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EDITORIAL

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Welcome to the latest issue of Essentials of Frontline Medicine Journal. As we present this year's last issue, we continue our mission to support evidence-based practice and to advance scholarly dialogue in general medicine and primary healthcare.

This issue brings together a diverse range of high-quality contributions that reflect the evolving challenges and innovations shaping frontline medical practice today. The articles explore critical themes including preventive care, patient-centered approaches, health equity, and the integration of research into everyday clinical decision-making. Together, they offer meaningful insights that aim to strengthen healthcare delivery and improve patient outcomes across diverse settings.

We extend our sincere appreciation to our authors, reviewers, and editorial team whose dedication and expertise have been essential in maintaining the scientific rigor and integrity of this publication. Their collective efforts ensure that the journal remains a trusted platform for sharing knowledge and fostering collaboration within the medical community.

As we continue to grow, we remain committed to promoting excellence, accessibility, and innovation in medical publishing. We invite our readers to engage with this issue, share its insights, and contribute to future editions of Essentials of Frontline Medicine Journal (ISSN: 3062-1704) as we work together to advance the future of frontline healthcare.

Sincerely,

Editor-in-Chiefs

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Sociodemographic and Clinical Profile of Children with Poor School Readiness

Büşra KAYA[1*], Esen YILDIRIM DEMİRDÖĞEN[1], Mehmet Akif AKINCI[1], Abdullah BOZKURT[1] **Original Article**

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ABSTRACT

Objective: School readiness refers to the physical, emotional, social, and cognitive competencies that enable children to succeed in primary education. While chronological age is the primary criterion, it alone is insufficient, as developmental pace, psychiatric conditions, and socio-environmental factors also play a critical role. Our aim was to identify the sociodemographic and clinical characteristics of these cases, to raise awareness in this area, and to contribute to the development of preschool intervention strategies for children who do not attain sufficient school readiness.

Methods: This study retrospectively evaluated children who presented to the Child and Adolescent Psychiatry outpatient clinic of Atatürk University Research Hospital between 2019 and 2024 for school readiness assessment and were found to have insufficient readiness. Sociodemographic characteristics, psychiatric and medical diagnoses, developmental histories, and results of The Denver II Developmental Screening Test (DDST-II) and The Metropolitan School Readiness Test were obtained from clinical records. Data were analyzed using SPSS 25.0, with descriptive statistics reported as frequencies, percentages, means, and standard deviations.

Results: Sixty children were included (21.7% female, mean age 74.9 months). The most common psychiatric diagnoses were intellectual disability (28.3%), speech and language disorder (15%), and Attention Deficit Hyperactivity Disorder (6.7%), while 23.3% had multiple diagnoses. 33.3% of the cases scored below 65 points on The Metropolitan School Readiness Test and thus did not achieve school readiness; 13.4% scored 65 points or above and were found to be at an average or a high normal level. In addition, 16.7% could not respond to the test, and 36.7% were not administered the test. The DDST-II revealed that 88.2% of tested children had developmental delays compared to peers.

Conclusion: Children's school readiness is shaped by multiple factors and requires a multidimensional approach. Early diagnosis and intervention, expanded preschool education, enriched home learning, and increased parental awareness are essential to support readiness.

Keywords: School readiness, child and adolescent psychiatry, the metropolitan school readiness test, the denver II developmental screening test

INTRODUCTION

School readiness refers to a child's attainment of age-appropriate physical and emotional well-being, along with the development of adequate social, communicative, and cognitive skills necessary for success at school (1). School readiness is considered synonymous with being prepared for school. Although age is the primary criterion when evaluating a child's readiness for school, reaching a certain chronological age alone is not always sufficient for school readiness. Children of the same age may differ in their developmental pace, cognitive levels, and socio-economic and cultural opportunities, which in turn affect their ability to meet the expectations of primary school. The factors influencing children's school readiness can be grouped into two categories: individual and familial/environmental. Individual factors include physical, cognitive, and emotional development, while familial/environmental factors encompass the child's sociocultural environment and preschool education (2). Among individual factors, psychiatric disorders are frequently observed. These diagnoses may include Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), Intellectual Disability

(ID), communication disorders, and other neurodevelopmental disorders (1,3). When evaluating a child's school readiness, a comprehensive assessment that incorporates both individual and environmental factors should be conducted. Any deficiency in these factors will hinder the child's attainment of school readiness.

In our country, children's school readiness is not routinely assessed before starting primary school. At the time of enrollment, the child's age in months is taken into account. Article 11 of the Regulation on Preschool Education and Primary Education Institutions of the Ministry of National Education specifies the age and conditions for entry into primary school. This article was amended, and the changes were published in the Official Gazette dated 10/07/2019 and numbered 30827. According to this article:

a) Children who have completed 69 months of age by the end of September of the enrollment year are registered in the first grade of primary school. In addition, children who are 66, 67, or 68 months old may also be enrolled in the first grade of primary school upon the written request of their parents.

b) School administrations, upon a written request from parents, may direct children who are 69, 70, or 71 months old and eligible for enrollment to preschool education or defer their enrollment for one year. Primary school enrollment procedures are carried out in accordance with these provisions. With the amendment made to subparagraph (b) of the relevant article on July 10, 2019, the requirement for a medical report was abolished (4). The amendments made to Article 11 of the relevant regulation are summarized in table 1, which can be accessed in the supplementary materials.

Article 34, Paragraph 5 of the Regulation on Special Education Services stipulates that, among children with special educational needs, those who are 66, 67, or 68 months old as of the end of September in the year of enrollment may, upon the written request of their parents, continue preschool education for one more year. In addition, students who have completed 68 months but have not yet reached 79 months of age by the end of September, and who document with a "Single Physician Medical Report" that they are not ready to start primary school, shall be allowed to continue preschool education for one more year, in line with the decision of the Special Education Evaluation Board (5).

Research has demonstrated a strong association between children's readiness for school and their subsequent academic and social success. There is a growing body of evidence indicating that children who make a positive start to school adapt better and achieve greater success both academically and socially, demonstrating greater willingness to engage in learning, exhibiting better relationships with peers and teachers, and showing more favorable mental and physical health outcomes in adulthood (6,7). Conversely, children who start primary school without having achieved adequate school readiness tend to experience a range of academic and social difficulties, including lower academic performance, increased risk of school dropout, and higher levels of antisocial behaviors (7). Therefore, the decision regarding school entry is a critical one that may have significant consequences for the individual's future (8). Despite the importance of school readiness for an individual's life, awareness on this issue has not been adequately developed in our country. The knowledge and awareness levels of families, teachers, and educational institutions should be enhanced.

Therefore, there is a need for research investigating the underlying reasons why some children fail to achieve adequate school readiness. In this study, we retrospectively examined cases who, despite having reached the legal age for primary school enrollment according to the relevant regulation, were deemed (based on clinical evaluation and psychometric testing) to require an additional year of preschool education, for which a "Single Physician Medical Report" was issued. In this study our aim was to identify the sociodemographic and clinical characteristics of these cases, to raise awareness in this area, and to contribute to the development of preschool intervention strategies for children who do not attain sufficient school readiness.

METHODS

Cases who presented to the Child and Adolescent Psychiatry outpatient clinic of Atatürk University Research Hospital between 2019 and 2024 for school readiness assessment and were determined to have not achieved adequate readiness were evaluated. Sociodemographic data, psychiatric and medical diagnoses, developmental histories, as well as results of The Denver II Developmental Screening Test (DDST-II) and The Metropolitan School Readiness Test were obtained retrospectively from outpatient clinic files.

The Metropolitan School Readiness Test is a developmental test used to assess whether children are prepared to start primary school. It consists of six sub-dimensions (word comprehension, sentence comprehension, general knowledge, matching, numbers

and copying) comprising a total of 100 items. Scores are classified as follows: 90–100 = superior, 80–89 = high normal, 65–79 = average, 40–64 = low normal, and 0–39 = poor risk.

The Metropolitan School Readiness Test developed by Hildreth, Griffiths, and McGauvran in 1965 (9). The test was later adapted into Turkish by educator Ayla Oktay in 1980 (10).

DDST first published in 1967, was revised by Frankenburg et al. in 1990 to form the DDST-II. The DDST-II evaluates developmental domains across four categories: personal-social, fine motor-adaptive, language, and gross motor. The test consists of 137 items and is administered by a trained examiner (11).

For data analysis, the SPSS for Windows version 25.0 software package was used. Descriptive statistics were presented as frequencies and percentages for categorical variables, and as means and standard deviations for continuous variables.

RESULTS

In this section, missing data were excluded and valid percentages were reported where applicable; for clarity, percentages based on the total sample (n= 60) are also provided in parentheses.

A total of 64 cases were included in the study; however, 4 cases were excluded due to incomplete data, and all analyses were conducted on 60 children. Of the children, 21.7% (n=13) were female and 78.3% (n=47) were male. The mean age of the children was 74.9 ± 3.9 months. Preschool education had been received by 51.7% (n=31) of the children. Regarding birth history, 37.9% (n=22) were preterm, 60.3% (n=35) were full-term, 1.7% (n=1) were post-term (Data were missing for 2 children (3.3%). Among the 60 children, 36.7% (n = 22) were born preterm, 58.3% (n = 35) at term, and 1.7% (n = 1) post-term). Cesarean delivery was reported in 60.7% (n=34) of the children (Delivery mode information was unavailable for 4 children (6.7%). Of the 60 cases, 36.7% (n = 22) were delivered via spontaneous vaginal birth and 56.7% (n = 34) via cesarean section). The majority of the children (96.4%, n=54) did not experience any problems at birth (Birth complication records were missing for 4 cases (n = 6.7). In 90% of the 60 cases (n = 54), no complications were reported, whereas 3.3% (n = 56) experienced a birth-related problem).

Among the cases with postnatal complications, 3.6% (n=2) had jaundice, 1.8% (n=1) had cyanosis, 12.5% (n=7) required incubator care, 1.8% (n=1) had low birth weight, 1.8% (n=1) had respiratory failure, and 21.4% (n=12) experienced more than one problem (Information regarding the presence or absence of postnatal complications was not available in the medical records of 4 cases (6.7%). Among the cases, 3.3% (n = 2) had jaundice, 1.7% (n = 1) had cyanosis, 11.7% (n = 7) required incubator care, 1.7% (n = 1) had low birth weight, 1.7% (n = 1) had respiratory failure, and 20.0% (n = 12) experienced more than one problem).

The mean age of mothers was 35.6 ± 6.0 years, while the mean age of fathers was 39.8 ± 5.8 years. The average years of education were 8.5 ± 4.1 years for mothers and 10.7 ± 3.8 years for fathers.

No psychiatric diagnosis was present in 20% (n=12) of the children. Among the children, 6.7% (n=4) had ADHD, 28.3% (n=17) had ID, 3.3% (n=2) had ASD, 15% (n=9) had Speech and Language Disorder, 1.7% (n=1) had Selective Mutism (SM), 1.7% (n=1) had Separation Anxiety Disorder, and 23.3% (n=14) had more than one psychiatric diagnosis (Table 2).

Table 2. Psychiatric Diagnosis Rates of the Cases

Psychiatric Diagnosis	**n**	**%**
None	12	20
ADHD	4	6.7
ID	17	28.3
ASD	2	3.3
Speech and Language Disorder	9	15
SM	1	1.7
Separation Anxiety Disorder	1	1.7
Multiple Diagnoses	14	23.3
Total	60	100

Abbreviations: ADHD, Attention Deficit Hyperactivity Disorder; ID, Intellectual Disability; ASD, Autism Spectrum Disorder; SM, Selective Mutism.

Among the children, 32.8% (n=19) had a medical diagnosis. The medical conditions of the children included Neurofibromatosis type 1, homozygous MTHFR A1298C mutation and history of cerebrovascular event, West syndrome, epilepsy, acute lymphoblastic leukemia, cerebral palsy, Down syndrome, hearing loss, visual impairment, Joubert syndrome, hydronephrosis, and facial paralysis.

The Metropolitan School Readiness Test was administered to 63.3% (n = 38) of the children. The test could not be administered to 22 children due to cognitive impairments. In addition, 16.7% (n = 10) of the children were unable to sustain their attention during

the assessment and therefore did not respond to it. Of the assessed children, 6.7% (n = 4) were at a high-normal level, 6.7% (n = 4) at an average level, 15% (n = 9) at a low-normal level, and 18.3% (n = 11) at a poor risk level of readiness. The Metropolitan School Readiness Test scores for the cases in our study are summarized in Table 3.

Table 3. Results of The Metropolitan School Readiness Test

Metropolitan School Readiness Test Results	n	%
High-Normal	4	6.7
Average	4	6.7
Low-Normal	9	15
Poor risk	11	18.3
No Response to Test	10	16.7
Test Not Administered	22	36.7
Total	60	100

DDST-II was administered to 56.7% (n=34) of the children. Among them, 11.8% (n=4) were found to have development at the level of their peers, while 88.2% (n=30) were determined to have development below the level of their peers.

DISCUSSION

In this study, the sociodemographic characteristics and psychiatric diagnoses of children who were determined, through clinical interviews and psychometric evaluations, not to have attained school readiness were examined. First, when looking at the gender distribution, it was found that the majority of the cases who had not attained school readiness were boys (78.3% male, 21.7% female). While some studies in the literature suggest that male gender is associated with lower levels of school readiness (7), other evidence indicates that gender does not exert a significant influence on school readiness (2). The predominance of males in our study, however, may be related to the fact that the sample was clinically based and that neurodevelopmental disorders occur more frequently in boys.

When the educational level of parents was evaluated, the mean duration of maternal education was found to be 8.5 ± 4.1 years, while that of paternal education was 10.7 ± 3.8 years. Previous studies emphasize that especially low maternal educational level may negatively affect children's school readiness (12). In our study, the relatively low educational level of mothers indicates that it could be considered as one of the factors influencing school readiness.

From the perspective of preschool education, it was determined in our study that 54.4% of the children had received preschool education. In the literature, there is strong evidence that preschool education makes positive contributions to children's school readiness and language skills (13–15). However, the presence of children in our sample who, despite having received preschool education, had not attained an adequate level of school readiness indicates that this relationship may not be one-way and definitive. This suggests that preschool education is an important factor in supporting children's school readiness, but its impact should be evaluated in interaction with individual, environmental, and developmental factors.

In our study, at least one psychiatric diagnosis was identified in 80% of the cases, with the most common diagnosis being ID at 28.3%. In a previous study evaluating school readiness, 13% of children were found to have an Axis I psychiatric disorder or cognitive delay, with the most common diagnosis again being ID at 4.5% (16). The fact that ID was the most frequent diagnosis in our study is consistent with this finding. ID is one of the most significant disorders directly affecting school readiness. Limitations in cognitive capacity cause notable difficulties not only in language, attention, memory, and problem-solving skills but also in self-care, social communication, and independence. Therefore, ID adversely affects not only academic performance but also the socioemotional demands of school, thereby reducing children's level of readiness for school (1,17). Our study included only children who were determined not to have achieved school readiness, whereas the aforementioned study evaluated all applicants, including those who were ready for school. Therefore, the higher rate of ID observed in our sample is an expected finding.

In our study, 6.7% of the cases were diagnosed with ADHD. In a study examining the relationship between school readiness and mental health problems, it was reported that children who started primary school one year earlier had more frequent attention problems and significantly higher Strengths and Difficulties Questionnaire (SDQ) hyperactivity/inattention scores (18). These findings indicate that attention problems play a decisive role in school readiness. The results obtained in our study are also consistent with the literature in demonstrating that ADHD constitutes a risk factor for school readiness. ADHD is one of the most common neurodevelopmental disorders in childhood, and due to difficulties in sustaining attention, problems with impulse control, and challenges in behavioral regulation, it directly affects academic adjustment. These problems, which begin in the preschool

period, become more apparent in the structured learning environment of primary school, leading to difficulties in complying with classroom rules, completing tasks, and establishing teacher–peer relationships. Therefore, ADHD disrupts school readiness not only by affecting academic performance but also by impairing children's social functioning and self-regulation skills (19,20).

In our study, 3.3% of the cases were diagnosed with ASD. In the literature, it has been reported that children with ASD experience difficulties in adapting to school due to limitations in social communication, challenges in self-regulation, and behavioral rigidity; and that this situation negatively affects their participation in classroom activities, teacher–student relationships, and peer interactions. The findings obtained in our study are consistent with the literature in demonstrating that ASD is a factor negatively affecting school readiness. ASD directly influences not only the cognitive domain but also social-emotional development. In particular, deficiencies in self-regulation skills limit children's participation in classroom activities and interactions with peers, thereby reducing their level of school readiness. Research has shown that early diagnosis and intervention programs for children with ASD have positive effects on cognitive and social-emotional development. These interventions also contribute significantly to school adjustment (1). Overall, it is observed that neurodevelopmental disorders such as ID, ADHD and ASD negatively affect school readiness in cognitive, behavioral, and socio-emotional dimensions. Therefore, recognizing these children at an early stage, before school entry, and directing them to appropriate intervention programs is critically important for supporting their school adjustment and academic achievement. We anticipate that enhancing the knowledge and awareness of family physicians, who monitor children from birth onward, will position them as key stakeholders in this process.

Randomized controlled trials (RCTs) have demonstrated that parenting programs implemented during the preschool and early primary school years are effective in promoting children's school readiness (21). Schools also play a key role in establishing strong partnerships with families at the point of school entry and in supporting each child's readiness for school. Furthermore, early interventions provided to children at risk for inadequate school readiness are considered to be more effective when they are sustained into the early years of schooling (7). We anticipate that the findings of our study will increase the awareness of teachers and school health professionals regarding school readiness, which may facilitate the early identification and referral of children who have already started primary school but experience academic or social difficulties and may not have fully achieved school readiness, thereby enabling timely access to appropriate intervention programs (21).

In the Metropolitan School Readiness Test, a score of 65 or above is accepted as the threshold indicating that the child has achieved school readiness. In our study, 33.3% of the cases scored below 65 points on The Metropolitan School Readiness Test and thus did not achieve school readiness, 13.4% scored 65 points or above and were found to be at an average or a high-normal level, and 16.7% could not respond to the test, 36.7% were not administered the test. The Metropolitan School Readiness Test evaluates not only cognitive capacity but also a wide range of skills required for primary school readiness, such as attention, number concepts, language development, conceptual knowledge, visual perception, memory, and hand–eye coordination. In this respect, the test is a valid and reliable instrument that, in addition to clinical evaluation, allows for the objective measurement of school readiness (10,22). However, even those children whose The Metropolitan School Readiness Test scores were within the normal range were deemed unready for school in clinical evaluation. This finding indicates that school readiness cannot be assessed using a single measurement tool, and that employing both developmental assessments and school readiness tests together provides more reliable results. Moreover, the fact that 16.7% of the cases could not respond to the test underscores the need for alternative assessment instruments.

Indeed, DDST-II was administered to 56.7% (n=34) of the children; of these, only 11.8% (n=4) were found to have age-appropriate development, while 88.2% (n=30) showed developmental delay compared to their peers. This result demonstrates that developmental deficiencies are a determining factor in school readiness. Similarly, the literature has reported that being older in age, having received preschool education, and being monolingual are significant predictors of achieving a The Metropolitan School Readiness Test Total Maturity Score of 65 or above (2).

Therefore, both individual developmental characteristics and environmental factors play a crucial role in school readiness. In conclusion, assessments of school readiness should not rely on a single instrument; rather, they should be approached through a multidimensional framework encompassing cognitive, developmental, socio-emotional, and environmental domains.

Limitations of the Study

This study has several limitations. First, the sample consisted only of children who were referred to the clinic and were identified as not having achieved school readiness; therefore, the findings cannot be generalized to the broader population. Second, due to the cross-sectional design, the ability of the findings to establish causal relationships is limited. Third, the sample size may have been insufficient for more detailed analyses in evaluating the relationship between sociodemographic variables and school readiness. Finally, the absence of parental and teacher perspectives restricted the development of a more comprehensive understanding of the children's functional levels.

CONCLUSION

Our research indicates that multiple factors influence children's school readiness. Therefore, school readiness should be addressed in a multidimensional manner. To ensure adequate school readiness, early diagnosis and intervention of existing psychiatric and medical conditions, expansion of preschool education programs, enhancement of home learning opportunities, and parental training and awareness are of great importance.

DECLARATIONS

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Data Availability Statement: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

REFERENCES

1.Nair MKC, Radhakrishnan R, Olusanya BO. Promoting school readiness in children with developmental disabilities in LMICs. Front Public Health. 2023;11:993642.

2. Küçük Ö. Okula başlama aşamasındaki çocuklarda okul olgunluğu ve dil gelişimi ile ilişkili bireysel ve ailesel etkenlerin araştırılması [master's thesis; Internet]. İzmir (TR): Dokuz Eylül Üniversitesi, Tıp Fakültesi, Çocuk ve Ergen Ruh Sağlığı ve Hastalıkları AD;2016. [cited 2025 Sep 14]. Available from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=7nN5DmABrlFqqNt9BtYmWg&no =t87uPOrxPDSdkh0I-pILmA

3. Marsh A, Spagnol V, Grove R, Eapen V. Transition to school for children with autism spectrum disorder: A systematic review. World J Psychiatry. 2017;7(3):184-196.

4. T.C. Millî Eğitim Bakanlığı. Okul Öncesi Eğitim ve İlköğretim Kurumları Yönetmeliği. Resmî Gazete. 2014 Jul 26;(29072). Madde 11. [Internet]. Ankara: T.C. Millî Eğitim Bakanlığı; 2014 [cited 2025 Aug 19]. Available from: https://kadisehri.meb.gov.tr/meb_iys_dosyalar/2022_11/07101659_Okul_Oncesi_ve_YlkoYretim_YonetmeliYi.pdf

5. T.C. Millî Eğitim Bakanlığı. Özel Eğitim Hizmetleri Yönetmeliği: Birinci Kısım – Genel Hükümler. Resmî Gazete. 2018 Jul 7;(30473). [Internet]. Ankara: T.C. Millî Eğitim Bakanlığı; 2018 [cited 2025 Aug 19]. Available from: https://www.resmigazete.gov.tr/eskiler/2018/07/20180707-8.htm

6. Dockett S, Perry B. Readiness for school: A relational construct. Australas J Early Child. 2009;34(1):20-26.

7. Garon-Carrier G, Mavungu-Blouin C, Letarte MJ, Gobeil-Bourdeau J, Fitzpatrick C. School readiness among vulnerable children: a systematic review of studies using a person-centered approach. Psicol Reflex Crit. 2024;37:16.

8. Duncan GJ, Dowsett CJ, Claessens A, Magnuson K, Huston AC, Klebanov P, et al. School readiness and later achievement. Dev Psychol. 2007;43(6):1428-1446.

9. Hildreth GH, Griffiths NL, McGauvran ME. Metropolitan readiness tests: Manual of directions. New York: Harcourt, Brace & World; 1965.

10. Oktay A. Metropolitan readiness testinin İstanbul'da farklı sosyo-ekonomik ve kültürel çevrelerdeki (5-6) yaş çocuklarına uygulanması [in Turkish]. Pedagoji Dergisi. 1980;1:119-138.

11. Anlar B, Bayoğlu BU, Yalaz K. Denver II Gelişimsel Tarama Testi – Türk Çocuklarına Uyarlanması ve Standardizasyonu [in Turkish]. Ankara: Gelişimsel Çocuk Nörolojisi Derneği; 2009.

12. Geoffroy MC, Côté SM, Giguère CE, Dionne G, Zelazo PD, Tremblay RE, et al. Closing the gap in academic readiness and achievement: the role of early childcare. J Child Psychol Psychiatry. 2010;51(12):1359-1367.

13. Taylor KK, Gibbs AS, Slate JR. Preschool attendance and kindergarten readiness. Early Child Educ J. 2000;27(3):191-195.

14. Marjanovic Umek L, Fekonja U. The effect of preschool on children's school readiness. Early Child Dev Care. 2008;178(6):569-588.

15.Koşan Y. Okul öncesi eğitimin iki dilli çocukların okula hazır bulunuşluklarına etkisinin incelenmesi [master's thesis; Internet]. Ankara (TR): Hacettepe University, Faculty of Education, Department of Preschool Education; 2015. [Erişim tarihi: 14 Eylül 2025]. Available from: https://tez.yok.gov.tr/UlusalTezMerkezi/

16.Yulaf Y, Yulaf Y, Gümüştaş F, Ayaz M. Okula başlamaya hazır oluşluk değerlendirmesi için bir devlet hastanesi çocuk psikiyatrisi kliniğine başvuran

çocuk ve ebeveynlerin özellikleri [in Turkish]. Turk J Child Adolesc Ment Health. 2015;22(2):95-102

17. Griffen B, Lorah E, Caldwell NS, Holyfield C. Effects of augmentative and alternative communication intervention on school readiness skills in young children with intellectual and developmental disabilities. Folia Phoniatr Logop. 2025;77(4):362-374.

18. Uğur Ç, Sertçelik M, Gül H, Duman NS, Kına S, Erdoğan G, et al. İlköğretime başlama yaşı ile ruh sağlığı sorunlarının ilişkisinin araştırılması [in Turkish]. Turk J Child Adolesc Ment Health. 2016;23(2):91-100.

19. Perrin HT, Heller NA, Loe IM. School readiness in preschoolers with symptoms of attention-deficit/hyperactivity disorder. Pediatrics. 2019;144(2):e20190038.

20. Hare MM, Garcia AM, Hart KC, Graziano PA. Intervention response among preschoolers with ADHD: the role of emotion understanding. J Sch Psychol. 2021;84:19-31.

21. Bierman KL, Stormshak EA, Mannweiler MD, Hails KA. Preschool programs that help families promote child social-emotional school readiness: promising new strategies. Clin Child Fam Psychol Rev. 2023;26(4):865-79.

22. Kayılı G, Arı R. Examination of the effects of the Montessori method on preschool children's readiness to primary education. Educ Sci Theory Pract. 2011;11(4):2104-2109.

The Relationship Between Desire to Smoke and Smoking Cessation Fatigue in Patients Applying to the Smoking Cessation Outpatient Clinic

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Original Article

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ABSTRACT

Objective: Smoking is one of the most important causes of preventable morbidity and mortality all over the world. This study aimed to examine the relationship between smoking cessation fatigue and desire to smoke in patients admitted to the smoking cessation outpatient clinic, to evaluate the scales that can guide treatment in this process, and to determine the sociodemographic characteristics and smoking habits of the patients.

Methods: A total of 605 patients, 302 males and 303 females, who applied to Istanbul Medeniyet University Goztepe Training and Research Hospital, Family Medicine Department, Smoking Cessation Polyclinic between May and November 2019, were included in the study. Sociodemographic data, smoking, Fagerstrom Nicotine Dependence Test (FNDT), Hospital Anxiety Depression Scale (HADS), Desire to Smoke and Smoking Cessation Fatigue Scales were recorded from the patients' files.

Results: The mean age of the patients was 39.1 ± 11.8 years, the mean age of starting smoking was 17.9 ± 4.7 years, and the daily cigarette consumption was 24.5 ± 10.3 cigarettes (median = 20). 33.1% of the participants had a chronic disease. The mean Beck Anxiety Inventory score was 7.59 ± 4.11, the mean Beck Depression Inventory score was 6.32 ± 3.79, the FNDT mean score was 6.44 ± 2.42, the Desire to Smoke mean score was 39.2 ± 15.6, and among the Smoking Cessation Fatigue sub-dimensions, emotional exhaustion mean score was 16.8 ± 6.2, pessimism was 8.3 ± 3.2, and devaluation was 18.1 ± 3.8.

Conclusion: The high level of nicotine dependence complicates the smoking cessation process. Regular use of scales and tests used in smoking cessation treatments can increase patient compliance and cessation success by guiding the treatment process.

Keywords: Smoking cessation, nicotine dependence, anxiety, depression, desire to smoke, smoking cessation fatigue.

INTRODUCTION

Smoking remains one of the leading preventable causes of morbidity and mortality worldwide (1,2). According to the World Health Organization, tobacco use results in millions of deaths each year and continues to pose a major public health burden, particularly in developing countries (1,2). In Türkiye, smoking prevalence remains high, and tobacco-related diseases lead to substantial healthcare expenditures and productivity losses (4,5). Despite advances in tobacco control policies, long-term smoking cessation success rates remain limited (6).

Smoking cessation is a complex process that cannot be explained solely by nicotine dependence; psychological and behavioral factors also play a critical role (7). Anxiety, depression, and stress-related coping behaviors have been shown to negatively affect smoking cessation outcomes, whereas even brief physician counseling can significantly improve quit rates (8,9). Despite pharmacological and

behavioral interventions, many individuals experience repeated unsuccessful quit attempts, which may eventually lead to motivational decline and emotional exhaustion (10).

"Smoking cessation fatigue" is a concept describing the emotional and motivational burden that arises from repeated quit attempts and prolonged cognitive engagement with quitting (11). This condition may manifest as pessimism, emotional exhaustion, or devaluation of cessation efforts and has been associated with an increased risk of smoking relapse (11,12). Importantly, smoking cessation fatigue is not limited to individuals who have already quit smoking; it may also be observed among active smokers at baseline, particularly those with a history of multiple quit attempts (12).

Another key component of the smoking cessation process is the desire to smoke, which reflects the intensity of nicotine craving and motivational conflict. The Questionnaire on Smoking Urges (QSU) has been widely used to assess smoking desire and has been shown to predict cessation failure and relapse risk (13). However, studies simultaneously examining the relationship between smoking cessation fatigue and the desire to smoke are limited, especially in clinical populations applying to smoking cessation outpatient clinics.

Understanding the interaction between smoking cessation fatigue and the desire to smoke may contribute to the development of individualized cessation strategies. Therefore, the present study aimed to examine the relationship between smoking cessation fatigue and the desire to smoke in patients applying to a smoking cessation outpatient clinic. In addition, we evaluated the associations of these constructs with sociodemographic characteristics, nicotine dependence, anxiety, and depression to better understand the psychological dynamics influencing the smoking cessation process.

METHODS

The Study Design

Our study has a cross-sectional design and was conducted in Istanbul Medeniyet University Goztepe Training and Research Hospital, Family Medicine Clinic, Smoking Cessation Polyclinic between May 1, 2019 and November 1, 2019. Patients who applied for smoking cessation were informed, and the questionnaire on smoking urges and the smoking cessation fatigue scale were applied. In addition, the information in the patients' file records was also included in the study. A total of 302 male and 303 female patients participated in the study.

Inclusion criteria

Being a patient over the age of 18 who applied to the Smoking Cessation Polyclinic and gave verbal or written consent. Exclusion criteria: using active psychiatric medication, major depressive disorder, bipolar disorder, having one of the diagnoses of psychotic disorder according to DSM-V, and having recently experienced a traumatic process.

Collected Data

By examining the file data, sociodemographic characteristics of the patients (age, gender, marital status, education level, occupation), smoking behaviors and attitudes (age of starting smoking, number of cigarettes smoked per day, previous quitting experiences, presence of other smokers at home, factors triggering smoking, etc.), reasons for quitting smoking, comorbidities, nicotine addiction levels, and anxiety and depression status were evaluated. In addition, data were recorded by applying the questionnaire on smoking urges and smoking cessation fatigue scales. The materials used are: Smoking Cessation Polyclinic Patient Form, Anxiety and Depression Status Scale, Fagerstrom Nicotine Dependence Test, Questionnaire on Smoking Urges, and Smoking Cessation Fatigue Scale.

Fagerström Test for Nicotine Dependence

Nicotine dependence levels were assessed using the Fagerström Test for Nicotine Dependence (FTND), a widely used six-item questionnaire developed to evaluate the intensity of physical nicotine addiction. Total scores range from 0 to 10, with higher scores indicating greater nicotine dependence. The Turkish validity and reliability of the test have been established by Uysal et al. (2004).

Hospital Anxiety and Depression Scale (HADS)

Anxiety and depression levels were assessed using the Hospital Anxiety and Depression Scale (HADS), a 14-item self-report instrument developed by Zigmond and Snaith in 1983. The Turkish version of the scale was validated by Aydemir et al. (1997) and includes established cut-off values for both subscales.

Questionaire on Smoking Urges and Smoking Cessation Fatigue Scale

Smoking desire and resistance to smoking cessation were assessed using the Questionnaire on Smoking Urges (QSU) and the Smoking Cessation Fatigue Scale (SCFS). The QSU, developed by Toll et al. in 2006, is a validated instrument measuring the intensity of smoking urges, with higher scores indicating stronger desire to

smoke. The Turkish validity and reliability of the QSU were established by Demirezen and Kurcer (2016).

Smoking cessation fatigue was evaluated using the Smoking Cessation Fatigue Scale (SCFS), developed by Mathew et al. in 2017. The Turkish adaptation of the scale was validated by Ozturk et al. in 2018. The SCFS consists of three subdimensions: emotional exhaustion, pessimism, and devaluation, reflecting emotional and motivational aspects of repeated smoking cessation attempts.

Ethical Approval

This study was approved by the Clinical Research Ethics Committee of Istanbul Medeniyet University Goztepe Training and Research Hospital (Decision No: 2019/176, Date: 17.04.2019). Informed consent was obtained from all patients who agreed to participate in the study. The study was conducted in accordance with the principles of the revised Declaration of Helsinki.

Statistical Analysis

In the evaluation of the data obtained in the study, the SPSS (Statistical Package for the Social Sciences) package program version 23.0 and the GraphPad Instat demo version were used for statistical analysis. The conformity of the data to the normal distribution was estimated with the Kolmogorov-Smirnov test. Data of continuous variables were expressed as mean, standard deviation, median, and range values; data of categorical variables were expressed as frequency and percentage. The Mann-Whitney U test was applied in two-group comparisons, and Kruskal-Wallis test (then Dunn's test for pairwise comparisons) was applied in analyses comparing more than two groups. The relationships between the variables were evaluated with the Spearman correlation test. The statistical significance level was accepted as $p<0.05$.

RESULTS

A total of 605 individuals between the ages of 18–75, with a median age of 39.1 years, were included in the study. 50.1% (n=303) of the participants were female and 49.9% (n=302) were male. 64.6% (n=391) of the patients were married, and the most common education level was higher education with 36.2% (n=219). 66% (n=399) of the participants were actively working. In addition, at least one chronic disease was found in 33.1% (n=200) of patients; these diseases were distributed as lung (11.1%), endocrine (10.9%), cardiovascular system (9.3%), and other (9.3%) diseases, in descending order. Some participants reported more than one chronic disease.

91.6% (n=554) of the patients voluntarily applied to the smoking cessation outpatient clinic. The most common reason for starting smoking was reported to be peer influence (43%, n=260). 20.3% (n=123) of the participants stated that they had received professional support before, and the most commonly used pharmacological treatment was varenicline with a rate of 9.9% (n=60). In addition, it was determined that 46.4% (n=281) of the patients had a smoker at home and 59.7% (n=361) at work; the balcony or the area in front of the window was found to be the most frequently preferred smoking area at home (81%, n=490).

According to the smoking status of the parents, 36.4% (n=220) of the patients did not have a smoker in the family; among the remaining participants, only the father of 38.2% (n=231) smoked, only the mother of 6% (n=36) smoked, and both the mother and the father of 19.5% (n=118) were found to smoke.

The mean age of the patients to start smoking was 17.9 ± 4.7 (median = 17) years, and their daily cigarette consumption was 24.5 ± 10.3 cigarettes (median = 20). The mean duration of smoking was 20.7 ± 11.7 (median = 19) years. The mean number of smoking cessation attempts of the participants was 2.0 ± 2.5 (median = 1), and the longest duration of abstinence achieved was 173.3 ± 567.7 (median = 14) days.

The mean scores of anxiety, depression, nicotine dependence, desire to smoke, and smoking cessation fatigue of the patients are shown in Table 1. The mean and median values of all corresponding scales and subdimensions are presented in Table 1.

The Beck Anxiety Inventory score was significantly higher in women than in men ($p<0.001$). The Beck Depression Scale score was higher in married individuals than in single patients ($p=0.039$). Those who started smoking due to stress had higher anxiety scores than those who started smoking due to peer influence or curiosity ($p=0.029$ and $p=0.022$). In addition, anxiety scores were significantly higher in patients who did not receive professional support than in those who received support ($p=0.023$)

Table 1: Scale, Test, and Questionnaire Scores

Scale / Test / Questionnaire	Mean	SD	Median	Min	Max
Beck Anxiety Scale	7.59	4.11	7	0	20
Beck Depression Scale	6.32	3.79	6	0	19
Fagerström Test for Nicotine Dependence	6.44	2.42	7	0	10
Questionnaire on Smoking Urges	39.20	15.61	40	10	70
Smoking Cessation Fatigue – Emotional Exhaustion	16.85	6.22	17	6	30
Smoking Cessation Fatigue – Pessimism	8.29	3.18	8	3	20
Smoking Cessation Fatigue – Devaluation	18.11	3.82	20	3	20

The Beck Anxiety Scale score was higher in those with chronic diseases compared to those without (p=0.044). Both anxiety and depression scores were significantly higher in patients with lung disease (p=0.006 and p<0.001).

The Fagerström Test for Nicotine Dependence score was significantly higher in individuals who smoked in the living room at home compared to those who smoked on the balcony or near the window (p = 0.015) (Table 2).

Table 2: Fagerström Test for Nicotine Dependence Scores According to Smoking Location in the Home

Groups	Mean	SD	Median	p
Balcony-Window	6.31	2.44	7	**0.015**
Living Room	7.00	2.18	7	
Both	7.10	2.49	8	

The Questionnaire on Smoking Urges score was significantly higher in women than in men (p<0.001). This score was higher in individuals who did not have a smoker in the workplace than those who did (p=0.046) (Table 3)

Table 3: The Questionnaire on Smoking Urges Scores According to the Characteristics of the Patients

Variable	Groups	Mean	SD	Median	p
Gender	Female	41.59	15.74	41	**<0.001**
	Male	36.81	15.13	38	
Smoker in the Workplace	No	40.82	15.93	41	**0.046**
	Yes	38.11	15.31	39	

The SCFS-Emotional Exhaustion score was found to be significantly higher in women than in men (p<0.001). In contrast, the SCFS-Pessimism score was significantly higher in men than in women (p=0.001).

The Smoking Cessation Fatigue Scale-Pessimism score and Smoking Cessation Fatigue Scale- Devaluation score were found to be statistically significantly higher in individuals who tried to quit smoking compared to those who did not (p = 0.025 and p = 0.018, respectively).

The SCFS-Emotional Exhaustion score was found to be higher in those who did not have a smoker in the workplace (p=0.020). In contrast, the SCFS-Devaluation score was significantly higher in those with smoking colleagues in the workplace (p=0.005) (Table 4)

DISCUSSION

Smoking is an important public health problem, and both active and passive smoking contribute to serious morbidity and mortality. According to the World Health Organization, smoking-related deaths are expected to increase in the coming years, particularly in developing countries (4). In the present study, a significant association was identified between the desire to smoke and smoking cessation fatigue, indicating that the desire to smoke increased as the level of cessation fatigue increased. This finding emphasizes that psychological processes, in addition to physical nicotine dependence, should be taken into account in smoking cessation interventions.

Table 4: Smoking Cessation Fatigue Scale Scores According to the Characteristics of the Patients

Variable	Groups	Emotional Exhaustion Mean±SD (Median)	p	Pessimism Mean±SD (Median)	p	Devaluation Mean±SD (Median)	p
Gender	Male	17.76±6.10 (18)	**<0.001**	7.85±2.96 (8)	**0.001**	18.03±3.91 (20)	0.684
	Female	15.95±6.22 (16)		8.74±3.32 (9)		18.20±3.74 (20)	
Trying to Quit Smoking	No	16.52±6.01 (16)	0.436	7.87±3.27 (8)	**0.025**	17.63±4.20 (20)	**0.018**
	Yes	16.97±6.30 (17)		8.45±3.13 (9)		18.29±3.86 (20)	
Smoker in the Workplace	No	17.57±5.82 (17.5)	**0.020**	8.06±3.02 (8)	0.113	17.74±4.14 (20)	**0.005**
	Yes	16.37±6.44 (16)		8.45±3.27 (9)		18.36±3.58 (20)	

In our study, the mean age of the patients was 39.1 ± 11.8 years. In the study by Yasar et al. (2016), this value was reported as 42.6 ± 13.5 years (19). This difference may be related to the cumulative adverse effects of long-term smoking exposure. In our sample, 64.6% of the participants were married, and 46.4% had at least one smoker at home. Argüder et al. (2013) reported that marital status did not have a direct effect on smoking cessation success; however, smoking within the household may increase the risk of relapse among married individuals. Regarding education level, higher education was the most common category (36.2%). Sahbaz et al. (2007) reported that a higher education level positively affected smoking cessation success (20). In our study, the most common reason for smoking initiation was peer influence (43%), which is consistent with the findings reported by Mayda et al. (2010) (21) and Sahin et al. (2012).

In the study conducted by O. Kılıc et al., it was reported that the mothers of 65.1% of the smoking students smoked, and the fathers of 44.3% of the smoking students smoked (22). In our study, the father was identified as the smoker in 38.2% of the participants, the mother in 6%, and both parents in 19.5%. These findings suggest that smoking behaviors within the family may contribute to increased exposure to passive smoking and may be associated with a greater tendency to initiate smoking.

In our study, 64.6% of the patients were married, and 46.4% had at least one smoker at home. Argüder et al. (2013) reported that marital status had no direct effect on smoking cessation treatment. However, shared smoking behaviors within the household, particularly among spouses, may be associated with an increased risk of relapse after smoking cessation.

In our study, Beck Anxiety scores were significantly higher in women than in men. Similarly, Isıktas et al. (2019) reported higher anxiety levels among female students (23). These findings indicate that anxiety symptoms may be more prevalent in women, and smoking may be used as a coping strategy rather than a causal relaxation mechanism. Esen et al. (2018) also reported higher anxiety scores in working individuals (24), which is consistent with our findings. In addition, peer influence as the reason for smoking initiation was found to be associated with anxiety scores. In the study by Fidan et al. (2003–2004), peer influence was reported as the most common reason for smoking initiation, and individuals with higher anxiety levels were found to require more professional support (25).

Lok et al. (2017) found that depression scores were higher in single individuals than in married individuals (26); similarly, in our study, depression scores were higher among single patients. This finding is consistent with previous literature reporting a higher prevalence of depression in individuals who are single, widowed, or living apart (27). In addition, Kutlu et al. (2012–2013) reported significantly higher depression scores in individuals with lung disease (28), which is also in line with our results.

Hezer and Karalezli (2018) found no significant difference between women and men in terms of the Questionnaire on Smoking Urges scores. In contrast, Demirezen and Kurçer (2005) (29) reported higher smoking urge scores in women, which is consistent with our

findings. Liu et al. (USA, n=1307) (30) demonstrated that smoking cessation fatigue was higher in women. Similarly, in our study, women had higher scores on the SCFS–Emotional Exhaustion subdimension.

In the study by Heckman et al. (n=301), smoking cessation fatigue scores were shown to increase over time and were associated with an increased risk of smoking relapse (31). These findings suggest that the Smoking Cessation Fatigue Scale (SCFS) may be a useful tool in smoking cessation and underscore the importance of regular patient follow-up.

Limitations of the Study

This study has several limitations. The cross-sectional design limits causal inference, and the use of self-administered, retrospective self-report data may have increased the risk of reporting bias. Additionally, the lack of structured psychiatric interviews and the single-center design may limit the generalizability of the findings.

CONCLUSION

Smoking is a major public health problem that causes significant physical and psychological harm due to its addictive and toxic components. Patients applying to smoking cessation outpatient clinics should be carefully evaluated and supported through psychotherapy and regular follow-up. Family physicians play a key role in preventive medicine by addressing tobacco control, assessing active and passive smoking, and providing appropriate counseling. Expanding smoking cessation clinics and training specialized healthcare professionals are also essential.

Further comprehensive, multicenter, and prospective studies conducted in smoking cessation outpatient clinics are needed to identify factors influencing treatment outcomes. The scales used in this study may contribute to treatment planning by improving the predictability of smoking cessation processes.

DECLARATIONS

Ethical Consideration: This study was approved by the Clinical Research Ethics Committee of Istanbul Medeniyet University Göztepe Training and Research Hospital (Decision No: 2019/176, Date: 17.04.2019). Written informed consent was obtained from all participants prior to participation in the study.

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Conflicts of Interest Statement: The authors declare no conflicts of interest related to this study.

Data Availability Statement: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

1. Shibuya K, et al. Who Framework Convention on Tobacco Control: development of an evidence-based global public health treaty. *BMJ*. 2003; 327 (7407):154-157.

2. Bilir N. Where in the world is Turkey in terms of tobacco control? *Turkish Journal of Thorax *. 2009; 10(1).

3. Ozturk O, Yalcin B, Unal M. The quality of life difference between smoker and non-smoker rheumatoid arthritis and ankylosing spondylitis patients. *J Addiction Res Ther*. 2014; 5:1-6.

4. World Health Organization. *WHO report on the global tobacco epidemic 2019: Offer help to quit tobacco use.* Geneva: WHO; 2019.

5. Turkish Statistical Institute (TurkStat) *Turkiye Health Survey 2016.* Ankara: TurkStat; 2016.

6. National Tobacco Control Program. *T.R. Ministry of Health Publication.* Ankara: Ministry of Health; 2008.

7. Turkish Thoracic Society. *Lung Cancer Diagnosis and Treatment Guide.*Journal of Thorax. 2006; 7.

8. Edis EC, Karlikaya C. The cost of lung cancer in Turkiye. * Journal of Tubercular Thorax *. 2007; 55 (1):51-58.

9. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med*. 2006; 3(11):e442.

10. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5).* 5th ed. Ankara: Physicians Publication Association. 2013.

11. T.R. Ministry of Health. *Global Adult Tobacco Research Turkiye 2012.* Ankara: Ministry of Health Publications; 2014.

12. Anderson JE, et al. Treating tobacco use and dependence: an evidence-based clinical practice guideline for tobacco cessation. *Chest*. 2002; 121 (3): 932-941.

13. Uzaslan E. The role of the physician in smoking cessation and the approach to the patient who applies to the smoking cessation outpatient clinic. *Turkiye Clinics Arch Lung*. 2003; 4 (4):225-234.

14. Prochaska JO, Redding CA, Evers KE. The transtheoretical model and stages of change. *Health Behavior: Theory, Research, and Practice.* 2015:125-148.

15. Ozge C. *Smoking Cessation Diagnosis and Treatment Consensus Report.* Turkish Thoracic Society Publication. 2014; 76.

16. Covey LS, et al. Advances in non nicotine pharmacotherapy for smoking cessation. *Drugs*. 2000; 59(1):17-31.

17. Dogan YH. The role of antidepressants in smoking cessation. *Turkish Journal of Family Practice *. 2007; 9(1):32-36.

18. Gonzales D, et al. Varenicline, an α4β2 nicotinic acetylcholine receptor partial agonist, vs sustained-release bupropion and placebo for smoking cessation: a randomized controlled trial. *JAMA*. 2006; 296 (1):47-55.

19. Yasar Z, et al. One-year smoking cessation outpatient clinic results: factors affecting smoking cessation. *Eurasian J Pulmonol*. 2014;16:99–104.

20. Sahbaz S, et al. The effects of smoking and demographic characteristics on the outcomes of smoking cessation treatments. *Journal of Thorax.* 2007; 8(2):110-114.

21. Gercek CG, et al. The frequency of smoking, alcohol and substance use in Duzce University, Faculty of Forestry students and the reasons for starting to use them. *Duzce Medical Faculty Journal*. 2010; 12(3):7-14.

22. Kilic O, et al. Determination of the factors affecting students' smoking: The case of Ondokuz Mayis University. *Turkish Journal of Agricultural Research *. 2018; 5(3):274-279.

23. Isiktas S, et al. Comparison of smokers and non-smokers in terms of their attitudes towards coping with stress. * Turkish Cypriot Journal of Psychiatry and Psychology *. 2019; 1 (2):102-107.

24. Esen AD, Arica S. Evaluation of nicotine dependence level and sociodemographic characteristics in those applying to quit smoking. *Ankara Med J*. 2018; 18(3):328-336.

25. Fidan F, et al. Factors affecting smoking cessation and success rates of the treatments applied. *Kocatepe Medical Journal*. 2005; 6(3):27-34.

26. Lok N, Bademli K. Determination of the relationship between physical activity and depression in adult individuals. *Mustafa Kemal University Journal of Social Sciences Institute *. 2017; 14(40):101-110.

27. Celik FH, Hocaoglu C. Major depressive disorder: definition, etiology, and epidemiology. * Journal of Contemporary Medicine *. 2016; 6(1):51-66.

28. Kutlu R, et al. Evaluation of depression and quality of life in patients hospitalized in the thoracic surgery service with short form 36. *Turkish Journal of Thoracic and Cardiovascular Surgery *. 2015; 23(3): 524-531.

29. Demirezen M, Kurcer MA. Effect of smoking cessation on anxiety and urge for smoking. *Zonguldak Medical Journal*. 2005.

30. Liu X, et al. Understanding the role of cessation fatigue in the smoking cessation process. *Drug Alcohol Depend*. 2013; 133 (2): 548-555.

31. Heckman BW, et al. Does cessation fatigue predict smoking-cessation milestones? A longitudinal study of current and former smokers. *J Consult Clin Psychol*. 2018; 86 (11): 903-910.

The Relationship Between Nutritional Knowledge and Hypertension Prevention Attitudes Among Individuals with a Family History of Hypertension

Deniz TANKUT[1], Sibel TUNÇ KARAMAN[1*], Okcan BASAT[1] **Original Article**

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ABSTRACT

Objective: This study aimed to investigate the relationship between the nutritional knowledge levels of individuals with hypertension (HT) in their families and their attitudes towards preventing HT.

Methods: This cross-sectional study was carried out with individuals aged 18 and over who applied to the Family Medicine Outpatient Clinic of a tertiary hospital, and those who had a family member with HT and met the inclusion criteria for the study. Descriptive Information Form, Nutrition Knowledge Scale (NKS) and Attitudes Scale towards Prevention of HT (ASPH) were used to obtain the data.

Results: The mean age of 212 participants included in the study was 37.11 ± 10.45, and 66% (n=140) were women. While the average NKS total score of the participants was 90.05 ± 20.27, the average ASPH total score was 111.49 ± 16.52. 25.5% (n=54) of the participants had low, 15.6% (n=33) had moderate, 23.1% (n=49) had high, and 35.8% (n=76) had very high nutritional knowledge. A significant correlation was found between NKS and ASPH total scores ($r = 0.883$, $p = 0.001$). Significant negative correlations were observed between age and body mass index (BMI) and NKS total scores ($r = -0.232$, $p = 0.001$; $r = -0.260$, $p = 0.001$, respectively). Similarly, age and BMI were also negatively correlated with ASPH total scores ($r = -0.231$, $p = 0.001$; $r = -0.175$, $p = 0.011$, respectively).

Conclusion: Nutrition knowledge and attitudes towards HT prevention were high among individuals with a family history of HT. Increased nutrition knowledge contributed positively to the development of attitudes towards HT prevention. Both nutrition knowledge and preventive attitudes were positively associated with female gender, younger age, higher socioeconomic status, and lower BMI. These findings highlight the importance of nutrition education and targeted interventions in developing preventive strategies to reduce HT risk.

Keywords: Attitude, hypertension, knowledge, nutrition, prevention

INTRODUCTION

Hypertension (HT) is defined as the persistent elevation of systemic arterial blood pressure and constitutes a significant public health issue worldwide (1). Globally, more than 1 billion adults suffer from HT (2). In Turkey, the prevalence of diagnosed HT among individuals aged 15 years and older has been reported as 16.1% (3). HT increases mortality and morbidity and places a substantial burden on healthcare systems (4, 5). Despite these impacts, the desired success levels in the diagnosis and treatment of HT have not yet been achieved.

The development of HT involves the interplay of genetic predisposition, dietary habits, and lifestyle factors. Individuals with a family history of HT are at higher risk due to both genetic and environmental influences. Therefore, enhancing nutritional knowledge and preventive health attitudes in these individuals is critical for the prevention and management of HT (6). In this context, the shaping of lifestyle behaviors among at-risk individuals plays a key role in HT prevention. Healthy lifestyle behaviors include balanced and low-sodium nutrition, regular physical activity, avoidance of harmful habits, regular blood pressure monitoring, and adherence to periodic health check-ups. Increasing awareness of

these behaviors supports individual health consciousness and contributes to public health improvement (7, 8).

The literature includes various studies examining the nutritional knowledge and preventive attitudes of individuals diagnosed with HT (9-12). However, limited research has focused on individuals without HT diagnosis. Especially, there is a paucity of studies concentrating on those with a family history of HT, indicating the need for more detailed investigation of this population (13, 14).

This study aims to evaluate the nutritional knowledge levels and preventive attitudes toward HT among individuals with a family history of HT, as well as to examine the relationship between these two variables. These findings may guide healthcare professionals in planning preventive services for individuals with a family history of HT.

METHODS

Study Design

This cross-sectional study was conducted between April 16 and June 16, 2023, among individuals who presented to the Family Medicine Outpatient Clinic of a tertiary care hospital and met the inclusion criteria.

Sample Size Determination

Determining the minimum sample size for studies using newly developed scales can be challenging due to limited preliminary data for formal power analysis. Therefore, recommendations based on the number of items in the scale were considered. Gorsuch (1983) and Kline (1994) recommend a minimum of 100 participants; Cattell (1978) suggests 3 to 6 times the number of items, and Hair et al. (2010) advocate at least 5 times the number of items (15-18).

Sample size was calculated using the Nutrition Knowledge Scale (31 items), which had more items than the ASPH (26 items). The recommended minimum sample size ranged from 100 to 192 participants. Accordingly, the study aimed to recruit 200 participants, and a total of 212 participants were enrolled.

Study Population

Participants were eligible for the study if they were aged 18 years or older; had a close relative—defined in this study as a parent, child, spouse, or grandparent—diagnosed with and treated for HT; did not have a personal diagnosis of HT; had no known active or severe psychiatric illness; had sufficient cognitive ability, which was determined by the researchers through observation during face-to-face interviews, based on participants' ability to comprehend study information and respond appropriately to the questionnaire items; and agreed to participate.

Individuals were excluded if they were under 18 years of age; had no family history of HT among the specified relatives; had a personal diagnosis of HT; had conditions preventing effective communication (e.g., significant hearing or speech impairment, cognitive dysfunction, or inability to cooperate); were pregnant or breastfeeding; or were unable to read and write.

Data Collection

A Descriptive Information Form, Nutrition Knowledge Scale (NKS) and Attitudes Scale towards Prevention of HT (ASPH) were used to obtain the data.

Using a researcher-designed form, participants' sociodemographic characteristics—including age, gender, education level, marital status, employment status, income level, and Body Mass Index (BMI) (kg/m^2) were recorded. The form also assessed the presence of chronic diseases, medication use, identification of family members with HT, duration of the HT, presence of HT-related complications, and knowledge about HT. Additionally, participants were asked about the presence of a blood pressure monitor at home, the location and frequency of blood pressure measurements, and symptoms observed in family members with HT.

Attitudes Scale towards Prevention of HT developed by Albayrak and Şengezer in 2022, was designed to assess the preventive attitudes of individuals with a family history of HT. The scale consists of 26 items, among which items 15 and 20 are negatively worded and are scored in reverse.

The scale includes five factors: Prevention and control (items 1, 4, 7, 10, 13, 18, 22, and 25); Habits and lifestyle (items 6, 12, 17, 21, 24, and 26); Nutritional attitude (items 5, 11, 16, and 20); Mental state and physical activity (items 3, 9, and 15); and Knowledge of disease and risk (items 2, 8, 14, 19, and 23). The overall reliability coefficient (Cronbach's alpha) of the scale is 0.910, while the subscale coefficients range between 0.601 and 0.813 (19).

The Nutrition Knowledge Scale, developed by Öngün Yılmaz et al. in 2021, was designed to assess adults' level of knowledge regarding nutrition, and its validity and reliability have been established in Turkish. The scale is a 31-item, five-point Likert-type instrument, with responses ranging from "Strongly agree" to "Strongly disagree," scored from 4 to 0, respectively. The total score ranges

from 0 to 126, with higher scores indicating a higher level of nutrition knowledge.

Nutrition knowledge levels were classified based on total scores as low (≤79), moderate (80–90), high (91–100), and very high (≥101). The Cronbach's alpha coefficient of the scale was reported as 0.851, indicating high internal consistency (20).

Ethical considerations

The study was conducted with the approval of the Local Ethics Committee (Date: 01.03.2023, Approval Number: 27). All procedures were carried out in accordance with the Declaration of Helsinki. Verbal and written informed consent were obtained from all participants.

Statistical analyses

Analyses were performed using IBM SPSS Statistics 22. Categorical variables were presented as frequencies and percentages; continuous variables as means and standard deviations. Normality was tested using the Kolmogorov-Smirnov test. Non-normally distributed variables were analyzed using Mann-Whitney U and Kruskal-Wallis tests; Pearson correlation was applied for normally distributed variables, and Spearman correlation for non-normally distributed variables. Chi-square tests were used for categorical data comparisons. Statistical significance was set at $p < 0.05$.

RESULTS

This study included 212 aged 18–64 years (mean age 37.11 ± 10.45; mean BMI 25.80 ± 4.33 kg/m²). Participants' sociodemographic and medical characteristics were described in Table 1.

Table-1. Distribution of Participants' Sociodemographic and Medical Characteristics

		n	%
Gender	Female	140	66
	Male	72	34
Education level	Literate only	8	3.8
	Primary school	35	16.5
	Middle school	5	2.4
	High school	73	34.4
	University	91	42.9
Marital status	Married	134	63.2
	Single	78	36.8
Income level	Low income	87	41
	Moderate income	76	35.8
	High income	49	23.1
Presence of chronic disease	No	192	90.6
	Yes	20	9.4
Regular medication use	No	149	70.3
	Yes	63	29.7
	Min-Max	**Mean±SD**	
Age	18 - 64	37.11 ± 10.45	
Body mass index	17.3 - 35.5	25.80 ± 4.33	

Participants' knowledge and practices related to HT were detailed in Table 2. Among them, 64.6% had hypertensive parents, 10.4% spouses or children, and 32.5% grandparents. 30.2% reported complications (e.g., retinopathy, nephropathy) in their hypertensive relatives. Notably, 38.2% were unaware of the HT diagnostic blood pressure threshold, while 56.1% knew that treatment is typically lifelong or exceeds 10 years. Although 78.8% owned a blood pressure monitor, only 13.6% measured their blood pressure frequently. Most measurements were done at home (82.1%).

Table-2. Distribution of Participants' Family History, Knowledge, and Behavioral Characteristics Regarding Hypertension

		n	%
A. Family History and Health Status			
Family members with HT*	Parents	137	64.6
	Spouse-children	22	10.4
	Grandparents	69	32.5
Presence of complications in hypertensive family members	Yes	64	30.2
	No	148	69.8
Symptoms observed in hypertensive family members*	Headache	162	76.4
	Dizziness	107	50.5
	Palpitation	81	38.2
	Chest pain	37	17.5
	Visual disturbance	20	9.4
	Nosebleed	64	30.2
B. Knowledge and Behavioral Characteristics Regarding Hypertension			
Known blood pressure thresholds for HT diagnosis (mmHg)	130/80	2	0.9
	140/90	68	32.1
	150/90	32	15.1
	160/100	29	13.7
	Don't know	81	38.2
Knowledge of treatment duration for HT	Less than 1 year	8	3.8
	1-5 years	11	5.2
	5-10 years	7	3.3
	More than 10 years/ lifelong	119	56.1
	Don't know	67	31.6
Knowledge of doctor visits frequency for hypertensive patients	Monthly	37	17.5
	Every 3 months	46	21.7
	1-2 times a year	93	43.9
	When blood pressure rises	36	17
Availability of blood pressure monitor at home	Yes	167	78.8
	No	45	21.2
Frequency of self-measuring blood pressure	Never	48	22.6
	Rarely	135	63.7
	Often	20	9.4
	Always	9	4.2
Places where blood pressure is measured*	Home	174	82.1
	Pharmacy	18	8.5
	Family health center	27	12.7
	Hospital	26	12.3

Descriptive statistics for the scale scores were presented in Table 3. ASPH scores ranged 73–130 (mean 111.49 ± 16.52, α=0.928) and NKS scores 12–124 (mean 90.05 ± 20.27, α=0.936). Based on NKS, 25.5% had low, 15.6% moderate, 23.1% high, and 35.8% very high nutrition knowledge.

Table-3. Descriptive Characteristics Related to Scale Scores

	Min-Max	Mean±SD	Median	Cronbach's alpha
ASPH total score	73 - 130	111.49 ± 16.52	115	0.928
Prevention and control	24 - 40	34.71 ± 4.71	36	0.820
Habits and lifestyle	16 - 30	24.97 ± 4.34	26	0.810
Nutritional attitude	11 - 20	17.01 ± 2.85	18	0.837
Mental state and physical activity	8 - 15	13.48 ± 2.24	15	0.848
Knowledge of disease and risk	13 - 25	21.32 ± 3.51	21	0.877
NKS total score	12 - 124	90.05 ± 20.27	97	0.936
			n	**%**
Nutrition knowledge levels according to NKS	Low		54	25.5
	Moderate		33	15.6
	High		49	23.1
	Very high		76	35.8

Table 4 revealed a strong positive correlation between NKS and ASPH scores (r=0.883, p=0.001) and a weak negative correlation between relatives' HT duration and NKS scores (r=−0.191, p=0.005). No significant correlation was found between HT duration and ASPH scores.

Table-4. Correlations Between Scale Total Scores and Demographic/Clinical Variables

Variable	Correlation with NKS total score		Correlation with ASPH total score	
	r	**p**	**r**	**p**
NKS total score	—	—	0.883	**0.001**[a]
ASPH total score	0.883	**0.001**[a]	—	—
Age	-0.232	**0.001**[b]	-0.231	**0.001**[b]
Body mass index	-0.260	**0.001**[b]	-0.175	**0.011**[b]
HT duration	-0.191	0.005[a]	-0.102	0.138[a]

[a]*Spearman's rho correlation test* [b]*Pearson correlation analysis *p<0,05*

ASPH: Attitudes Toward Hypertension Prevention Scale; NKS: Nutrition Knowledge Scale

ASPH and NKS scores by sociodemographic characteristics were summarized in Table 5. Females scored higher than males (p=0.001); scores increased with education and income (p=0.001). Married participants had higher ASPH scores (p=0.001); NKS scores did not differ by marital status. Chronic disease presence had no significant effect.

Table-5. Distribution of ASPH and NKS Scores by Sociodemographic Characteristics

		ASPH total score	NKS total score
		Mean ± SD	**Mean ± SD**
Gender	Female	115.87 ± 12.57	94.64 ± 18.22
	Male	102.97 ± 19.76	81.11 ± 21.18
	[1]p	**0.001***	**0.001***
Education level	Literate only	91.25 ± 19.93	66.75 ± 21.86
	Primary school	99.34 ±19.32	74.49 ± 15.53
	Middle school	108.4 ± 23.29	85.2 ± 17.82
	High school	111.34 ±16.87	89.36 ± 21.46
	University	118.23 ± 8.71	98.9 ± 15.13
	[2]p	**0.001***	**0.001***
Marrital status	Married	114.07 ± 16.32	92.11 ± 19.56
	Single	107.06 ± 16.01	86.5 ± 21.09
	[1]p	**0.001***	0.233
Income level	Low	100.32 ± 18.18	77.34 ± 19.01
	Moderate	115.97 ± 9.33	95.82 ± 13.29
	High	124.37 ± 6.65	103.65 ± 18.68
	[2]p	**0.001***	**0.001***
Presence of chronic disease	No	110.91 ± 17.11	89.26 ± 21
	Yes	117.1 ± 7.14	97.6 ± 7.83
	[1]p	0.508	0.498

*[1]Mann Whitney U Test, [2]Kruskal Wallis Test *p<0.05 (statistically significant)*

ASPH and NKS scores by family history and HT knowledge were illustrated in Table 6. Scores did not differ by hypertensive parents but were lower in participants with hypertensive spouses or children (p=0.001). Those with hypertensive grandparents had higher NKS scores (p=0.001). Correct knowledge of the 140/90 mmHg threshold, lifelong treatment duration, regular doctor visits, home BP monitor possession, and frequent BP self-measurement were all associated with higher scores (p=0.001).

Table 6. Distribution of ASPH and NKS Scores by Family History and Hypertension-Related Knowledge

		ASPH total score	NKS total score
		Mean ± SD	**Mean ± SD**
HT in parents	Yes	113.6 ± 14.01	90.24 ± 19.14
	No	107.64 ± 19.85	89.69 ± 22.31
	[1]p	0.168	0.364
HT in spouse/children	Yes	90.68 ± 20.32	66.41 ± 17.29
	No	113.9 ± 14.23	92.78 ± 18.79
	[1]p	**0.001***	**0.001***
HT in grandparents	Yes	111.7 ± 17.39	94.87 ± 20.41
	No	111.39 ± 16.15	87.72 ± 19.86
	[1]p	0.525	**0.001***
Known blood pressure thresholds for HT diagnosis (mmHg)	130/80	105 ± 1.41	75.5 ± 16.26
	140/90	124 ± 7.89	105.09 ± 16.03
	150/90	100.16 ± 14.52	79.41 ± 20.06
	160/100	104.21 ± 22	81.55 ± 20.82
	Don't know	108.23 ± 14.18	85.02 ± 16.22
	[2]p	**0.001***	**0.001***
Knowledge of treatment duration for HT	Less than 1 year	116 ± 5.66	104.13 ± 3.18
	1-5 years	81.73± 9.73	56.55 ± 2.94
	5-10 years	78.86 ± 11.7	60.86 ± 11.11
	More than 10 years/ lifelong	119.15 ± 11.24	98.45 ± 17.41
	Don't know	105.64 ± 14.58	81.99±16.22
	[2]p	**0.001***	**0.001***
Knowledge of doctor visits frequency for hypertensive patients	Monthly	107.46 ± 14.07	85.86 ± 17.03
	Every 3 months	113.11 ± 16.41	93.85 ± 22.4
	1-2 times a year	116.43 ± 16.18	96.3 ± 18.95
	When blood pressure rises	100.81 ± 14.28	73.33 ± 12.66
	[2]p	**0.001***	**0.001***
Availability of blood pressure monitor at home	Yes	113.87 ± 15.61	93.3 ± 19.05
	No	102.67 ± 16.97	77.98 ± 20.31
	[1]p	**0.001***	**0.001***
Frequency of self-measuring blood pressure	Never	90.48 ± 15.39	66.88 ± 15.55
	Rarely	117.42 ± 11.3	96.56 ± 17.42
	Often	116.25 ± 9.04	98.1 ± 8.27
	Always	124 ± 0	98 ± 0
	[2]p	**0.001***	**0.001***

DISCUSSION

This study examined the relationship between nutritional knowledge and attitudes toward HT prevention among individuals with a family history of HT. The results revealed that participants had high levels of both knowledge and attitudes. Higher nutritional knowledge was associated with more positive prevention attitudes.

Both outcomes were positively associated with female gender, younger age, higher socioeconomic status, and normal BMI. Additionally, participants who measured their blood pressure more frequently and those who correctly identified diagnostic thresholds for HT demonstrated significantly better knowledge and attitudes. These findings suggest that improving nutritional literacy—especially in at-risk groups—can foster healthier perspectives and potentially more effective preventive behaviors.

Our findings are consistent with a limited number of previous studies exploring how family history affects HT-related behaviors. For example, Asante et al. reported that regular blood pressure monitoring correlated with knowledge levels, with attitude emerging as the strongest predictor (21). Similarly, Çetinkaya Özdemir et al. found that individuals with a family history of HT were more likely to adopt positive prevention behaviors (22). The ASPH scores in our study support these earlier findings.

In contrast, several studies—such as those by Tokem et al., Yavuz et al., and Rahman et al.—have highlighted inadequate knowledge and prevention attitudes among hypertensive patients, often accompanied by poor adherence to preventive practices (23-25). The relatively high scores in our sample may reflect the facilitating role of intra-family information sharing in the presence of chronic illness.

To our knowledge, research specifically targeting nutritional knowledge among individuals with a family history of HT is scarce. Most prior studies involving broader patient populations report moderate to low knowledge levels (26-28). In contrast, 23.1% and 35.8% of our participants exhibited high and very high nutritional knowledge, respectively. This may reflect heightened sensitivity to dietary issues within families impacted by chronic disease.

Multiple studies have shown that women tend to have greater nutritional knowledge and more favorable health attitudes than men (27, 29, 30). Our findings support this pattern and may relate to cultural roles, health expectations, or greater health information exposure among women.

Regarding age, findings in the literature are inconsistent. Some studies report that nutrition knowledge increases with age, possibly due to lifelong exposure to dietary habits and health-related experiences. Others, however, indicate no clear association or even a decline among older adults (31-33). In our study, a negative correlation was observed between age and both nutrition knowledge and health-promoting attitudes. This may be due to lower education, reduced access to health information, or limited digital literacy in older participants.

Educational attainment was positively associated with both outcomes, a relationship commonly reported in prior research (27, 34, 35). Our results affirm the critical role of health education in fostering knowledge and motivation for HT prevention.

Finally, studies frequently report an inverse association between BMI and nutritional knowledge (27, 28, 36). Similarly, our data showed that individuals with lower knowledge levels had higher BMI, emphasizing the need for targeted interventions.

Limitations of the Study

This study has several limitations that should be acknowledged. The cross-sectional design restricts the ability to infer causal relationships between nutritional knowledge and preventive attitudes. The single-center setting may limit the generalizability of the findings. In addition, reliance on self-reported questionnaires introduces potential recall and social desirability biases.

Despite these limitations, the study provides valuable insights into nutrition knowledge and preventive attitudes among individuals with a family history of HT. These findings may guide preventive efforts for hypertension.

Future research should employ longitudinal designs to clarify causal links. Including more diverse populations could enhance external validity. Broadening the scope to assess nutrition knowledge and preventive behaviors across multiple family members could provide deeper insights. Moreover, qualitative studies are warranted to explore barriers and facilitators influencing individuals with a family history of HT.

CONCLUSION

This study revealed that individuals with a family history of hypertension possess good nutrition knowledge and favorable attitudes toward hypertension prevention. Nutrition knowledge was positively associated with preventive behaviors. Female gender, younger age, higher socioeconomic status, and lower BMI were

linked to better knowledge and attitudes. In addition, regular blood pressure monitoring and accurate understanding of hypertension were associated with more proactive preventive behaviors. These findings highlight the importance of identifying individuals with hypertensive relatives and encouraging lifestyle modifications. Promoting nutrition education and fostering positive attitudes toward hypertension prevention may contribute to improved long-term cardiovascular outcomes, particularly in at-risk populations.

DECLARATIONS

Ethical approval: The study was conducted with the approval of the Clinical Research Ethics Committee of Gaziosmanpaşa Training and Research Hospital (Date: 01.03.2023, Approval Number: 27).

Conflict of interest statement: On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Data availability statement: The data used and analyzed during the study could be available from the corresponding author upon reasonable request.

Authors' contributions

Concept/Design: DT, STK, OB.

Data Collection and/or Processing: DT STK

Data analysis and interpretation: DT, STK

Literature Search: DT, STK

Drafting manuscript: STK

Critical revision of manuscript: DT, STK, OB.

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REFERENCES

1. McEvoy JW, McCarthy CP, Bruno RM, Brouwers S, Canavan MD, Ceconi C, et al. 2024 ESC Guidelines for the management of elevated blood pressure and hypertension [published correction appears in Eur Heart J. 2025 Apr 7;46(14):1300.
2. World Health Organization. Health topics/Hypertension. Available at: https://www.who.int/health-topics/hypertension#tab=tab_1 Access date: 27.06.2025
3. Türkiye Sağlık Araştırması 2022. Available at: https://data.tuik.gov.tr/Bulten/Index?p=Turkiye-Health-Survey-2022-49747 Access date: 01.04.2025
4. Brouwers S, Sudano I, Kokubo Y, Sulaica EM. Arterial hypertension. Lancet. 2021;398(10296):249-261.
5. Ohya Y, Kario K, Itoh H, Nishiyama A, Ishimitsu T, Ichihara A, et al. Statement of the Asian Hypertension Society Network: the Okinawa Declaration on the unity of hypertension societies in Asian countries and regions to overcome hypertension and hypertension-related diseases. Hypertens Res. 2022;45(1):1-2.
6. Shim JS, Heo JE, Kim HC. Factors associated with dietary adherence to the guidelines for prevention and treatment of hypertension among Korean adults with and without hypertension. Clin Hypertens. 2020;26:5.
7. Shamsi SA, Salehzadeh M, Ghavami H, Asl RG, Vatani KK. Impact of lifestyle interventions on reducing dietary sodium intake and blood pressure in patients with hypertension: A randomized controlled trial. Turk Kardiyol Dern Ars. 2021;49(2):143-150.
8. di Cagno A, Fiorilli G, Buonsenso A, Di Martino G, Centorbi M, Angiolillo A, et al. Long-term physical activity effectively reduces the consumption of antihypertensive drugs: a randomized controlled trial. J Cardiovasc Dev Dis. 2023;10(7):285.
9. Ruan Y, Huang Y, Zhang Q, Qin S, Du X, Sun Y. Association between dietary patterns and hypertension among Han and multi-ethnic population in southwest China. BMC Public Health. 2018;18(1):1106.
10. Maharjan N, Maharjan N, Li R. Knowledge on diet among the hypertensive patients in a tertiary care center Nepal: a descriptive cross-sectional study. JNMA J Nepal Med Assoc. 2020;58(222):98-101.
11. Mu T, Xu R, Zhu Q, Chen, L, Dong D, Xu J, et al. Diet-related knowledge, attitudes, and behaviors among young and middle-aged individuals with high-normal blood pressure: A cross-sectional study in China. Front Public Health. 2022;10:898457.
12. Zhang Z, Xuan Z, Fu Y, Zhao H, Zhan P, Yang C, & et al. Knowledge, attitudes, and practices regarding hypertension diet among patients with hypertension. Scientific reports. 2025;15(1):11915.
13. Asiri AA, Asiri S, Asiri H. Knowledge related to hypertension risk factors, diet, and lifestyle modification: a comparative study between hypertensive and non-hypertensive individuals. Cureus. 2020;12(8):e9890.
14. Gong D, Yuan H, Zhang Y, Li H, Zhang D, Liu X, et al. Hypertension-related knowledge, attitudes, and behaviors among community-dwellers at risk for high blood pressure in Shanghai, China. Int J Environ Res Public Health. 2020;17(10):3683.
15. Gorsuch RL. Factor analysis. 2nd ed. Lawrence Erlbaum Associates; 1983.
16. Kline P. An easy guide to factor analysis. Routledge; 1994.
17. Cattell RB. The scientific use of factor analysis in behavioral and life sciences. Plenum Press; 1978.
18. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. 7th ed. Pearson; 2010.
19. Albayrak Z, Şengezer T. Attitudes towards the prevention of hypertension development in ındividuals who have a family member with hypertension: A scale development study. Turk J Fam Pract. 2022;26(2):53-65
20. Öngün Yılmaz H, Aydin Haklı D, Toğuç H, Çobanoğlu Z, Önel Sayar C, Erkul C, et al. Nutrition Knowledge Scale (NKS): Development, factor structure, and validation for healthy adults. Progress in Nutrition. 2021;23(3):e2021104.
21. Asante DO, Dai A, Walker AN, et al. Assessing hypertension and diabetes knowledge, attitudes and practices among residents in Akatsi South District, Ghana using the KAP questionnaire. Front

Public Health. 2023;11:1056999. doi:10.3389/fpubh.2023.1056999.

22. Çetinkaya Özdemir S, Semerci V, Metin T. Effect of alexithymia severity on attitudes toward hypertension prevention in adults: a cross-sectional study. MAS Journal of Applied Sciences. 2023;8(3):511-519.
23. Tokem Y, Taşçı E, Yılmaz M. Investigation of disease management of individuals with hypertension at home. Turk J Card Nur. 2013;4(5):30-40.
24. Aygün O, Yavuz S, Aygün K, Yıldırım E. The relevance between knowing the salt ingredient of nutrients and consuming them: is it better with hypertensive patients?. Turk J Fam Pract. 2015;19(4): 170-178.
25. Rahman M, Alam SS, Mia M, Haque M, Islam K. Knowledge, attitude and practice about hypertension among adult people of selected areas of Bangladesh. MOJ Public Health. 2018;7(4):211-214.
26. Yahia N, Wang D, Rapley M, Dey R. Assessment of weight status, dietary habits and beliefs, physical activity, and nutritional knowledge among university students. Perspect Public Health. 2016;136(4):231-244.
27. Valmórbida JL, Goulart MR, Busnello FM, Pellanda LC. Nutritional knowledge and body mass index: a cross-sectional study. Rev Assoc Med Bras (1992). 2017;63(9):736-740.
28. Özkarabulut AH, Rashidi M, Yıldırım G. Measuring Nutritional Knowledge Levels of Diabetes Patients Type 2. IGUSABDER. 2021;(14):241-257.
29. Mohammed AH, Hassan BAR, Suhaimi AM. Hypertension knowledge, awareness, and attitude among the hypertensive population in Kuala Lumpur and rural areas in Selangor, Malaysia. J Public Health (Berl.). 2021;29:443-450.
30. Almomani MH, Rababa M, Alzoubi F, Alnuaimi K, Alnatour A, Ali RA. Effects of a health education intervention on knowledge and attitudes towards chronic non-communicable diseases among undergraduate students in Jordan. Nurs Open. 2020;8(1):333-342.
31. Ong RHS, Chow WL, Cheong M, Lim GH, Xie W, Baggs G, et al. Associations between socio-demographics, nutrition knowledge, nutrition competencies and attitudes in community-dwelling healthy older adults in Singapore: findings from the SHIELD study. J Health Popul Nutr. 2021;40(1):52.
32. Koch F, Hoffmann I, Claupein E. Types of nutrition knowledge, their socio-demographic determinants and their association with food consumption: results of the NEMONIT Study. Front Nutr. 2021;8:630014.
33. Aihemaitijiang S, Ye C, Halimulati M, Huang X, Wang R, Zhang Z. Development and validation of Nutrition Literacy Questionnaire for the Chinese elderly. Nutrients. 2022;14(5):1005.
34. Arslan H, Yücel İ. Examination of nutritional knowledge levels of elite swimmers. Journal of Sports and Performance Researches. 2023;14(2):165-176.
35. Mengi Çelik Ö, Duran S. Evaluation of the relationshıp between social media addiction and nutrition knowledge and some variables in nurse candidates. Karya J Health Sci. 2022;3(3):302-306.
36. Ul Haq I, Mariyam Z, Li M, Huang X, Jiang P, Zeb F, et al. A comparative study of nutritional status, knowledge attitude and practices (KAP) and dietary ıntake between international and Chinese students in Nanjing, China. Int J Environ Res Public Health. 2018;15(9):1910.