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Research Article

Assessing the knowledge levels of senior midwifery and nursing students on consanguineous marriage, genetics, and genetic counseling

Fahri Aşkan ^{a,*}, Derin Çelik ^b^a Van Yüzüncü Yıl University, Faculty of Health Sciences, Department of Child Health and Diseases Nursing, Van, Turkey^b Graduate Nurse, Van, Turkey

* Corresponding author: Van Yüzüncü Yıl University, Faculty of Health Sciences, Department of Child Health and Diseases Nursing, Van, Turkey
E-mail addresses: fahriaskan@yyu.edu.tr (F. Aşkan)

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Highlights

- The study highlights the need for more comprehensive genetic counseling education for senior midwifery and nursing students.
- Enhanced education will contribute to the protection of public health by improving the role of health professionals in genetic disease management.

Abstract

Aim: To evaluate the level of knowledge among senior nursing and midwifery students regarding consanguineous marriage, genetics, and genetic counseling.

Method: This descriptive study was conducted between May and June 2024 with senior students enrolled in the Faculty of Health Sciences, Department of Midwifery and Nursing, at Van Yüzüncü Yıl University. The study population comprised 188 students from the Midwifery and Nursing departments. The sample size was calculated to be at least 156 students using the G*Power 3.1.9.4 program, with parameters set at $d=0.2$, $\alpha=0.05$, and Power $(1-\beta)=0.80$. A total of 157 students participated in the study. Data were collected using a sociodemographic form, the Genetic and Genetic Counseling Information Form, and the Consanguineous Marriage Attitude Scale. Statistical analysis was performed using SPSS version 26.0.

Results: The mean age of the participating students was 22.97 ± 1.19 years. Among them, 40.8% reported that their parents had a consanguineous marriage, 49.7% had a family or close relative with a history of genetic diseases, and 25% reported a speech disorder within their families. Additionally, 40.8% of the students were found to have adequate knowledge about genetics and genetic diseases. While 92.4% believed they had a role in providing counseling, only 35.6% considered their education sufficient for evaluating individuals with genetic problems, and 20.4% had knowledge about preconceptional counseling.

Conclusion: The findings indicate that students recognize their counseling roles in genetic diseases but possess insufficient knowledge about genetics and genetic diseases. The content of consanguineous marriage and genetic counseling training should be created in accordance with professional roles and responsibilities, and current practices should be conveyed to students.

Practice implications: Students were found to have a negative attitude toward consanguineous marriage and expressed a desire for more education on genetics and genetic counseling.

Keywords: Consanguineous marriage, midwifery, genetics, genetic counseling, nursing.

Introduction

Marriages between individuals who share one or more common ancestors are termed consanguineous marriages. The degree of consanguinity depends on the level of familial closeness, with marriages between first cousins (children of uncles or aunts) being the most common and medically high-risk type of consanguineous unions (Yılmaz et al., 2019). According to the data of the Turkish Statistical Institute (TUIK, 2023); According to the marriage statistics in our country, 5.9% of the official marriages in 2010 were consanguineous marriages, and this rate decreased continuously in the following years, reaching 4.3% in 2018 and 3.2% in 2023. Such marriages pose significant risks to child health and are a major factor contributing to the prevalence of genetic diseases (Sevinç & Çelik, 2016).

Genetic diseases arise due to alterations in the genotype or through epigenetic changes that impact phenotype without directly altering DNA (Aydemir & Kayasu Ayata, 2022). These diseases can be mitigated or prevented through pre-marital and prenatal screening tests, pre-pregnancy genetic counseling, and early diagnosis, which

enables timely intervention (Demir et al., 2022). With advancements in genetic research and diagnostic methods, coupled with the higher prevalence of consanguineous marriages in Turkey compared to developed Western countries, genetic counseling has become increasingly important (Aslantürk & Pınar, 2020).

Genetic counseling, as defined by the World Health Organization (WHO), is “a communication process that addresses human problems associated with genetic diseases occurring or at risk of occurring in a family.” This process involves diagnosing genetic conditions, understanding their etiology, and informing families about available treatment options (Karaca Saydam, 2020).

To address the prevalence of genetic diseases, undergraduate midwifery and nursing curricula include education on genetic counseling. The primary aim of this training is to equip students with the knowledge to understand heredity models, identify individuals and groups at risk, and appreciate the importance and utility of genetic diagnostic tests and treatments. Additionally, it aims to enhance their ability to assess prospective parents' educational needs on genetic issues and effectively

communicate this information (Aykan & Fidancı, 2021). Midwives and nurses play critical roles in identifying genetic disease risks, counseling individuals and families, obtaining and evaluating medical histories, providing education, and documenting and reporting findings (Demir et al., 2022).

Studies suggest that the knowledge and skills midwifery and nursing students gain during their undergraduate education significantly contribute to raising awareness about genetic diseases and consanguineous marriages, ultimately reducing their prevalence (Özmen & Çetinkaya, 2012; McLaughlin et al., 2024).

In the modern healthcare context, genetic counseling services are pivotal in the early diagnosis and prevention of genetic diseases. The responsibilities of midwives and nurses in genetic counseling processes underscore the need for effective health services based on genetic knowledge. Evaluating midwifery and nursing students' understanding of genetic diseases, consanguineous marriages, and genetic counseling is essential for developing and improving educational programs in this field. This study aimed to assess the knowledge levels of senior midwifery and nursing students regarding consanguineous marriage, genetics, and genetic counseling.

Study questions

1. Residual analysis was conducted to evaluate the What is the level of knowledge of senior midwifery and nursing students about consanguineous marriage?
2. What is the level of knowledge of senior midwifery and nursing students about genetics and genetic counseling?

Methods

Study design

This research was planned as a descriptive study. It was conducted between May and June 2024 with senior students studying in the Midwifery and Nursing Departments of the Faculty of Health Sciences at Van Yüzüncü Yıl University (YYU).

Population and sample

The study population consisted of senior students enrolled in the midwifery and nursing departments during the spring term of the 2023–2024 academic year. The total number of senior students was determined after obtaining the necessary permissions from the relevant faculty, which included 86 midwifery students and 102 nursing students. The study aimed to reach the entire population. Senior students were specifically included because they were close to graduation, possessed more knowledge and experience on the subject, and were expected to engage directly in healthcare practices related to consanguineous marriage and genetic counseling.

A total of 157 students, representing 83.5% of the population, participated in the study. Participation criteria included being a 4th-year student in either the Midwifery or Nursing Department and providing voluntary consent to participate. Students in the 1st, 2nd, and 3rd years of both departments were excluded from the study.

Data collection tools

The data collection form was prepared in line with the relevant literature and consisted of 57 questions divided into three sections. The first section included 14 questions on sociodemographic characteristics. The second section contained 10 questions measuring knowledge about genetics, genetic diseases, and genetic counseling. The third section comprised 33 items from the Consanguineous Marriage Attitude Scale (CMAS). The CMA scale, validated and tested for reliability by Alp and Şen (2020), contains 30 items and evaluates attitudes across six sub-dimensions: accepting attitude, social values, social pressure, risk perception, health perception, and legitimizing myths. The total score ranges from 30 to 150, with higher scores indicating a more positive attitude toward consanguineous marriage.

The data collection form included specific genetic diseases that are relevant to midwifery and nursing practices and are frequently encountered in Turkey. Expert opinions were sought during the preparation of the forms to ensure their validity and relevance.

Data collection process

Data were collected after obtaining all necessary permissions and consents. The research purpose was explained to the students in a classroom setting. Participants voluntarily completed the data collection forms under the supervision of a lecturer. The process lasted approximately seven minutes per session.

Data analysis

The collected data were analyzed using the statistical package program SPSS 26. Descriptive statistics, including numbers, percentages, means, and standard deviations, were calculated. A significance level of $p < 0.05$ was considered statistically significant for all analyses.

Results

The study revealed that the mean age of the student nurses was 22.97 ± 1.19 years. Among the participants, 55.4% were studying nursing, 40.8% reported a history of consanguineous marriage in their family, and 49.7% had a family history of genetic diseases. It was found that 5.7% of the students' parents were in a first-degree consanguineous marriage, 20.4% were in a second-degree consanguineous marriage, and 15.3% were in a third-degree consanguineous marriage. Furthermore, speech disorders were identified as the most common familial condition, affecting 25.8% of the participants' families (Table 1).

The students reported that 40.8% felt their knowledge of genetics and genetic diseases was sufficient, while 92.4% acknowledged that midwives and nurses play a counselling role in the diagnosis of genetic diseases. It was found that 32.4% of the students received information about genetic diseases from the institutions where they were educated, and 24.0% learned about it through the child health and diseases nursing course during their nursing or midwifery education. Additionally, 64.4% of the students expressed that the information provided in the courses was inadequate for evaluating individuals with genetic problems. Only 19.6% of the students had knowledge of amniocentesis, a diagnostic test. Furthermore, 79.6% of the students were unfamiliar with the term "Preconceptional Counselling" (Table 2).

When the total and sub-dimension mean scores of the Consanguineous Marriage Attitude Scale were analyzed,

the mean total score was found to be 63.40 ± 14.17 . Among the sub-dimensions, the lowest mean score was observed in the health perception dimension (4.76 ± 2.24), while the highest mean score was recorded in the legitimized myths dimension (16.40 ± 14.17) (Table 3).

When comparisons were made according to the total and sub-dimension mean scores of the Consanguineous Marriage Attitude Scale based on the sociodemographic characteristics of the students, it was found that the mean scores for the social values and social pressure sub-dimensions were significantly higher for students with illiterate mothers compared to those with mothers who had a higher education level ($p < 0.05$). Similarly, the mean scores for the risk perception sub-dimension and the total score of the CMAS were significantly higher for students with illiterate fathers compared to those whose fathers had a higher education level (primary school and above) ($p < 0.05$). It was also observed that the mean score for the social values sub-dimension was significantly higher among students whose parents had consanguineous marriages compared to those whose parents did not ($p < 0.05$). Furthermore, the mean score for the social pressure sub-dimension was higher and significant ($p < 0.05$) among students with a family history of genetic disease, compared to those without such a history (Table 4).

Discussion

Midwifery and nursing students' knowledge about consanguineous marriages, genetics, and genetic counselling is critical, as these professionals play an important role in providing health education and preventive services. This study is essential for understanding the level of knowledge of midwives and nurses on these topics, ultimately ensuring public health and effective genetic counselling practices. The mean score of the CMAS obtained in the study was 63.40 ± 14.17 , indicating that attitudes towards consanguineous marriage are not favorable, considering the scale's total score range.

It was found that almost half of the students (40.8%) had consanguineous marriages in their families, and 49.7% had a family history of genetic diseases. Ebid et al. (2021) found that about one-quarter (25.8%) of nursing students had consanguineous marriages, with the rate of family genetic diseases caused by consanguineous marriages at approximately one-tenth (11.2%) (Ebid et al., 2021). Similarly, Turaçlar et al. (2014) reported that around one-fifth (21.3%) of parents had consanguineous marriages, while Demir et al. (2022), in a study with senior midwifery students from ten faculties, found that more than one-tenth (14.3%) of students' parents had consanguineous marriages. These findings highlight the prevalence of consanguineous marriages and genetic diseases in different studies and emphasize the spread of genetic diseases within families. The high rate of consanguineous marriages in this study is thought to be influenced by sampling and regional differences.

The education level is an important factor affecting consanguineous marriage. In the social values and social pressure sub-dimensions of the CMA scale, students with illiterate mothers had significantly higher scores. Likewise, illiterate fathers had higher total scores on the CMA scale, with the difference being significant. It is reported that social and cultural factors, such as family decisions, arranged marriages, and traditional obligations, play a significant role in consanguineous marriages (Şen &

Hilmiye, 2015). Şenel et al. (2009) observed that students in the Central Anatolia Region supported consanguineous marriages at a higher rate (8.4%) than those in other regions. Additionally, the rate of consanguineous marriages decreased with higher paternal education, but maternal education did not significantly affect this rate, suggesting that women's influence on such decisions is limited in patriarchal social structures (Şenel et al., 2009). Although similar results were found in this study, both maternal and paternal education levels significantly affected consanguineous marriage decisions. Abdu et al. (2023) concluded that habits and traditions were the most common reasons for consanguineous marriage, and those who supported it tended to be older and had lower educational levels (Abdu et al., 2023). Thus, as education levels rise, consanguineous marriages and the likelihood of genetic problems resulting from them tend to decrease.

The prevalence of genetic diseases, often a cause of disability, is about 10% in the general population, but it is higher in populations with consanguineous marriages (Sevinç & Çelik, 2016). This is supported by the finding in our study that students with a family history of consanguinity also had a history of genetic diseases. The lack of complete or correct information about genetic diseases increases the need for genetic counselling. In the study, while most students recognized the counselling role of midwives and nurses (92.4%), the majority were unaware of preconceptional counselling (79.6%). In their study, Özkan and Taş Arslan (2019) stated that senior midwifery (37.7%) and nursing (51.5%) students should take part in genetic counseling. Turaçlar et al. (2014) found that over half (56.5%) of nursing and midwifery students had insufficient knowledge about genetics, but the majority (94.3%) believed midwives and nurses should play a counselling role. In that study, most students (97.1%) stated that they received genetic information during their undergraduate education, mainly from the child health and diseases course (64.4%) (Turaçlar et al., 2014). Similarly, Arslantürk and Pınar (2020) concluded that nurses lack sufficient genetic counselling awareness and skills (Arslantürk & Pınar, 2020). In another study, half of the midwifery students believed they had adequate genetic knowledge (Demir et al., 2022). These findings align with the results of the current study, where most students were aware of their role in genetic counselling but lacked sufficient knowledge. It can be explained by the lack of genetic knowledge in the training curriculum of midwives and nurses and the inadequacy of genetic centers and genetic services (Gharaibeh et al., 2010). More than half (64.4%) of students stated that the genetic education they received was inadequate for evaluating individuals with genetic problems. This highlights the need for further studies to improve students' knowledge and skills in genetics, as well as specialized midwives and nurses with sufficient expertise in genetics and genetic testing.

In this study, students reported knowledge of various genetic diagnostic techniques, including amniocentesis (19.6%), ultrasound (18.9%), triple screening tests (16.2%), umbilical blood sample (15.1%), and chromosome analysis (14.3%). Demir et al. (2022) found that almost half (45.1%) of midwifery students received information about genetics from pregnancy and women's health courses, and they were familiar with tests such as triple screening (99.1%), ultrasound (98.6%), amniocentesis (97.7%), and other diagnostic methods (Demir et al., 2022). The differences in

findings could be due to variations in course content and student interests in midwifery and nursing programs.

Table 1.
Sociodemographic characteristics of students (n=157).

	N	%
Your department		
Midwifery	70	44.6
Nursing	87	55.4
Status of parents' consanguineous marriages		
Yes	64	40.8
No	93	59.2
Genetic disease history in family and close relatives		
Yes	78	49.7
No	79	50.3
Degree of consanguinity of parents		
First Degree	9	5.7
Second Degree	32	20.4
Third Degree	24	15.3
Genetic disease history in family and close relatives		
Yes	78	49.7
No	79	50.3
Genetic diseases in the family ²		
Mental Retardation	10	6.4
Phenyl ketone urine	12	7.6
Cerebral Palsy	18	11.5
Kidney Diseases	15	9.6
Hearing Impairment	11	7.0
Speech Impairment	40	25.5
Visual Impairment	20	12.7
Congenital neurological diseases	10	6.4
Other ³	21	13.3

Note: ¹Number of respondents who answered yes to consanguineous marriage history, ²Number of 'yes' to a family history of genetic diseases, ³Cardiac anomalies, blood diseases (thalassemia), anatomical disorders, orthopedic disability, multiple malformations, epilepsy.

Table 2.
Students' knowledge and opinions about genetic counseling.

	n	%
Do you think your knowledge about genetics and genetic diseases is sufficient?		
Yes	64	40.8
No	93	59.2
Do you think that midwives/nurses have a counseling role in the diagnosis of genetic diseases?		
Yes	145	92.4
No	12	7.6
Where did you learn about genetic diseases?		
From the institutions I studied at	134	32.4
From health professionals (physicians, nurses, midwives, etc.)	81	19.6
People in my circle	42	10.1
Mass media (TV; radio; newspapers etc.)	67	16.2
Internet (Computer. Telephone, etc.)	90	21.7
From which course(s) you received information about genetics during your nursing/midwifery education		
Genetics course	107	22.5%
Childbirth and women's health course	105	22.1%
Child health and diseases	114	24.0%
Pathology	54	11.4%
Internal diseases	95	20.0%
Do you think that the information you received in the courses is sufficient to evaluate individuals with genetic problems?		
Yes	56	35.6

No	101	64.4
Please mark the diagnostic tests you have information about*		
Ultrasound	119	18.9%
Amniocentesis	123	19.6%
Umbilical blood sample	95	15.1%
Cordocentesis	64	10.2%
Triple screening tests	102	16.2%
Chorionic villus sampling	36	5.7%
Chromosome analysis	90	14.3%
Are you familiar with the term Preconceptional Counseling		
Yes	32	20.4
No	125	79.6

Note: *More than one option is selected.

Table 3.

Total and subscale mean scores of the Consanguineous Marriage Attitude Scale.

	Received Min-Max Values M±SD	Possibly Min-Max. Values	Min-Max
Accepting attitude	12.33±5.40	7-30	7-35
Social values	11.76±4.48	7-26	7-35
Social pressure	11.76±2.67	4-19	4-20
Risk perception	6.64±3.40	3-15	3-15
Health perception	4.76±2.24	3-13	3-15
Legitimizing myths	16.14±3.25	6-26	6-30
Total score	63.40±14.17	36-117	30-150

Table 4.

Comparison of total and subscale Scores of the CMAS according to sociodemographic characteristics of students (n=157).

Identifying features			Total and subscale mean scores of the consanguineous marriage attitude scale						
Features	n	%	Accepting Attitude X±SD	Social Values X±SD	Social Pressure X±SD	Risk Perception X±SD	Health Perception X±SD	Legitimizing Myths X±SD	CMAS Score X±SD
Your department									
Midwifery	70	44.6	12.48±5.53	11.04±4.02	11.48±2.64	6.62±3.84	4.55±2.26	15.98±3.10	62.18±12.29
Nursing	87	55.4	12.20±5.32	12.34±4.76	11.98±2.68	6.65±3.03	4.93±2.22	16.26±3.39	64.39±15.52
t			0.320	-1.822	-1.174	-0.048	-1.039	-0.531	-0.969
p			0.749	0.070	0.242	0.962	0.301	0.596	0.334
Mother's education level									
Illiterate ^a	60	38.2	13.01±5.17	13.63±4.63	12.56±2.22	6.65±3.03	4.53±1.88	16.70±2.90	67.00±13.25
Primary school ^b	51	32.5	12.25±5.38	10.33±3.50	11.41±2.84	6.47±3.40	4.94±2.33	16.05±3.45	61.47±12.58
Middle school ^c	21	13.4	10.95±5.02	10.95±4.79	10.80±2.46	7.42±4.59	4.47±2.15	16.00±2.58	60.61±14.86
High school and above ^d	25	15.9	13.56±5.45	10.45±5.47	11.42±2.45	6.45±2.45	5.23±3.01	15.55±3.21	62.45±14.45
F			0.550	3.772	2.600	1.653	0.695	1.129	0.310
p			0.738	0.003	0.027	0.154	0.628	0.347	0.262
				b, c, d<a	b, c, d<a				
Father's education level									
Illiterate ^a	13	8.3	15.84±6.14	15.30±4.34	12.30±2.42	9.84±3.43	5.53±3.35	17.07±3.59	75.92±14.61
Primary school ^b	50	31.8	12.42±4.99	11.52±4.45	11.76±2.58	6.58±3.20	4.82±2.30	16.76±2.67	63.86±12.55
Middle school ^c	43	27.4	11.32±4.77	11.34±3.72	11.62±2.76	6.20±3.32	4.25±1.78	15.93±2.48	60.69±11.45
High school and above ^d	51	32.5	11.45±5.46	11.25±3.45	11.43±2.73	6.83±3.65	4.90±2.03	15.20±3.64	61.46±15.58
Kw			1.717	2.075	0.418	3.256	0.994	1.220	2.638
p			0.134	0.72	0.836	0.007	0.424	0.302	0.026
						b, c<a			b, c<a
Parents' consanguineous marriages									
Yes	64	40.8	13.18±5.50	12.60±4.73	12.04±2.76	6.50±2.90	4.98±2.26	16.60±3.08	65.93±14.15
No	93	59.2	11.70±5.29	11.09±4.16	11.54±2.59	6.72±3.74	4.58±2.22	15.78±3.35	61.44±13.90
t			1.690	2.150	1.158	-0.428	1.090	1.565	1.970
p			0.093	0.037	0.248	0.669	0.279	0.120	0.065
Family and close relatives with a history of genetic diseases									
Yes	78	49.7	12.93±5.56	12.21±4.51	12.25±2.68	6.19±2.74	4.91±2.26	16.43±2.92	64.94±13.87
No	79	50.3	11.73±5.20	11.31±4.43	11.27±2.57	7.08±3.91	4.62±2.22	15.84±3.55	61.88±14.38
t			1.398	1.262	0.764	-1.660	0.809	1.315	1.357
p			0.164	0.209	0.021	0.100	0.420	0.259	0.177

Note: t: Independent sample t test; F; One Way ANOVA; Kw; Kruskal Wallis test.

Limitations

The study has several limitations. It was conducted in only one university, which may limit the generalizability of the findings. Additionally, the cross-sectional design of the study restricts the ability to draw conclusions about causality.

Conclusion

This study aimed to assess the knowledge and attitudes of senior midwifery and nursing students regarding consanguineous marriage, genetic diseases, and genetic counseling. According to the findings, students have a satisfactory attitude towards consanguineous marriage. Additionally, their practical knowledge about genetic counseling practices was insufficient. These results highlight the importance of enhancing genetic counseling education for health professionals.

It is recommended that nursing and midwifery students receive more comprehensive training in genetic counseling to strengthen their ability to contribute to the early diagnosis and prevention of genetic diseases. Strengthening education in genetic counseling is crucial for safeguarding public health and ensuring that health professionals are well-equipped to support families affected by genetic conditions.

Ethics approval statement

Ethical approval for the study was obtained from the Van YYÜ Non-Interventional Ethics Committee (Decision No: 2024/0408, dated 19.04.2024). Institutional permission was secured from the Faculty Dean, and informed consent was obtained from all students who participated in the study.

Patient consent statement

N/a.

Consent for publication

N/a.

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CRedit authorship contribution statement

F. Aşkan: Concept, Design, Supervision, Consultancy, Data collection and/or data processing, Analysis and interpretation, Literature search, Writing of the article, References, Critical review. **D. Çelik:** Supervision, Data collection and/or data processing, Literature search, Writing of the article, References.

Data availability statement

N/a.

Declaration of competing interest

There are no conflicts of interest between the authors.

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References

- Abdu, Y., Ahmed, K., Ibrahim, M. I. M., Abdou, M., Ali, A., Alsiddig, H., Selim, N. A., & Yassin, M. A. (2023). Perception of consanguineous marriage among the Qatari population. *Frontiers in Public Health*, 11, 1228010. <https://doi.org/10.3389/fpubh.2023.1228010>
- Alp, İ., & Şen, S. (2020). Endogamy marriage attitude scale: A methodological study. *International Anatolia Academic Online Journal Health Sciences*, 6(2), 168–191.
- Arslanturk Y, Pinar G. (2020). Determining awareness and competency of nurses regarding genetic counseling roles. *Journal of Health and Life Science*, 2(2), 49–56. <https://doi.org/10.33308/2687248X.202022203>
- Aydemir, H., & Karasu Ayata, M. (2022). The knowledge levels of the faculty of health sciences students on genetic diseases, prenatal tests and genetics. *Journal of Health Sciences*, 6(3), 174–183.
- Aykan, E. B., & Fidancı, B. E. (2021). Genetics/genomic in pediatric nursing. *Turkish Journal of Family Medicine and Primary Care*, 15(4), 895–905. <https://doi.org/10.21763/tjfmpe.900034>
- Demir, R., Çoban, A., Taşpınar, A. (2022). Information and opinions of midwifery students on genetic diseases and genetic counseling. *Journal of Health sciences of Adıyaman University*, 8(1), 67–76. <https://doi.org/10.30569.adiyamansaglik.998896>.
- Ebid, N. S., Soliman, S. M., Shabana, K. R. A., & Metwaly, N. S. (2021). Effect of premarital counseling regarding consanguineous marriage on nursing student's perception and satisfaction. *Evidence Based Nursing Research*, 3(3), 28–34. <https://doi.org/10.47104/ebnrojs3.v3i3.207>.
- Gharaibeh, H., Oweis, A., & Hamad, K. H. (2010). Nurses' and midwives' knowledge and perceptions of their role in genetic teaching. *International Nursing Review*, 57(4), 435–442. <https://doi.org/10.1111/j.1466-7657.2010.00814.x>.
- Karaca Saydam, B. (2020). Genetik Danışmanlık ve Hastalıklar. (Ed.) Etki Genç, R. Özkan H. Ebeler İçin Yenidoğan Sağlığı ve Hastalıkları (2th ed.). Elazığ: Anadolu Nobel Tıp Kitabevleri, 275-303.
- McLaughlin, L., Mahon, SM., Khemthong, U. (2024). A systematic review of genomic education for nurses and nursing students: Are they sufficient in the era of precision health? *Nursing Outlook*, 72(5), 102266. <https://doi.org/10.1016/j.outlook.2024.102266>.
- Özkan, S., & Arslan, F. T. (2019). Nursing and midwifery students' opinions about their roles in genetic counseling. *Acıbadem University Health Sciences Journal*, (2), 225–230. <https://doi.org/10.31067/0.2019.145>.
- Özmen, D., & Çetinkaya, A. (2012). The problems experienced by families with disabled children. *Journal of Ege University Faculty of Nursing Faculty*, 28(3), 35–49.
- Şen, Ş. R., & Hilmiye, Aksu. (2015). The incidence of consanguineous marriages and affecting factors in women aged 15-49 years in Aydın, Turkey. *Florence Nightingale Journal of Nursing*, 23(2), 126–135.

- Şenel, E., Şahin, C., Süslü, İ., & Güntürkün, H. (2010). A study on the levels of knowledge and approaches of the high school students related to consanguineous marriage. *TÜBAV Bilim Dergisi*, 2(3), 317-326.
- Sevinç, S., & Yavaş Çelik, M. (2016). Consanguineous marriages, perceived social competence and children's health. *Mersin Üniversitesi Sağlık Bilimleri Dergisi*, 9(3), 122-130.
- TÜİK, İstatistiklerle Aile, (2023). Retrieved from <https://data.tuik.gov.tr/Bulten/Index?p=İstatistiklerle-Aile-2023-53784>. Accessed January 7, 2025.
- Turaçlar, N., Altuntuş, K., & Ege, E. (2014). Information of genetic diseases and genetic counseling of midwifery and nursing students. *STED*, 23(2), 50-59.
- Yılmaz, A., Dayıoğlu, H., & Bulut, E. (2019). The frequency and outcomes of consanguineous marriage in the province of Kütahya. *Journal of Science and Technology of Dumlupınar University*, 43, 53-73.