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How young women's levels of spirituality affect sexual and reproductive health stigma attitudes in Türkiye: Analysed with artificial neural networks

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Abstract

This study examined the impact of young women's spirituality levels on their stigmatizing attitudes towards sexual and reproductive health. The research was of a cross-sectional type. The sample of the research consisted of 301 midwifery students studying at the university. R programming language 4.1.3, G*Power 3.1, and SPSS-22 software were used in the analysis of the study. The regression model developed to determine the effect of spirituality level on sexual and reproductive health stigmatization level of young women was found to be significant, F (1,299) = 42.003, p = 0.001, and 12.3% of the variance in the dependent variable (R^2 = .123) was explained by the independent variable. The level of spirituality was found to have a positive and significant effect on the level of sexual and reproductive health stigmatization in women (β = 0.351; t (299) = 6.481, p = 0.001). In our study, SHAP values (Shapley Additive Explanations) in the analysis conducted with artificial neural networks showed that the most important variable in the estimation of the model was spirituality. Increasing the spirituality level of midwifery students was associated with an increase in the level of sexual and reproductive health stigma in young women. *(Afr J Reprod Health 2026; 30 [22]: 111-120).*

Keywords: Midwifery, reproductive health, sexual health, spirituality, stigma, women

Résumé

Cette étude a examiné l'impact du niveau de spiritualité de jeunes femmes sur leurs attitudes stigmatisantes à l'égard de la santé sexuelle et reproductive. Il s'agit d'une étude transversale. L'échantillon était composé de 301 étudiantes en maïeutique à l'université. Les logiciels et langages R (version 4.1.3), G*Power (version 3.1) et SPSS (version 22) ont été utilisés pour l'analyse des données. Le modèle de régression élaboré pour déterminer l'effet du niveau de spiritualité sur le degré de stigmatisation lié à la santé sexuelle et reproductive s'est révélé significatif, F (1, 299) = 42,003, p = 0,001 ; 12,3 % de la variance de la variable dépendante (R^2 = 0,123) étaient expliqués par la variable indépendante. Il a été constaté que le niveau de spiritualité exerce un effet positif et significatif sur le niveau de stigmatisation lié à la santé sexuelle et reproductive chez ces femmes (β = 0,351 ; t (299) = 6,481, p = 0,001). Dans notre étude, l'analyse effectuée à l'aide de réseaux de neurones artificiels — via les valeurs SHAP (Shapley Additive Explanations) — a montré que la spiritualité constituait la variable la plus déterminante dans le modèle. Une augmentation du niveau de spiritualité chez les étudiantes en maïeutique était associée à une hausse du niveau de stigmatisation lié à la santé sexuelle et reproductive. *(Afr J Reprod Health 2026; 30 [22]: 112-121).*

Mots-clés: Maïeutique, santé reproductive, santé sexuelle, spiritualité, stigmatisation, femmes

Introduction

Spirituality is a multidimensional concept encompassing individuals' search for meaning and purpose in life, as well as their beliefs, values, and connections with the transcendent.[1-2] Although spirituality and religiosity are conceptually distinct, they are often closely intertwined, particularly in societies where religion plays a central role in daily life. While religiosity typically refers to organized beliefs, practices, and institutional affiliations, spirituality reflects a broader, more subjective experience of meaning and connectedness.[3] However, in predominantly Muslim societies such as Türkiye, spirituality is not commonly conceptualized as separate from religiosity; rather,

it is perceived as an inherent dimension of religious life.[4] In this context, spiritual values are largely shaped by Islamic teachings, which influence individuals' moral frameworks, behaviors, and social norms. Religion is widely acknowledged as a powerful determinant of human behavior, particularly in shaping attitudes toward sexuality and reproductive health.[5] In many Muslim communities, religious norms emphasize modesty, chastity, and the preservation of family honor, which significantly influence perceptions of sexual behavior, especially among unmarried individuals.[6] These norms often contribute to restrictive attitudes toward premarital sexual activity and reproductive health practices, including contraception and abortion. Empirical studies have shown that higher levels of religiosity are associated with delayed sexual initiation and reduced engagement in risky sexual behaviors.[5-7] While these patterns may have protective aspects, they may also contribute to stigmatizing attitudes toward individuals who deviate from these norms.

Stigmatization is defined as a social process characterized by labeling, stereotyping, separation, and discrimination against individuals based on perceived deviations from societal norms.[8] In the context of sexual and reproductive health, stigma often manifests in negative judgments toward individuals experiencing unintended pregnancies, seeking abortion services, or living with sexually transmitted infections.[9-10] In conservative sociocultural settings, such as Türkiye, these attitudes are further reinforced by religious and moral beliefs, leading to the marginalization of young women who engage in or are perceived to engage in non-normative sexual behaviors.

The consequences of stigma are profound and multifaceted. Stigmatized individuals are more likely to experience social isolation, discrimination, and reduced access to healthcare services.[11] For young women, stigma can act as a significant barrier to seeking sexual and reproductive health services, including contraception, safe abortion, and STI testing.[10] This avoidance may result in adverse outcomes such as unsafe abortion practices, increased risk of maternal morbidity and mortality, and deterioration in mental health.[12] Moreover, stigma has been associated with decreased self-esteem, heightened feelings of guilt and shame, and increased vulnerability to anxiety, depression, substance use, and suicidal ideation.[13-14] Despite the growing body of research on religiosity and health behaviors, the role of spirituality particularly as a nuanced and multidimensional construct in shaping stigmatizing attitudes toward sexual and reproductive health remains underexplored. Most existing studies focus primarily on religiosity, overlooking the potential independent or interacting effects of spirituality. Furthermore, the complexity of these relationships may not be fully captured by traditional statistical approaches.

In recent years, artificial neural networks (ANNs) have emerged as powerful analytical tools capable of modeling complex, nonlinear relationships among variables.[15] Unlike conventional methods, ANNs can uncover hidden patterns and interactions that may better explain how different dimensions of spirituality influence stigma-related attitudes. Applying ANN-based approaches in this context may provide a more comprehensive understanding of the interplay between spirituality and stigmatization. Therefore, this study aims to evaluate the effect of young women's spirituality on their stigmatizing attitudes toward sexual and reproductive health in Türkiye. Specifically, it seeks to explore how varying levels and dimensions of spirituality influence stigma-related perceptions using artificial neural network modeling. Understanding these relationships may contribute to the development of culturally sensitive interventions and educational programs aimed at reducing stigma and improving access to sexual and reproductive health services among young women.

Research questions

How do young women's spirituality levels affect their sexual and reproductive health stigmatization attitudes?

Methods

Type of research

The research is a cross-sectional study.

Population and sample of the study

The study included a total of 301 students enrolled in the Department of Midwifery at the Faculty of Health Sciences at Tarsus University and Atatürk

University for the 2022/2023 academic year. The study did not employ a sample selection technique; instead, participation was voluntary, with students who agreed to take part comprising the study sample. A post hoc power analysis, conducted based on the data from these 301 participants, demonstrated that the study achieved a power of 99% at a 95% confidence level with a medium effect size. [16] Reporting of the study followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines for transparent and comprehensive reporting.[17]

Inclusion criteria

To be a student of the Faculty of Health Sciences, Department of Midwifery
Being single
To be between 18-24 years old

Research instrument

Personal information form, sexual and reproductive health stigma scale in young women, and spirituality scale were used to collect research data.

Personal information form

It is a questionnaire form consisting of 9 questions to determine the
socio-demographic characteristics of the students.

Sexual and reproductive health stigma scale in young women (SRHSSYW)

The Sexual and Reproductive Health Stigma Scale for Young Women (SRHSSYW) was developed by Hall et al. in 2017 to identify stigma related to sexual and reproductive health in women aged 15-24 years.[18] The scale comprises 20 items, divided into three sub-dimensions: Accepted Stigma, Internalized Stigma, and Attitudes Based on Stigma.
Accepted Stigma: Contains 6 items (items 1-6), with possible scores ranging from 0 to 6. Internalized Stigma: Includes 7 items (items 7-13), with possible scores ranging from 0 to 7. Attitudes Based on Stigma: Consists of 7 items (items 14-20), with possible scores ranging from 0 to 7. Each item of the scale is graded as 0=Disagree, 0=Neutral, 1=Agree. There are no reversed items on the scale. The total score, which ranges from 0 to 20, indicates the level of stigma, with higher scores reflecting higher stigma.

The reliability and validity of the SRHSSYW scale were evaluated by Bayrakçeken and Eryilmaz in 2021, who reported a Cronbach alpha coefficient of 0.83. In the current study, the Cronbach alpha value was found to be 0.75, indicating a good level of internal consistency.[19]
By using this scale in predictive models, we can quantify stigma levels and analyze factors influencing sexual and reproductive health stigma among young women. This analysis helps in developing targeted interventions to reduce stigma and improve health outcomes.

Spirituality Scale (SS):

The scale, created by Demirci and Eksi[20], contains six items and is structured as a single dimension without any reverse-scored items. It follows a 5-point Likert format: "1: Not Suitable for Me at All, 2: Not Suitable for Me, 3: Somewhat Suitable for Me, 4: Quite Suitable for Me, 5: Completely Suitable for Me." The possible scores range from 6 to 30, with higher scores indicating a greater level of spirituality. The original scale has a Cronbach's alpha reliability coefficient of 0.88.[16] In this study, the Cronbach's alpha was calculated at 0.89, suggesting strong internal consistency.

Data collection

The research data were collected online between 15.06.2022-15.07.2022 from the students of Tarsus University Faculty of Health Sciences, Department of Midwifery, and Atatürk University Faculty of Health Sciences, Department of Midwifery, with a questionnaire form created in Google Forms.

Data analysis

Data analysis was conducted using the SPSS-22 statistical software. Normality tests were performed, confirming that the data followed a normal distribution (Kurtosis and Skewness values between -1.5 and +1.5).[19] To assess the data, Pearson correlation and simple linear regression analyses were applied, with statistical significance set at $p<0.05$. Estimation of stigma levels regarding

Sexual and Reproductive Health in Young Women was performed using the R programming language version 4.1.3. For visualizations, the ggplot2, hrbrthemes, hexbin, GGally, corrplot, and plotly packages were utilized, while SHAPforxgboost and xgboost packages were used to generate SHAP visualizations. To implement and compare machine learning models, a 10-fold cross-validation approach was applied using the caret package. Within the caret package, the following functions were used to evaluate model performance: *knn* for K-Nearest Neighbor regression (KNN), *svmRadial* for Support Vector Machine regression (SVM), *avNNet* for Artificial Neural Network regression (ANN), *rf* for Random Forest (RF), *xgbLinear* for XGBoost, and *glmnet* for regularized regression (REG).

Ethical considerations

Prior to beginning the study, ethical approval was granted by the Tarsus University University Scientific Research and Publication Ethics Committee (Decision Date: 30.05.2022, Meeting Number: 5, Decision Number: 2022/53). Participants provided informed consent before taking part in the study. In order to uphold the protection of individual rights, the research was conducted in full compliance with the principles outlined in the Declaration of Helsinki.

Consent to participate

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

Results

It was found that 30.9% of the individuals who participated in the study were between 22-24 years of age, 52.8% lived in a province for the longest time, 77.7% lived in a nuclear family, 53.8% had an income equivalent to their expenses, and 58.1% received information on sexual and reproductive health (Table 1).

A significant positive correlation was found between the mean total scores of the Sexual and Reproductive Health Stigma Scale and the Spirituality Scale (Table 2).

The regression model developed to determine the effect of spirituality level on young women's Sexual and Reproductive Health Stigma level was found $F(1,299)=42.003$, $p=0.001$, and 12.3% of the variance in the dependent variable ($R^2=.123$) was explained by the independent variable. The independent variable predicts the dependent variable. Accordingly, spirituality level has a positive and significant effect on the level of sexual and reproductive health stigmatization in women ($\beta= 0.351$; $t(299)=6.481$, $p=0.001$) (Table 3).

Analysis with artificial neural networks

To estimate Sexual and Reproductive Health Stigma in Young Women (SRHSSYW), several regression algorithms were utilized: K Nearest Neighbor Regression (KNN), Support Vector Machine Regression (SVM), Artificial Neural Network Regression (ANN), Random Forest (RF), XGBoost Regression (XGBoost), and Regular Regression (REG). For REG, the Alpha (mixing parameter) ranges from 0 to 1, where Alpha = 0 corresponds to Ridge Regression and Alpha = 1 corresponds to Lasso Regression. The predictor variables included Age, Residence, Family Type, Income, Information on Sexual and Reproductive Health, and Spirituality.

The models were evaluated using 10-fold cross-validation on a dataset split into 70% training (212 observations) and 30% testing (89 observations). Figure 1 displays the most accurate parameter values for each algorithm based on the training data. Figure 2 presents the Root Mean Square Error (RMSE) and Mean Absolute Error (MAE) for the test data predictions, showing that while most models provided accurate predictions, the ANN model outperformed others. The prediction accuracy of the ANN model is illustrated in Figure 3, where red lines represent ANN predictions and blue lines represent actual test data. The close alignment of the red lines with the blue lines indicates a high prediction accuracy

(SHAP) were calculated. SHAP values reveal the contribution of each variable to the model's predictions. According to the SHAP analysis in Figure 4, Spirituality emerged as the most significant variable for predicting SRHSSYW.

This analysis demonstrates that the ANN model provides the most accurate predictions for SRHSSYW, with Spirituality being the most influential predictor.

Table 1: Descriptive characteristics of ındividuals (n=301)

Demographic Characteristics		**n**	**%**
Age (Years)	18	23	7.6
	19	61	20.3
	20	54	17.9
	21	70	23.3
	22-24 years old	93	30.9
The place where she lived the longest	Province	159	52.8
	District	84	27.9
	Village	58	19.3
Family Type	Nuclear family	234	77.7
	Extended family	67	22.3
Monthly income status	My income is more than my expenses	37	12.3
	My income is equal to my expenses	162	53.8
	My income is less than my expenses	102	33.9
Receiving information on sexual and reproductive health	Yes	175	58.1
	No	126	41.9

Table 2: The Relationship Between Sexual and Reproductive Health Stigma Scale and Spirituality Scale Total and Subscale Scores of Young Women (n=301)

		(1)	(2)	(3)	(4)	(5)
(1) Mean Total Score of Sexual and Reproductive Health Stigma Scale in Young Women	**r**	-				
	p	-				
(2) Accepted stigmatization subscale	**r**	.597	-			
	p	**.001**	-			
(3) Internalized stigmatization sub-dimension	**r**	.840	.277	-		
	p	**.001**	**.001**	-		
(4) Attitudes on which stigmatization is based sub-dimension	**r**	.711	.076	.460	-	
	p	**.001**	.187	**.001**	-	
(5) Spirituality Scale	**r**	.351	.173	.249	.338	-
	p	**.001**	**.003**	**.001**	**.001**	-

Table 3: Results of simple linear regression analysis to determine the effect of spirituality on sexuality and reproductive health stigma level in young women

Independent variable	***B***	***SD***	***β***	***t***	***p****
(Constant)	2.302	1.030		2.235	**0.026**
Spirituality Scale	0.271	0.042	0.351	6.481	**0.001**
			R=0.321 ***R^2=0.123*** ***F=42.003*** ***p=0.001***		

Simple Linear Regression Analysis*

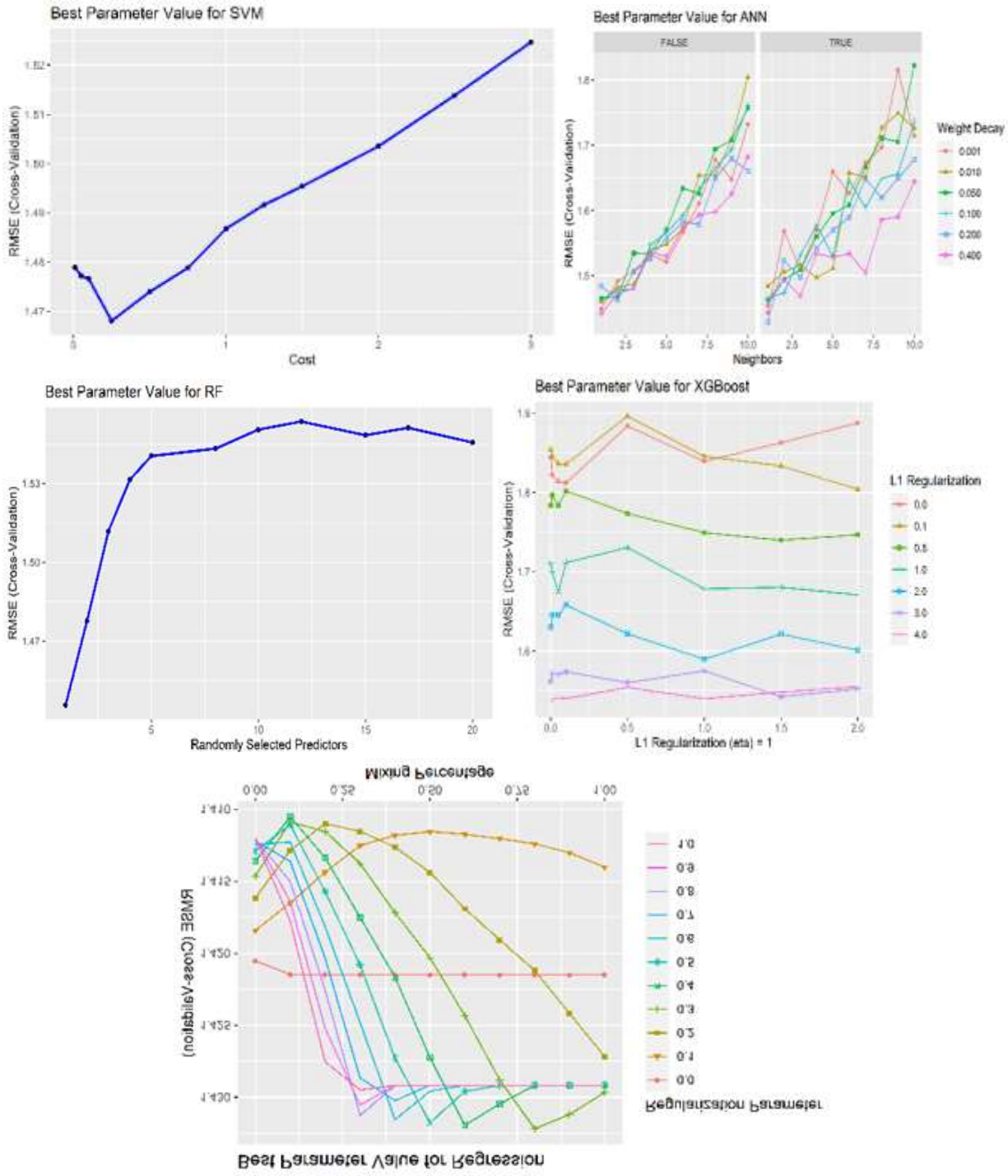


Figure 1: With algorithms, Models are used for the estimation of the SRHSSYW variable and determining the best parameter value according to the training data

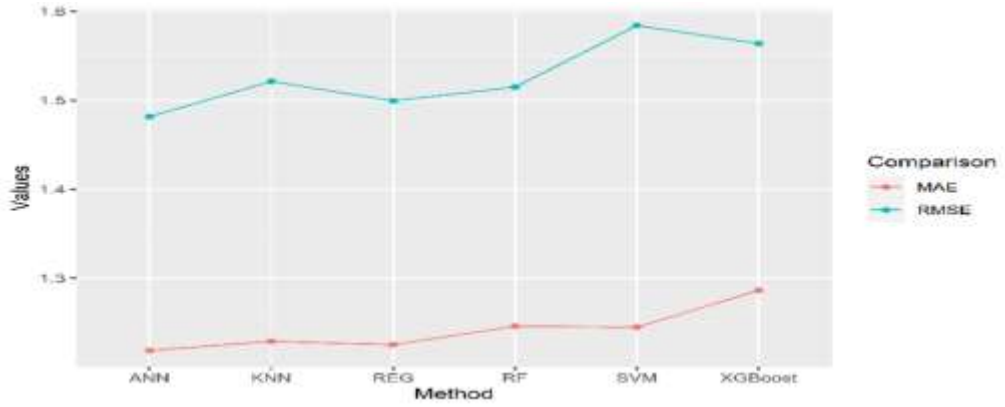


Figure 2: The metric values of the methods according to the estimation of the test data

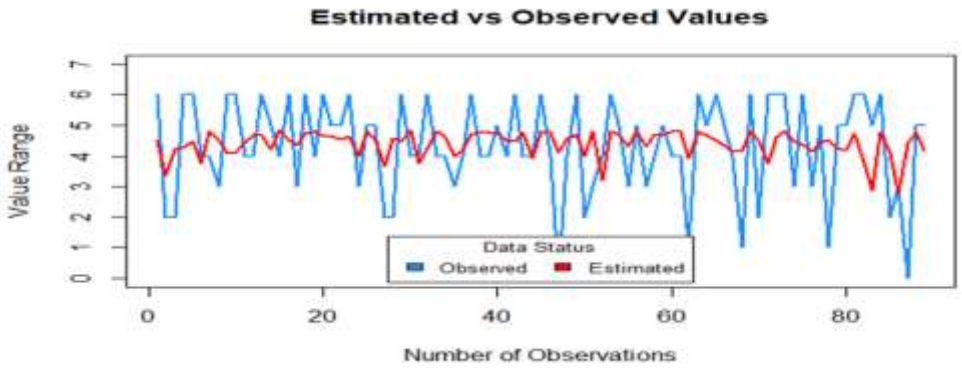


Figure 3: SRHSSYW prediction with the ANN method

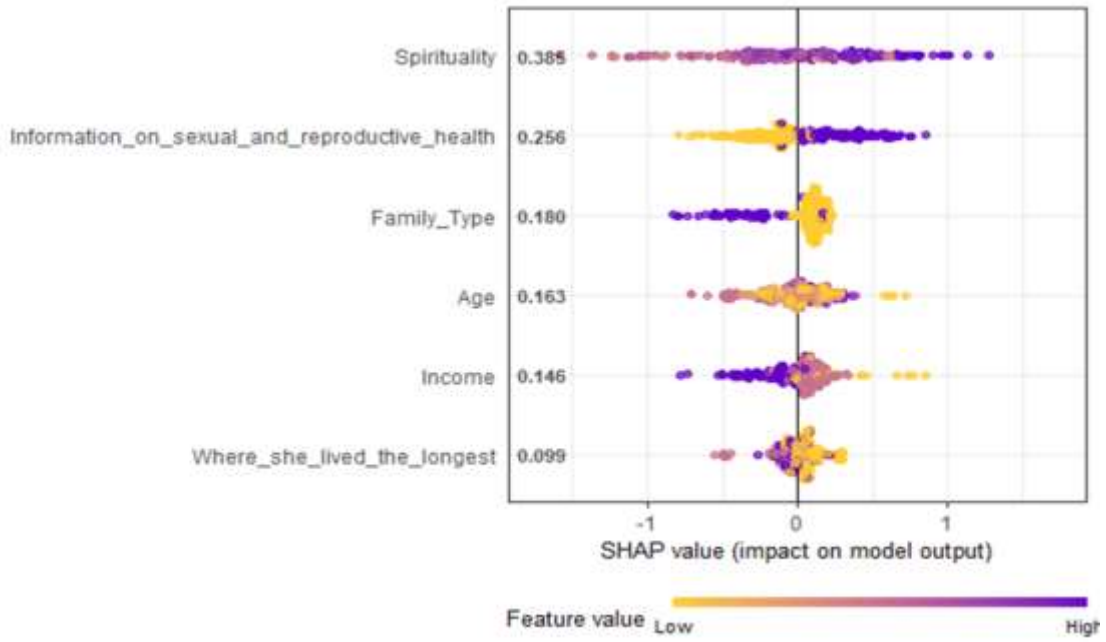


Figure 4: Determining the contributions of variables to the model for SRHSSYW estimation with Shapley values

Discussion

In this part of the study, the findings are discussed in the light of the literature. People may encounter various problems from time to time in life. Among these problems, problems related to sexual and reproductive health have an important place among women. According to the results of the Sexual and Reproductive Health Survey among Young People in Türkiye, 43% of the young people stated that they had a friend who had a sexual experience before marriage, and 53.2% of the young people in the same survey showed visual media as a source of information for STIs.[22]

Stigma is affected by many individual and social parameters. For example, stigma affects the demographic characteristics of individuals, and it is assumed that demographic characteristics affect the stigmatization tendency of individuals. Religiosity and spirituality have been theorized to overlap in meaningful ways,[23] and research has generally found that these constructs share some of the same variance.[24]

Spirituality and sexual and reproductive health an emerging subfield that encompasses the synergies and tensions between these two disciplines. Sexual and reproductive health is broadly defined to include family planning, contraception, reproductive technology, genetic counseling, HIV/AIDS, and domestic violence counseling and services.[25] In this study, a significant positive correlation was found between the mean total scores of the Sexual and Reproductive Health Stigma Scale and the Spirituality Scale of young women ($p<0.05$). It was found that the increase in the level of spirituality of individuals increased the level of sexual and reproductive health stigma of young women. In Coleman's study, spirituality, sexual orientation, age, and HIV symptoms were found to contribute significantly to mental well-being and functional health status.[26] Burris, Smith, and Carlson found a moderating effect between spirituality and gender. A unique and strong relationship between spirituality and sexual practices of young adults, especially women, was identified.[27] Luquis, Brelsford, and Rojas-Guyler found that sexual behaviors in men were not affected by sexual attitudes and spirituality, while sexual behaviors in women were affected by sexual attitudes.[28] In addition, previous research has shown that spirituality affects sexual attitudes and that these sexual attitudes affect sexual behaviors.[28-29] Murray-Swank, Pargament, and Mahoney found a unique and useful way of examining the link between sexuality and spirituality.[30] Beckwith and Morrow conducted a study with university students, and the results showed a negative relationship between spirituality and sexual attitudes.[31] That is, basic spirituality was found to be negatively related to sexual attitudes, including permissiveness and sexual practices. Murray, Ciarrocchi, and Murray-Swank found a negative relationship between spirituality, sexual freedom, and high-risk sexual intercourse among graduate and undergraduate students.[32] It is thought that these different results are due to different perceptions of spirituality and sexuality in different societies.

Conclusion

It was found that increasing the spirituality level of midwifery students increased the level of sexual and reproductive health stigmatization in young women. In our study, SHAP values (Shapley Additive Explanations) in the analysis made with artificial neural networks, spirituality was found to be the most important variable in the prediction of the model. It is recommended to conduct the study in different regions.

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Author contributions

GS: Conception and design, acquisition of data, analysis and interpretation of data, drafting of the manuscript, critical revision of the manuscript for important intellectual content; MY: Conception and design, drafting of the manuscriptcritical revision of the manuscript for important intellectual content, statistical analysis, supervision; HÖ: Conception and design, acquisition of data, drafting of the manuscript, supervision; SES: Conception and design, acquisition of data, analysis and interpretation of data, drafting of the manuscript,

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Conflict of interest

The authors declare no conflicts of interest.

Strength and limitations of the study

This study had several limitations; due to its cross-sectional design, causal relationships between spirituality and stigmatizing attitudes towards sexual and reproductive health could not be established; therefore, future longitudinal and multi-center studies are recommended to better clarify causal relationships.

References

1. Koenig HG. Religion, spirituality, and health: The research and clinical implications. ISRN Psychiatry 2012;2012:278730. doi:10.5402/2012/278730.
2. Puchalski CM, Vitillo R, Hull SK, Reller N. Improving the spiritual dimension of whole person care. J Palliat Med 2014;17(6):642–56. doi: 10.1089/jpm.2014.9427.
3. Zinnbauer BJ, Pargament KI, Cole B, Rye MS, Butter EM, Belavich TG, et al. Religion and spirituality: Unfuzzying the fuzzy. J Sci Study Relig 1997;36(4):549–64.doi: 10.2307/1387689.
4. Adawiyah WR, Pramuka BA. Scaling the notion of Islamic spirituality in the workplace. Journal of Management Development 2017;36(7):877-98. doi:10.1108/JMD-11-2014-0153.
5. Burdette AM, Hill TD, Myers K. Understanding religious variations in sexuality and sexual health. In: DeLamater J, Plante RF (Ed.). Handbook of the Sociology of Sexualities. Springer International Publishing; Imprint: Springer, 2015; 349-70.
6. Ciftci A, Jones N, Corrigan PW. Mental health stigma in the Muslim community. Journal of Muslim Mental Health 2013;7(1):17-32.
7. Regnerus MD. Forbidden fruit: Sex & religion in the lives of American teenagers. Oxford University Press: USA. 2007,68.
8. Link BG, Phelan JC. Conceptualizing stigma. Annu Rev Sociol 2001;27:363–385.doi: 10.1146/annurev.soc.27.1.363.
9. Kumar A, Hessini L, Mitchell EMH. Conceptualising abortion stigma. Cult Health Sex 2009;11(6):625–639. doi: 10.1080/13691050902842741.
10. Rai SS, Peters RM, Syurina EV, Irwanto I, Naniche D, Zweekhorst MB. Intersectionality and health-related stigma: insights from experiences of people living with stigmatized health conditions in Indonesia. International Journal for Equity in Health 2020; 19(1): 206.doi: 10.1186/s12939-020-01318-w.
11. Dao L. Sexual and Reproductive Health and Rights. In: APHA's 2018 Annual Meeting & Expo; 2018 Nov 10-14; San Diego, CA. Washington, DC: American Public Health Association; 2018.
12. Ganatra B, Gerdts C, Rossier C, Johnson BR, Tunçalp Ö, Assifi A et al. Global, regional, and subregional classification of abortions by safety, 2010–14: estimates from a Bayesian hierarchical model. The Lancet 2017; *390*(10110):2372-81.doi: 10.1016/S0140-6736(17)31794-4.
13. Major B, O'brien LT. The social psychology of stigma. Annu. Rev. Psychol 2005; *56*(1), 393-421.doi: 10.1146/annurev.psych.56.091103.070137.
14. Dessie ZG, Zewotir T. HIV-related stigma and associated factors: a systematic review and meta-analysis. Frontiers in Public Health 2024;12:1356430.doi: 10.3389/fpubh.2024.1356430.
15. Haykin S. Neural networks and learning machines. 3rd ed. New Delhi: Pearson Education India; 2009.
16. Cohen J. Statistical power analysis for the behavioral sciences. New Jersey: Lawrence Erlbaum Associates; 1988,124-8.
17. Vandenbrouckel JP, Von Elm E, Altman DG, Gotzsche PC, Mulrow CD, Pocock SJ, Poole C, Schlesselman JJ and Egger M. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): explanation and elaboration. PLoS Medicine 2007; 4(10):1628-55.doi: 10.1097/EDE.0b013e3181577511.
18. Hall KS, Manu A, Morhe E, Harris LH, Loll D, Ela E, Kolenic G, Dozier JL, Challa S, Zochowski MK. Development and validation of a scale to measure adolescent sexual and reproductive health stigma: results from young women in Ghana. The Journal of Sex Research 2017; 1-13. doi:10.1080/00224499.2017.1292493.
19. Bayrakceken E, Eryilmaz G. Validity and reliability of the Turkish version of the stigma scale for sexual and reproductive health in young women. International Journal of Caring Sciences 2021;14(3):1961-1974.
20. Demirci I, Eksi H. Keep calm and be happy: A mixed method study from character strengths to well-being. Educational Sciences: Theory & Practice 2018; 18(29):303–54. doi:10.12738/estp.2018.2.0799.
21. Tabachnick BG, Fidell LS, Ullman JB. Using multivariate statistics. Boston: MA: Pearson. 2013,138-52.
22. Ozcebe H, Unalan T, Turkyılmaz SA, Coskun Y. Türkiye gençlerde cinsel sağlık ve üreme sağlığı araştırması. Çalışma Ortamı Dergisi 2007;112:235.
23. Zinnbauer BJ, Pargament KI, Scott AB. The emerging meanings of religiousness and spirituality: Problems and prospects. Journal of Personality 1999;67:889-919. doi:10.1111/1467-6494.00077.
24. Zinnbauer BJ, Pargament K. Religiousness and spirituality. In: Paloutzian RF, Park CL (eds.), Handbook of the

psychology of religion and spirituality. New York: Guilford.2005, 21-42.
25. Gaydos LM, Smith A, Hogue CJR, Blevins J. An emerging field in religion and reproductive health. Journal of Religion and Health 2010; 49(4):473-84. doi:10.1007/s10943-010-9323-1.
26. Coleman CL. Spirituality and sexual orientation: relationship to mental wellbeing and functional health status. Journal of Advanced Nursing 2003; 43(5):457-64. doi:10.1046/j.1365-2648.2003.02743.x.
27. Burris JL, Smith GT, Carlson CR. Relations among religiousness, spirituality, and sexual practices. Journal of Sex Research 2009;46(4):282-9.doi: 10.1080/00224490802684582.
28. Luquis RR, Brelsford GM, Rojas-Guyler L. Religiosity, spirituality, sexual attitudes, and sexual behaviors among college students. J Relig Health 2012;51:601–14. doi:10.1007/s10943-011-9527-z.
29. Lefkowitz ES, Gillen MM, Shearer CL, Boone TL. Religiosity, sexual behaviors, and sexual attitudes during emerging adulthood. Journal of Sexual Research 2004;41:150-9. doi:10.1080/00224490409552223
30. Murray-Swank NA, Pargament KI, Mahoney A. At the crossroads of sexuality and spirituality: the sanctification of sex by college students. The International Journal for the Psychology of Religion 2005;15(3):199-219. doi:10.1207/s15327582ijpr1503_2.
31. Beckwith HD, Morrow JA. Sexual attitudes of college students: The impact of religiosity and spirituality. College Student Journal 2005*;* 39(2):357-66.
32. Murray KM, Ciarrocchi JW, Murray-Swank NA. Spirituality, religiosity, shame and guilt as predictors of sexual attitudes and experiences. Journal of Psychology and Theology 2007*;* 35(3):222–34. doi:10.1177/009164710703500305.