ORİJİNAL ARAŞTIRMA ORIGINAL RESEARCH

DOI: 10.5336/nurses.2022-91726

Factors Affecting Epistemological Beliefs of Undergraduate Nursing Students: Descriptive Cross-Sectional Study

Hemşirelik Lisans Öğrencilerinin Epistemolojik İnançlarını Etkileyen Faktörler: Tanımlayıcı Kesitsel Çalışma

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ABSTRACT Objective: This research aims to determine the epistemological beliefs of nursing undergraduate students and examine the affecting factors. **Material and Methods:** This study uses a descriptive cross-sectional design. The study sample consisted of 621 students receiving education in the 2018-2019 academic year. The "personal information form", consisting of 10 questions developed by the researchers based on the literature, and the "Epistemological Beliefs Questionnaire" were used to collect the research data. The data were analyzed through the "SPSS 20.0" using descriptive statistics of the characteristics and epistemological beliefs of the participants. Chi-square Automatic Interaction Detection analysis was used to determine the affecting factors. **Results:** In the epistemological belief sub-dimensions, the belief that learning depends on effort was 63.47±16.17, the belief that it depends on ability was 22.00±8.49, and the belief in the existence of a single truth was 28.28±8.01. It has been determined that students' epistemological beliefs are affected by gender, where they live, and academic success ($p<0.05$). **Conclusion:** The epistemological beliefs can severely impact nursing students' academic behavior; therefore, the epistemological beliefs of students from different socioeconomic backgrounds should be challenged and improved. The findings from this study can contribute to developing strategies for invisible belief barriers that lead students to fail in increasing the quality of care by using accurate and reliable information.

Keywords: Nursing; nursing students; nursing education; epistemological belief

ÖZET Amaç: Bu araştırma, hemşirelik lisans öğrencilerinin epistemolojik inançlarını belirlemek ve etkileyen faktörleri incelemek amacıyla gerçekleştirilmiştir. **Gereç ve Yöntemler:** Bu çalışmada, tanımlayıcı kesitsel tasarım kullanılmıştır. Araştırmanın örneklemini 2018-2019 eğitim öğretim yılında eğitim gören 621 öğrenci oluşturmuştur. Araştırma verilerinin toplanmasında araştırmacılar tarafından literatüre dayalı olarak geliştirilen 10 sorudan oluşan "Kişisel Bilgi Formu" ve "Epistemolojik İnançlar Anketi" kullanılmıştır. Veriler, katılımcıların özellikleri ve epistemolojik inançları tanımlayıcı istatistikler kullanılarak "SPSS 20.0" istatistik paket programı yardımıyla analiz edilmiştir. Etkileyen faktörlerin belirlenmesinde Otomatik KiKare Etkileşim Belirleme analizi kullanılmıştır. **Bulgular:** Epistemolojik inanç alt boyutlarında öğrenmenin çabaya bağlı olduğuna dair inanç 63,47±16,17, yeteneğe bağlı olduğuna dair inanç 22,00±8,49 ve tek bir doğrunun varlığına olan inanç 28,28±8,01 olarak bulunmuştur. Öğrencilerin epistemolojik inançlarının cinsiyet, yaşadıkları yer ve akademik başarılarından etkilendiği belirlenmiştir ($p<0,05$). **Sonuç:** Epistemolojik inançlar, hemşirelik öğrencilerinin akademik davranışlarını ciddi şekilde etkileyebilir, bu nedenle farklı sosyoekonomik geçmişlerden gelen öğrencilerin epistemolojik inançları sorgulanmalı ve geliştirilmelidir. Bu çalışmadan elde edilen bulgular, doğru ve güvenilir bilgiler kullanılarak öğrencilerin bakımın kalitesini artırmada başarısızlığa yol açan görünmez inanç engellerine yönelik stratejilerin geliştirilmesine katkı sağlayabilir

Anahtar Kelimeler: Hemşirelik; hemşirelik öğrencileri; hemşirelik eğitimi; epistemolojik inanç

Epistemological beliefs are cognitive variables that affect students' learning approaches.[1,2] Epistemological beliefs are also expressed as implicit theories that guide the practices of individuals and enable them to make decisions.[3] Studies reveal that epistemological beliefs affect students' learning processes, absorption of knowledge, usage of learning strategies, motivation to learn and increase their lifelong learning trends.[4]

Schommer developed the most basic model regarding epistemological beliefs.[5] Individuals whose epistemological beliefs are not developed believe that information is unchanged, is in a simple, unrelated structure, is relayed by an authority, the ability to

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Peer review under responsibility of Turkiye Klinikleri Journal of Nursing Sciences.

Received: 01 Jun 2022 ***Received in revised form:*** 02 Sep 2022 ***Accepted:*** 16 Sep 2022 ***Available online:*** 20 Sep 2022

learn is innate and unchangeable, and that a subject can be learned immediately, and if it is not learned, it cannot be learned again. Students, who believe that learning not be accomplished with effort and ability, are more passive in the learning process and exhibit more superficial learning approaches such as memorization.[4]

Nursing is an information-intensive profession that requires the construction, use, and development of knowledge to ensure safe and professional care.[6] Evidence-based nursing practices require using the most accurate and reliable information for the individual/patient through evaluating complex information from a scientific perspective. Using correct and reliable information also improves the quality of care and supports professional nursing practices.[6] Also, learning how to learn, innovation, and being able to reflect these in nursing care are qualities being sought in nursing.[7] Therefore, knowledge of the structure of epistemological beliefs of nursing students is important for the development of nursing education programs.[8,9]

There is a study examining the relationship of epistemological beliefs with the focus on control, self-efficacy, and problem-solving skills in nursing students and evaluating the effect of two different education systems on the development of epistemological beliefs.[9-12] However, no research was conducted regarding what factors affected each dimension of the epistemological beliefs of nursing students. In the research, answers were sought for the following questions; (1) What are the epistemological belief (Effort, Talent, One-Truth) levels of students in the field of nursing education? and (2) What socio-demographic characteristics affect the epistemological beliefs of students?

MATERIAL AND METHODS

AIM

This study was conducted to determine nursing undergraduate students' epistemological beliefs and examine the affecting factors.

STUDY DESIGN AND PARTICIPANTS

This study is a descriptive cross-sectional study. The study population consisted of 962 students enrolled in the nursing department in the academic year of 2017-2018. The entire universe was sampled without using any sampling method in the study.

Permission was obtained from the school administration to conduct the research. The study data were obtained from students who attended the school between November and December 2018 and volunteered to participate in the research. Before the questionnaire application, information was given about the purpose of the research and that participation was voluntary. It is assumed that the students, who filled in the questionnaires and gave them back, gave their permission to participate in the study. 720 of 962 students were included in the total. Questionnaires were distributed to 720 students who were included, and 691 of them handed them back in. Since 70 of the 691 questionnaires had missing data, statistical analysis was applied to 621 questionnaires. Participants; 19.5% (n=121) were first class, 30.3% (n=188) was second class, 24.3% (n=151) was third class, and 25.9% (n=161) is a fourth-year student. The representation rate of the universe for the sample is 64.55%.

DATA COLLECTION TOOLS

Nursing Students Personal Information Form

This form consists of 10 questions developed by researchers based on the literature.[9,10,13] The personal information form consists of questions about age, gender, education grade, branch, family type, place of residence, income level, scholarship status, high school of their graduate, and academic achievement average.

Epistemological Beliefs Questionnaire

The Epistemological Beliefs Questionnaire was developed by Schommer to determine students' epistemological beliefs.[1] The questionnaire was translated into Turkish by Deryakulu and Büyüköztürk, and its reliability and validity studies were also carried out. The Turkish version of the questionnaire consists of 3 dimensions and 34 questions, and the dimensions are: The Belief of Learning Depends on Effort (Effort)", "The Belief of Learning Depends on Ability (Ability)," and The Belief That There is Only One Unchanging Truth (Unchanging Truth)". Seventeen questions, all of which are negative, are found in the

dimension of "The Belief of Learning Depends on Effort (BLDE)" (1st-17th items), and eight questions, all positive, in "BLDE" (18th-25th items) and nine questions, all positive, in "The Belief That There is Only One Unchanging Truth (BOOUT)" (26th-34th items). Questionnaire items are rated by using a five-point Likert as (1) Strongly disagree, (2) Disagree, (3) No idea, (4) Agree (5) Strongly agree.[14] Scores taken from the questionnaire are evaluated on a dimension basis. A high score from each dimension indicates that the individual has immature beliefs about that dimension, and a low score indicates mature beliefs. Test-retest reliability of the original questionnaire is 0.74, and the reliability coefficients of the factors change between 0.85 and 0.63. Deryakulu and Büyüköztürk determined the Cronbach alpha value of the questionnaire as 0.84 for the sub-dimension that learning depends on effort, 0.69 for the sub-dimension of the Belief That Learning Depends on Ability (BLDA), 0.64 for the sub-dimension of the belief that one-truth exists and 0.81 for the entirety of the questionnaire.[14] In this study, questionnaire internal consistency values are determined as follows; 0.95 for the first dimension, 0.90 for the second dimension, 0.84 for the third dimension, and 0.92 for the whole questionnaire.

DATA COLLECTION

The data collection tools were given to the students to complete between November and December 2018. The questionnaires were distributed to the students and collected by the researchers in a classroom. No time limit was applied to that students fill out the data collection forms, and filling out the questionnaire took approximately 6-8 minutes.

STATISTICAL ANALYSIS

The data obtained with the data collection tools were transferred to the computer environment and analyzed with the help of the "SPSS 20.0" (IBM Corp., Armonk, NY, USA) statistical package. The characteristics and epistemological beliefs of the participants were analyzed using descriptive statistics. Chi-square Automatic Interaction Detection (CHAID) analysis was used to determine the factors of influence. Ten questions in the personal information form are also included in the CHAID analysis. CHAID is utilized for the prediction, classification, and recognition of interconnection among variables CHAID decision tree model is an understandable, accessible, and interpretable model, and the decision tree technique has high prediction accuracy and trustable choices.[15,16] In determining the questionnaire reliability analysis, Cronbach's alpha value was calculated, and the 0.05 significance level was taken as a criterion for interpreting the results.

ETHICAL CONSIDERATIONS

The ethical permit of the research was obtained from the Süleyman Demirel University Social and Human Sciences Ethics Committee on the decision of the ethics committee dated July 13, 2018 and numbered 87432956/050.99/190370. The participants were informed that all data would be kept confidential and that only researchers could access the collected information. Prior informed consent was obtained from all the participants, of the study. It is assumed that the students, who filled in the questionnaires and gave them back, gave their permission to participate in the study. The study complies with the provisions of the Helsinki Declaration.

RESULTS

It was determined that 79.5% of the students were female, 30.3% were in the second grade, 83.7% had a nuclear family, 52.5% lived in the city, 86.3% were of middle-income level, and 58.6% did not receive a scholarship (Table 1).

When the averages of the students from the epistemological belief sub-dimensions are examined (Table 2); the following scores were determined to have been taken; 63.47±16.17 from the dimension BLDE, 22.00±8.49 from the dimension BLDA and 28.28±8.01 from the dimension BOOUT.

BLDE dimension, gender (F=6.805, p=0.009) was determined as the most important variable affecting student nurses' beliefs (Figure 1). Male students (M=60.150, SD=16.455) had lower scores than female students (M=64.328, SD=16.007). Also, the variable that affected the BLDE of male students was determined as the place of residence (F=7.888, p=0.040). It was determined that the scores of male

TABLE 1: Distribution of personal characteristics of student nurses (n=621).

		n	%
Gender	Female	494	79.5
	Male	127	20.5
Grade	1st grade	121	19.5
	2nd grade	188	30.3
	3rd grade	151	24.3
	4th grade	161	25.9
Branch	1st education	410	66.0
	2nd education	211	34.0
Family type	Nuclear family	520	83.7
	Extended family	89	14.3
	Fragmented family	12	1.9
Place of residence	Province	326	52.5
	District	215	34.6
	Town	15	2.4
	Village	65	10.5
Income level	Low	44	7.1
	Middle	536	86.3
	High	41	6.6
Receiving a scholarship	Yes	257	41.4
	No	364	58.6
The type of high school graduated from	Regular high school	82	13.2
	Health vocational high school	27	4.3
	Anatolian high school	455	73.3
	Science high school	12	1.9
	Vocational high school	45	7.2

TABLE 2: Epistemological belief sub-dimension scores of nursing students (n=621).

	Mean	SD	Minimum	Maximum
The belief that learning depends on effort	63.47	16.17	17.00	85.00
The belief that learning depends on ability	22.00	8.49	8.00	40.00
The belief that there is only one unchanging truth	28.28	8.01	9.00	45.00

SD: Standard deviation.

students living in a village (M=47.182, SD=18.745) were lower than those living in a province, district, and town (M=61.379, SD=15.764). In other words, the epistemological beliefs of male students living in a village were found to be more developed.

When the factors affecting student nurses' BLDA were seen, the most important variable was gender (F=12.922, p=0.000) (Figure 2). In this dimension, male students' scores (M=24.394, SD=7.888) were higher than female students' (M=21.385, SD=8.543). In other words, it was determined that female students were more developed in BLDA than male students. It was determined that the variable that affects BLDA in men is the academic achievement score. It was found that the scores of male students whose academic grade average is above 2.50 (M=20.781, SD=7.001) were lower than those of 2.50 and below (M=25.611, SD=7.830). In other words, it was found that the BLDA of men with a grade point average (GPA) above 2.5 were more developed than those with a GPA below 2.5.

The most important variable affecting student nurses' **BOOUT** was their *place of residence* (F=11.724, p=0.005). The scores of students residing in

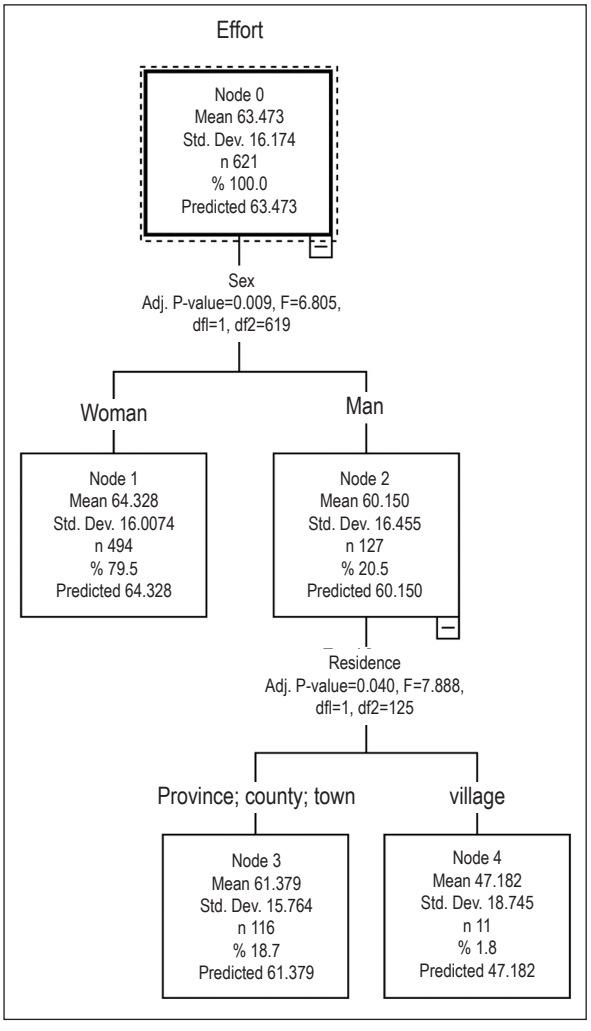

FIGURE 1: The result of Chi-square Automatic Interaction Detection analysis of undergraduate nursing students according to the effort sub-dimension. df: Degrees of freedom.

a village (M=25.092, SD=7.586) were found to be lower than those living in a province, district, and town (M=28.658, SD=7.985) (Figure 3).

DISCUSSION

Today, nursing students are expected to be members of professions who know how to access information and perform evidence-based safe nursing practices for the individual/family/society with the information they obtain. In this context, nursing students' beliefs, gains regarding what to do, why to do it, and how to do it, and their epistemological beliefs about knowledge and learning are important factors, as they affect the students' learning approaches and academic success.[6] This study aims to determine the epistemological beliefs of nursing students and the factors affecting them.

In this study, students' BLDE was found to be at an undeveloped level. Arslan obtained results parallel to our findings in his study in which he examined the epistemological beliefs and mobile learning readiness of 292 Vocational School of Technical Sciences students.[17] In the study conducted by Karadağ et al., it was stated that the BLDE dimension was at an undeveloped level, while Yılmaz and Kaya and Orgun and Karaoz found the BLDE dimension to be at a developed level in their study of 2014.[9-11] Orgun et al. also determined that students studying in an integrated system have a more developed level of BLDE compared to students studying in classical ed-

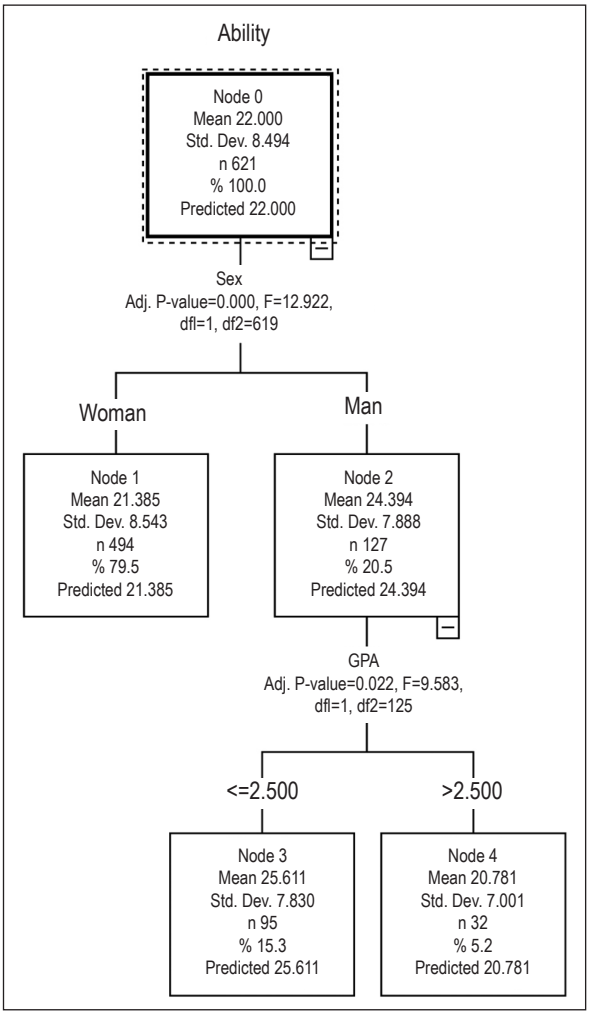

FIGURE 2: The result of Chi-square Automatic Interaction Detection analysis of undergraduate nursing students according to the ability sub-dimension. df: Degrees of freedom; GPA: Grade point average

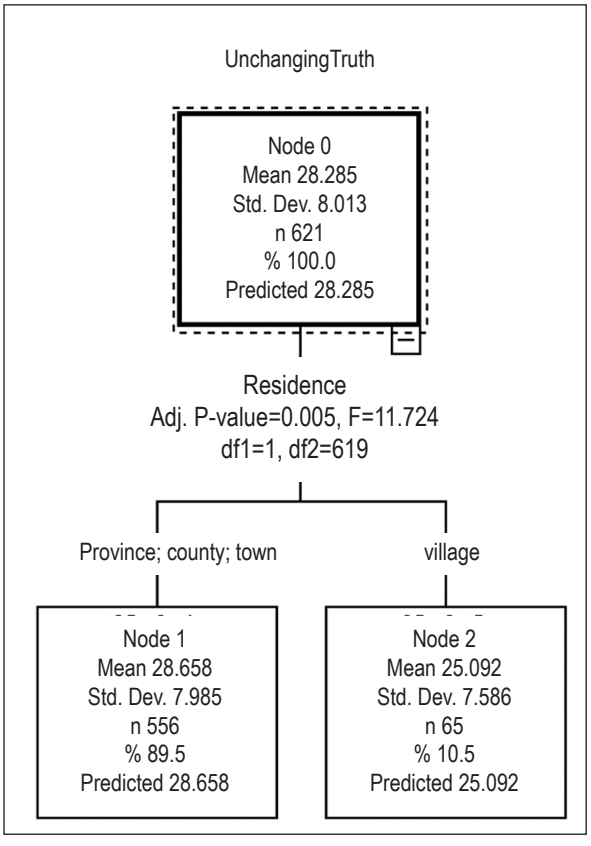

FIGURE 3: The result of Chi-square Automatic Interaction Detection analysis of undergraduate nursing students according to the unchanging truth effort sub-dimension.
df: Degrees of freedom.

ucation.[12] The obtained findings are partially similar to the literature. The determination of the BLDE shows that students have educational needs based on research and inquiry.

It was determined that the most important variable affecting the BLDE is gender and place of residence. It was determined that men had more developed BLDE than female students. Eyres et al. found that epistemological beliefs were affected by factors such as gender and culture in a study with students who had recently started nursing education.[18] In a mixed method study conducted by Çuhadaroğlu with 517 students from two different universities, it was determined that gender was an important factor affecting the epistemological beliefs of university students.[19]

Men living in a village had more BLDE than those living in provinces, districts, and towns. In the meta-analysis study by Kanadlı and Akay, in which they examined 37 studies on epistemological beliefs conducted with university students in Türkiye between 2005 and 2017, they have revealed that women's beliefs that learning depends on the effort are more developed than men.[20] Türkoğlu et al. determined that in 608 nursing students, women's epistemological beliefs towards the Internet were more advanced than men.[21]

In the study conducted by Yılmaz and Kaya, it is stated that there is no statistically significant difference between the place where nursing students spend the longest time of their lives and their epistemological beliefs.[9] In our research, the belief of male students living in a village that learning depends on effort is more developed than that of female students may be connected to the fact that more responsibility is given to men in a village, that they are in fitting environments for observing and questioning in the nature, that villages have more limited opportunities compared to the provinces and districts, and that they need to be more creative in order to sustain their lives.

In this research, it was determined that the most developed epistemological belief of students was the BLDA. The study Tümkaya conducted with 488 university students revealed that students trained in the health field had matured epistemological beliefs in the BLDA dimension compared to other social and science students.[22] In the study with 333 midwifery and nursing students that Karadağ et al. conducted, it was found that the dimension of BLDA was more developed than the dimension of effort and belief in one truth. The study of Yılmaz and Kaya stated that the student nurses' BLDA is moderately developed.[9,11]

The studies with teacher candidates determined that female students had more advanced BLDA than male students.[23,24] Contrary to these findings, in the study of Avcı et al., it was found that men's BLDAs were more developed than female students.[25] In our study, it was determined that female students had more developed BLDA than male students. This result reveals that female students believe that learning ability is not an innate fixed skill as opposed to male students and that this skill can be developed over time depending on education or experience.

Our research determined that the academic achievement score of males is a variable that affects BLDA, and male students with academic GPAs above 2.50 are more developed than those with GPAs of 2.50 and lower. Upon examination of the literature, it has been determined that individuals with developed epistemological beliefs have higher academic achievement, have more effective learning habits, and are more successful in controlling their understanding of new information.[26,27] Calabrese states that there is a difference between nursing students' academic achievement and epistemological beliefs; it was also determined that those with high GPAs had developed/mature epistemological beliefs.[13] In our study, male students with a GPA below 2.5 believe that learning is an innate feature and ignoring the developing effect of educational environments may have affected their learning and, therefore, their behavior for success.

Our study found that students' belief in the existence of a single truth was moderately developed. In the study conducted by Karadağ et al., it was determined that nursing students were moderately developed/mature in BOOUT.[11] Orgun et al., Orgun and Karaoz, and Yılmaz and Kaya indicate in their study that the students' "BOOUT" dimension is undeveloped/immature.[9,10,12] It is determined that the strongest epistemological beliefs among all students in different nursing education programs in the Philadelphia region are BOOUT.[13]

The fact that nursing students have a medium-developed of belief in the existence of a single truth makes us believe that they are of the thought that knowledge is simple, specific, and absolute, that knowledge is obtained from educators, and that learning ability is innate, and they prefer the memorization method in their studies. Labasky reported that students' quality of practice and care could be negatively affected.[28]

Students' BOOUTs may be moderately developed due to the characteristics of basic medical courses such as anatomy, physiology, and biochemistry, along with individual, cultural and environmental features. Assenheimer et al. have stated that strategies to teach lessons such as anatomy, physiology, and biochemistry strengthen the belief in one unchanging truth.[29]

This study determined that the most important variable affecting student nurses' BOOUT is their place of residence. It has been found that students living in a village are at a more developed/mature level in BOOUT than those living in a province and district. Arslan found that university students living in the city had more developed epistemological beliefs. These differences seen between studies can be explained by the complex structure of epistemological beliefs. Individuals may develop different beliefs about the source, precision and structure of knowledge, depending on the culture and environment they are in.[17,30]

When a student sits down on the first day of class, they are bringing a variety of identities that have been developed through multiple experiences, academic domains, and social and cultural spaces.[31] It is stated that the cultural and social environment influences epistemological belief, and the social environment and sociocultural environments cause differences in individuals' knowledge, knowledge, learning processes, and, consequently, their epistemological beliefs.[19]

In this study, the developed/mature BOOUT of which the students live in villages compared to those who live in provinces, districts, or towns means that they think knowledge can change due to its nature. When it is considered that understanding positive sciences and the basic way for the development in this area is the observance of nature, we can imply that village life offers this opportunity to students. The mature beliefs of the nursing students that knowledge can change will positively contribute to their knowledge-seeking behaviors and innovative features.[32,33]

In light of the information obtained from the literature review, the results of the study, where the epistemological beliefs of nursing students were examined, are partially similar. It is seen that the findings obtained from these research results generally overlap with the literature. There may be multiple reasons for this partial overlap. The implementation of different educational programs may be a result of these differences. Although the core curriculum pro-

gram in nursing education is implemented for all nursing schools in Türkiye, it is thought that this may be related to factors such as regional differences in schools, epistemological beliefs of instructors, the status of institutionalization, different model applications in educational programs, and the presence of students with different socio-cultural characteristics. Epistemological beliefs can severely impact nursing students' academic behavior; therefore, the epistemological beliefs of students from different socioeconomic backgrounds should be challenged and improved.

LIMITATIONS

The data obtained in this study is limited only by the responses of students studying at a nursing school that provides undergraduate education. It cannot be generalized to other nursing schools. The lack of sufficient studies on this subject has limited the discussion of the findings.

CONCLUSION

The research determined that the students' belief that learning depends on talent is the most developed belief dimension and that gender, academic achievement, and place of residence make up epistemological belief factors. Epistemology is the philosophy of knowledge. Epistemological beliefs are described as beliefs regarding knowing and knowledge. Giving more weight to the knowledge philosophy in the curriculum of nursing students will improve their perspective on knowledge and increase their ability to question knowledge. Also, it is proposed that academic counseling should be provided by identifying their epistemological beliefs and characteristics before starting an undergraduate education program.

In future research, comparing the epistemological beliefs of the academic staff with the students, examination of the characteristics of students such as their learning styles and learned helplessness, using qualitative and quantitative research methods together, and making different intercultural comparisons can contribute to a better understanding of the situation.

Acknowledgements

The authors would like to thank all students who participated in the study.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Tangül Aytur Özen, Filiz Kantek;* ***Design:*** *Tangül Aytur Özen, Filiz Kantek;* ***Control/Supervision:*** *Tangül Aytur Özen, Filiz Kantek, Hande Yeşilbaş;* ***Data Collection and/or Processing:*** *Tangül Aytur Özen, Hande Yeşilbaş;* ***Analysis and/or Interpretation:*** *Tangül Aytur Özen, Filiz Kantek, Hande Yeşilbaş;* ***Literature Review:*** *Tangül Aytur Özen;* ***Writing the Article:*** *Tangül Aytur Özen, Filiz Kantek;* ***Critical Review:*** *Tangül Aytur Özen, Filiz Kantek, Hande Yeşilbaş.*

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