averaged neural network classification (avNNet), Random Forest classification (RF), XGBoost classification (XGBoost), Monotone multi-layer perceptron neural network classification (MONMLP), Classical artificial neural network regression (NN) and neural networks with feature extraction (pcaNNet) algorithms were used to obtain the best performance of the algorithms in the Caret package. To estimate the effect on orthorexia nervosa, two different groupings were made. 40 and below were categorised as having orthorexia nervosa and over 40 as not having orthorexia nervosa. Age, education status, income level, body mass index, number_of_children, current_trimester, daily internet duration, body image and cyberchondria variables were used in the model. While creating the prediction model, the optimum hyperparameter values for 10 different algorithms were determined by using 10-fold cross-validation method. In order to determine these values, the data set was divided into 70% training and 30% test data to be suitable for categorical variable estimation. There are 202 monthly observations in the training set and 86 monthly observations in the test set.

Ethical aspects of the research

Ethics committee approval was obtained from Agri Ibrahim Cecen University for the research (Date and Number: 06.12.2022-E-95531838-050.99-58142). All participants were informed by the researcher about the purpose and method of the research, the time they would allocate for the research, that participation in the research would not cause any harm, and that participation was based on the principle of voluntariness, and their consent was obtained. Written permission was obtained from the institution for the data collection process. Since individual rights should be protected in the research, the Helsinki declaration of human rights was adhered to throughout the study.

Results

In our study, it was found that 40.3% of the pregnant women were between 27-31 years of age, 61.1% had an income equivalent to their expenses, 29.9% were high school graduates, 47.9% were slightly obese, 43.8% had 2 or more children, 56.3% were in the third trimester, 44.4% had 3 or more pregnancies, and 51.4% had a daily internet usage time of 61 minutes or more (Table 1).

Table 1. Distribution of sociodemographic and obstetric characteristics of pregnant women (n=288)

Characteristics	n	%
Age		
21 and below	36	12.5
22-26	90	31.2
27-31	116	40.3
32 and above	46	16.0
Income level		
Income less than expenditure	50	17.4
Income equals expenditure	176	61.1
Income more than expenditure	62	21.5
Education status		
Primary school	52	18.0
Middle school	66	22.9
High school	86	29.9
License	84	29.2
Body mass index		
Weak	4	1.4
Normal	78	27.1
Slightly fat	138	47.9
Obese	68	23.6
Number of children		
0	88	30.5
1	74	25.7
2 and above	126	43.8
Pregnancy week		
1st trimester	22	7.6
2nd trimester	104	36.1
3rd trimester	162	56.3
Number of pregnancies		
1	106	36.8
2	54	18.8
3 and above	128	44.4
Daily internet usage time		
1-29 min	52	18.0
30-60 min	88	30.6
61 min and over	148	51.4

When the results of the analyses related to the hierarchical regression models conducted to reveal the effects of body image and cyberchondria level on orthorexia neurosis were examined. Statistical estimates for model 1 show that the model is significant and usable (F(1.286)= 15.573, p=0.001). In the regression model, when the t test results regarding the significance of the regression coefficient significance of the regression coefficient significance coefficient significance of

Table 2. Hierarchical regression analysis results between total orthorexia nervosa scale, body image scale and cyberchondria severity scale

Independent variables	Orthorexia Nervosa Scale (Dependent variable)						
	B	*SD*	*β*	*t*	*p**	95.0% Confidence interval for B	
Model 1						Lower bound	Upper bound
(Constant)	29.805	1.745		17.080	**0.001**	26.370	33.240
Body image scale	0.049	0.013	0.221	3.841	**0.001**	0.024	0.074
Model 2							
(Constant)	30.560	2.424		12.608	**0.001**	25.789	35.331
Body image scale	0.049	0.013	0.223	3.856	**0.001**	0.024	0.075
Cyberchondria severity scale	-0.008	0.019	-0.026	-0.450	0.653	-0.046	0.029
R	Model 1: 0.221		Model 2: 0.223				
R^2 /Adjusted R^2	Model 1: 0.049 / 0.046		Model 2: 0.050 / 0.043				
R^2 Change	Model 1: 0.049		Model 2: 0.001				
F	Model 1: 14.573		Model 2: 7.457				

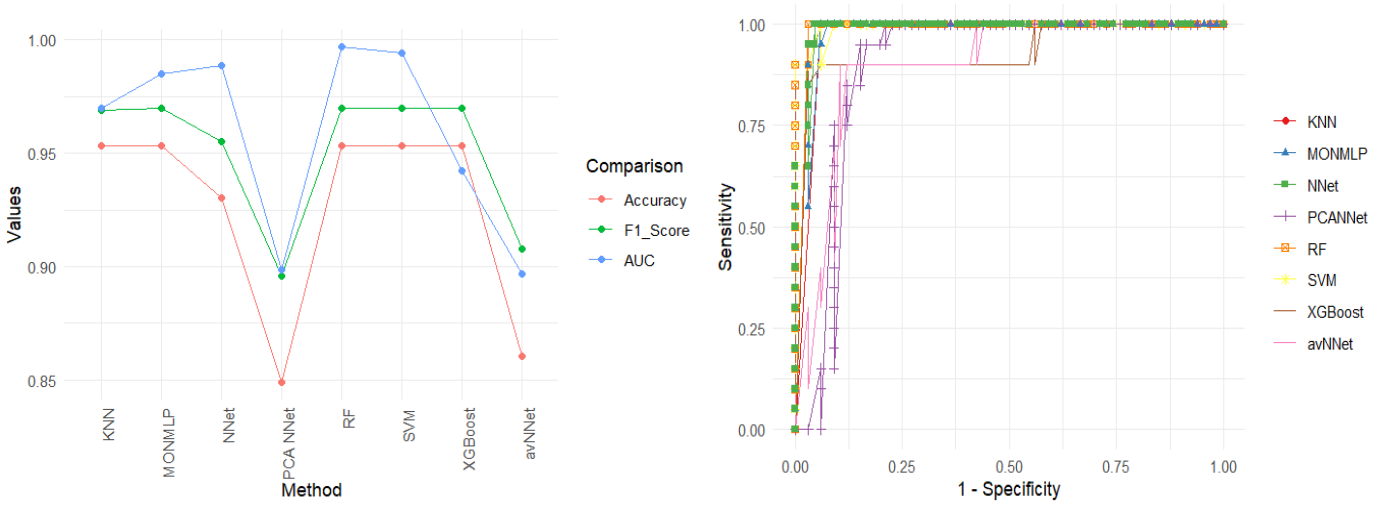

Figure 1. Accuracy, F1, AUC scores and ROC curve

the regression coefficient were analyzed, it was found that the increase in the body image level of the participants (t=-7.376, p<0.001) caused a statistical decrease in the level of "orthorexia nervosa" (increase in score decreases orthorectic attitude).

Statistical estimates for model 2 showed that the model was significant and usable (F(2.285)= 7.457, p=0.001). In the regression model, when the t-test results regarding the significance of the regression coefficient were analysed, it was found that the increase in the body image level of the participants (t=3.856, p< 0.001) caused a statistical decrease in the level of "orthorexia nervosa" (score increase decreases orthorectic attitude). As a result of regression analysis, it was determined that cyberchondria level had no effect on "orthorexia nervosa" level (t=-0.450, p=0.653) (Table 2).

On the training data set, hyperparameter adjustments were made to ensure that the algorithms perform optimally. The results obtained in this process are the hyperparameter results obtained in the training phase of the algorithms after scaling the data set between 0 and 1. These findings enabled the determination of the optimum hyperparameters by comparing the Accuracy values. The predictions performed on the test data set using these optimum hyperparameters and the performance analyses of these methods are shown in Figure 1. These visualizations reveal the effectiveness of the methods used and their classification of the data set in detail.

When the metrics (Accuracy, F1, AUC, and ROC) used for the comparison of hyperparameter values are analyzed, Figure 1 is obtained. This figure shows the Accuracy, F1, AUC and ROC values obtained as a result of the predictions made on the test data of the most appropriate metric values determined in the training data set.

In the analysis, although all models except Random Forest and SVM models produced similar and successful results, it was observed that these two models gave the most accurate results. When it is necessary to make a choice between these two models, the Random Forest method can be preferred since it provides a classification rate close to 96%. When the optimal hyperparameter values are used for the Random Forest model, the predictions made on the test data result.

As a result of visual inspection, it was observed that only 4 observations were misclassified. Two observations were incorrectly predicted to be Orthorexia nervosa, although they were not Orthorexia Nervosa, and the other 2 observations were incorrectly predicted due to the opposite situation. That is, only 4 observations out of a total of 86 observations were mispredicted.

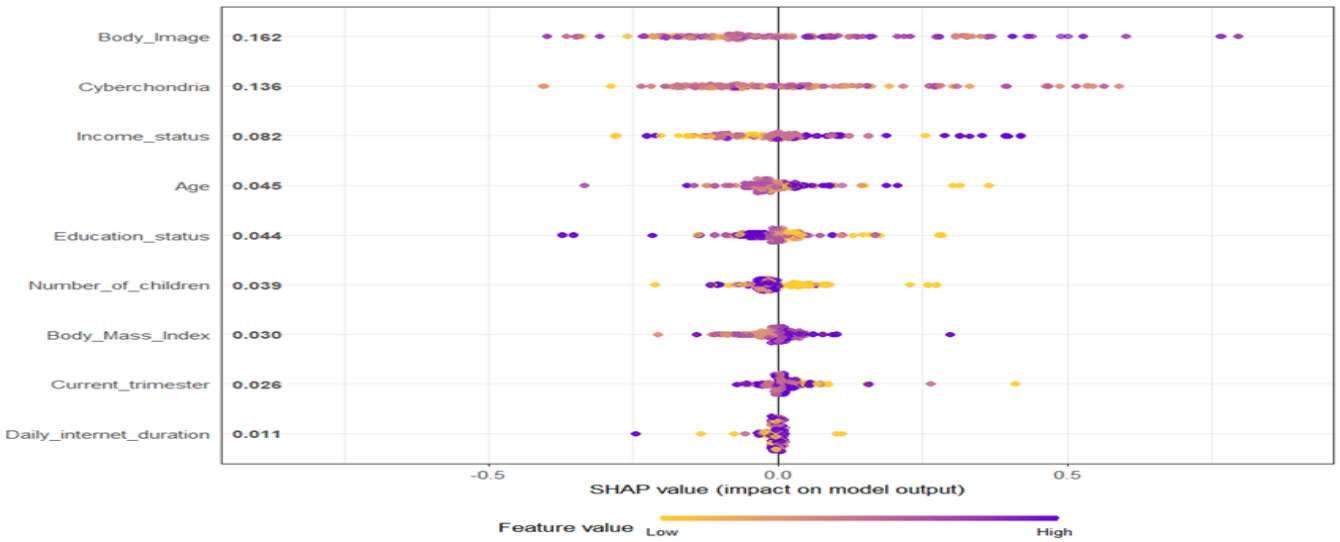

Figure 2. Determination of the contribution of variables to the model for orthorexia classification with shapley values

The comparison of the performance of all variables in the forecasting model was carried out using machine learning algorithms. Shapley additive explanations (Shapley additive explanations, SHAP) were used to understand the importance and contribution of each variable in the model. In order to avoid any bias during the performance comparison, the SHAP values of the variables in the best-performing model were analyzed. SHAP values show the extent to which each variable is effective in the predictions of the model and the magnitude of this effect.

According to the graph, the most important variable in the prediction of the Orthorexia nervosa variable was determined to be body image. The values shown on the x-axis of the SHAP graph reflect the amount of change in log-odds and the probability of success can be derived from these values. If the SHAP value of a variable is greater than zero, this indicates a positive effect for most observations.

The SHAP plot shows the names of the variables in order of importance on the y-axis and the average SHAP values of these variables next to them. The x-axis shows the amount of change in log-odds. The original values of the variables are expressed in colors, and this field can take two different colors for variables but can cover a wide spectrum of colors for numeric variables.

It is determined that the body image variable has a higher effect of 0.162 units compared to the other variables. The observations of this variable with the highest impact are indicated by the purple-colored dots on the graph. These purple dots have both positive and negative effects but generally have a greater positive effect. This means that as body image increases, the probability of not having orthorexia nervosa increases (Figure 2).

When figure 3 is analyzed, it is seen that there is a positive and average strength interaction between orthorexia nervosa and body image. Their distributions are close to the Gaussian distribution, and their intensities are between the mean values of both variables (Figure 3).

Discussion

The study aimed to determine the relationship between body image, orthorexia nervosa, and cyberchondria in pregnant women. The results were examined in this section of the study in the context of the literature.

In our study, it was found that body image affected the level of orthorexia nervosa in pregnant women ($p<0.05$). This shows that the level of orthorexia nervosa decreases as pregnant women like their body image. An important area of research is the connection between pregnant women's orthorexia nervosa and body image. This study is expected to provide light on the association between pregnant women's orthorexia nervosa and body image because there hasn't been any research on the subject in the literature. Barnes and Caltabiano found that excessive preoccupation with weight and high body image scores were predictors of orthorexia nervosa (Barnes & Caltabiano, 2016). In addition, it was emphasized in the study of Barthels and colleagues that orthorexia-prone individuals have very strict thoughts not only about healthy eating but also about a healthy body image (Barthels et al., 2015). In order to better understand and support the mental and physical health of the mother during a critical period such as pregnancy, more research is needed, especially focusing on the interaction between body image during pregnancy and orthorexia nervosa. In our study, it was found that cyberchondria level did not affect the level of orthorexia nervosa in pregnant women ($p>0.05$). There is no study examining the level of cyberchondria and orthorexia in pregnant women, and it is thought that this result will contribute to the literature. Searching for health-related information on the internet has become an ordinary situation for many people. Searches are made especially for disease symptoms and medical conditions (Altındiş et al., 2018). Cyberchondriacs become anxious and fearful by searching the symptoms of diseases in their own bodies on the internet (Uzun, 2022). In the literature, there is no study examining the relationship between cyberchondria and orthorexia nervosa in pregnant women, and in one study, the situation of the nursing group was examined.

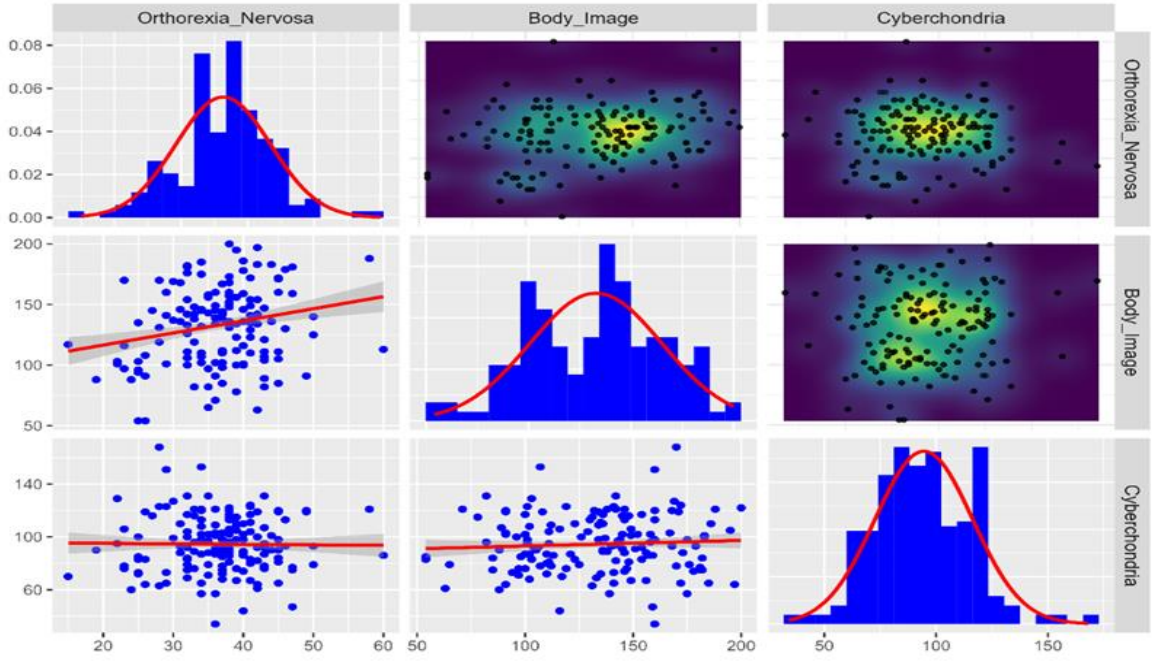

Figure 3. Distribution, interaction and density graph of orthorexia nervosa, body image and cyberchondria variable

Atsızata (2024) determined that as the cyberchondria levels of nurses increased, orthorexia nervosa levels increased. In this study, which differs from our study, it is thought that it is due to the different groups and the importance of the perspective of individuals. When orthorexia nervosa and cyberchondria are examined in the context of modern health behaviors, unique interactions and results may emerge, especially in pregnant women. Orthorexia nervosa and cyberchondria both have the potential to have a harmful impact on the mother's and the fetus's health during pregnancy. Healthy nutrition during pregnancy is critical for fetal development.

However, pregnant women with orthorexia nervosa may completely eliminate certain food groups from their diet in the name of healthy eating. This may limit the intake of essential nutrients needed by both the mother and the developing fetus, leading to nutritional deficiencies and potential health problems. In the case of cyberchondria, pregnant women may obsessively search for health-related information on the Internet and become unnecessarily anxious about the information they encounter in the process. This can lead to increased levels of anxiety and stress, which is detrimental to the health of both mother and baby during pregnancy. Excessive stress can increase the risk of pregnancy complications such as preterm labor and low birth weight.

Orthorexia nervosa and cyberchondria should be carefully managed by health professionals during pregnancy. Health professionals can help pregnant women to avoid unnecessary worry and stress by guiding them to eat a balanced and varied diet and informing them about the potential risks of seeking health information on the internet. This approach can contribute to the healthy management of pregnancy and minimize potential negative effects.

Conclusion

We found in our study that when pregnant women's admiration of their bodies increased, so did their Cross-sectional studies treat the data as a cross-section at a particular moment in time and therefore do not show changes or trends over time, which is a limitation of the study.

Conflict of Interest

The authors have no relevant financial or non-financial interests to disclose.

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Ethics Committee Approval

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Informed Consent

Informed consent was obtained from all individual participants included in the study.

Peer-Review

Externally peer-reviewed.

Author Contributions

M.Y.: Design, Methodology, Data Analysis, Writing - Original Draft.

B.D.G.: Design, Data Collection, Writing - Original Draft.

S.G.: Data Collection, Writing - Original Draft.

A.D.K.: Methodology, Writing - Original Draft.

References

Altındiş, S., İnci, M. B., Aslan, F. G., & Altındiş, M. (2018). An evaluation of cyberchondria levels and related factors in university employees. *Sakarya Medical Journal, 8*(2), 359-370.

Arusoğlu, G. (2006). *The investigation of healthy eating fixation (Orthorexia) and the adaptation of the ORTO-15 scale* (Doctoral dissertation, Hacettepe University).

Atsizata, M., & Sögüt, S. C. (2024). The relationship between orthorexia nervosa and cyberchondria levels in nurses: A cross-sectional study. *Archives of Psychiatric Nursing*, *48,* 30-35.

Barnes, A. M., & Caltabiano, M. L. (2016). The interrelationship between orthorexia nervoza, perfectionism, body image and attachment style. *Eating and Weight Disorders, 22*(1)*,* 177-184. https://doi.org/10.1007/s40519-016-0280-x

Barthels, F., Meyer, F., & Pietrowsky, R. (2015). Orthorexic eating behavior a new type of disordered eating. *Ernahrungs Umschau, 62*(10), 156-161. https://doi.org/10.4455/eu.2015.029

Cena, H., Barthels, F., Cuzzolaro, M., Bratman, S., Brytek-Matera, A., Dunn, T., Varga, M., Missbach, B., & Donini, L. M. (2019). Definition and diagnostic criteria for orthorexia nervosa: A narrative review of the literature. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity, 24*, 209-246. https://doi.org/10.1007/s40519-018-0606-y

Cohen, J. (1992). Statistical power analysis current directions. *Psychological Science, 1*(3), 98-101. https://doi.org/10.1111/1467-8721.ep10768783

Donini, L. M., Marsilli, D., Graziani, M. P., Imbriale, M., & Canella, C. (2005). Orthorexia nervosa: Validation of a diagnosis questionnaire. *Eating and Weight Disorders, 10*, e28-e32. https://doi.org/10.1007/BF03327537

Fuller-Tyszkiewicz, M., Skouteris, H., Watson, B. E., & Hill, B. (2013). Body dissatisfaction during pregnancy: a systematic review of cross-sectional and prospective correlates. *Journal of Health Psychology, 18*, 1411-1421. https://doi.org/10.1177/1359105312462437

He, J., Zhao, Y., Zhang, H., & Lin, Z. (2021). Orthorexia nervosa is associated with positive body image and life satisfaction in Chinese elderly: Evidence for a positive psychology perspective. *International Journal of Eating Disorders, 54*(2), 212-221. https://doi.org/10.1002/eat.23400

Hovardaoğlu, S. (1992). Body perception scale. *Journal of Psychiatry, Psychology, Psychopharmacology, 1*(1), 11-26.

Koven, N. S., & Abry, A. W. (2015). The clinical basis of orthorexia nervosa: Emerging perspectives. *Neuropsychiatric Disease and Treatment, 11*, 385-394. https://doi.org/10.2147/NDT.S61665

Linde, K., Lehnig, F., Nagl, M., Stepan, H., & Kersting, A. (2022). Course and prediction of body image dissatisfaction during pregnancy: A prospective study. *BMC Pregnancy and Childbirth, 22*(1), 1-14. https://doi.org/10.1186/s12884-022-05050-x

McElroy, E., & Shevlin, M. (2014). The development and initial validation of the cyberchondria severity scale (CSS). *Journal of Anxiety Disorders, 28*(2), 259-265. https://doi.org/10.1016/j.janxdis.2013.12.007

Messer, M., Liu, C., McClure, Z., Mond, J., Tiffin, C., & Linardon, J. (2022). Negative body image components as risk factors for orthorexia nervosa: Prospective findings. *Appetite, 178*(1), 106280. https://doi.org/10.1016/j.appet.2022.106280

Muse, K., McManus, F., Leung, C., Meghreblian, B., & Williams, J. M. G. (2012). Cyberchondriasis: Fact or fiction? A preliminary examination of the relationship between health anxiety and searching for health information on the Internet. *Journal of Anxiety Disorders, 26*(1), 189–196. https://doi.org/10.1016/j.janxdis.2011.11.005

Pauzé, A., Plouffe-Demers, M. P., Fiset, D., Saint-Amour, D., Cyr, C., & Blais, C. (2021). The relationship between orthorexia nervosa symptomatology and body image attitudes and distortion. *Scientific Reports, 11*(1), 13311. https://doi.org/10.1038/s41598-021-92569-2

Roomruangwong, C., Kanchanatawan, B., Sirivichayakul, S., & Maes, M. (2017). High incidence of body image dissatisfaction in pregnancy and the postnatal period: Associations with depression, anxiety, body mass index and weight gain during pregnancy. *Sexual & Reproductive Healthcare, 13*, 103-109. https://doi.org/10.1016/j.srhc.2017.08.002

Secord, P. F., & Jourard, S. M. (1953). The appraisal of body-cathexis: Body-cathexis and the self. *Journal of Consulting Psychology, 17*(5), 343-347. https://doi.org/10.1037/h0060689

Skouteris, H., Carr, R., Wertheim, E. H., Paxton, S. J., & Duncombe, D. (2005). A prospective study of factors that lead to body dissatisfaction during pregnancy. *Body Image, 2*, 347-361. https://doi.org/10.1016/j.bodyim.2005.09.002

Starcevic, V., Berle, D., & Arnáez, S. (2020). Recent insights into cyberchondria. *Current Psychiatry Reports, 22*, 1-8. https://doi.org/10.1007/s11920-020-01179-8

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2013). *Using multivariate statistics* (6th ed.). Pearson.

Uzun, S. U., & Bozkurt, N. (2022). Cyberchondria and associated factors among university staff. *ESTUDAM Public Health Journal*, *7*(2), 257-268.

Vandenbroucke, J. P., von Elm, E., Altman, D. G., Gøtzsche, P. C., Mulrow, C. D., Pocock, S. J., Poole, C., Schlesselman, J. J., & Egger, M. (2007). Strengthening the reporting of observational studies in epidemiology (STROBE): Explanation and elaboration. *PLoS Medicine, 4*(10), 1628-1655. https://doi.org/10.1371/journal.pmed.0040297