Evaluation of Child Development Knowledge Among Medical Students

Tıp Öğrencilerinin Çocuk Gelişimi Bilgilerinin Değerlendirilmesi

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ABSTRACT

Objective: With the developments in the world, a significant decrease in the death rates of chronic or fatal diseases causes the problems that affect the development of children to be seen more frequently. Physicians must be aware of the basic developmental stages and information of children during medical education for early diagnosis and intervention. This study aimed to determine the knowledge of medical students about child development.

Material and Methods: A total of 482 3rd and 4th-year medical faculty students who did not take the Developmental Pediatrics lecture in the Department of Pediatrics of İnönü University Faculty of Medicine between 2018 and 2019 were included in the study. Our study included socio-demographic information and questions on "Caregiver Knowledge of Child Development Inventory".

Results: 227 (47.09%) 3rd year and 255 (52.90%) 4th-year students were included in the study. The mean Caregiver Knowledge of Child Development Inventory total score was 14.44±5.89 for 3rd-year students and 16.10 ± 5.90 for 4th-year students. More than 50% of the third and fourth year students answered 5 of the 10 questions in the developmental skills component section correctly. It was observed that the developmental skills and stimulation component knowledge of the third and fourth year medical students were not sufficient. It was also understood that the general pediatrics courses given in the third year did not increase the knowledge of the fourth year students about child development.

Conclusion: Evaluating the child development knowledge of medical students is important for interventions and studies to ensure that medical students are familiar with and detect developmental delays in infancy and early childhood.

Key Words: Medical Students, Child Development, Medical Education, Developmental Behavioral Pediatrics, Early Childhood Development

ÖZ

Amaç: Dünyada gelişmelerle birlikte, kronik ya da ölümcül hastalıkların ölüm oranlarında önemli bir azalma görülmesi; çocukların gelişimlerini etkileyen sorunların daha sık görülmesine neden olmaktadır. Erken tanı ve müdahalenin

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gerçekleşmesi için, hekimlerin temel gelişim basamaklarından haberdar olması ve bu tür bilgilerin tıp eğitimi sırasında edinilmesi gerekir. Bu çalışmanın amacı, tıp öğrencilerinin çocuk gelişimi hakkındaki bilgilerini belirlemektir.

Gereç ve Yöntemler: Çalışmaya, 2018- 2019 yılları arasında İnönü Üniversitesi Tıp Fakültesi Çocuk Sağlığı ve Hastalıklarında Gelişimsel Pediatri dersi almamış toplam 482 3.sınıf ve 4.sınıf tıp fakültesi öğrencileri dahil edilmiştir. Çalışmamızda 1. bölüm sosyo-demografik bilgileri, 2. bölüm; "Bakım Verenlerin Bebeklik ve Erken Çocukluk Dönemi Gelişimi ve Gelişimin Desteklenmesi Bilgisi'ni (CKCDI) ile ilgili soruları içermektedir.

Bulgular: Çalışmaya 227 (%47.09) 3. sınıf, 255 (%52.90) 4.sınıf olmak üzere toplam 482 tıp öğrencisi dahil edildi. Ortalama CKCDI toplam puanı 3 sınıf öğrencileri için 14.44±5.89, 4 sınıf öğrencilerinde ise 16.10 ± 5.90'di. Üçüncü ve 4. Sınıf öğrencilerinin %50'sinden fazlası gelişim basamakları bileşeni bölümündeki 10 sorunun 5'ini doğru yanıtladığı ancak gelişimsel uyaranla destekleme bileşeni bölümündeki 10 sorudan 3. Sınıfların sadece 1 soruya (sayı saymayı öğretme) ve 4. sınıfların ise (sayı saymayı, renkleri öğretme) 2 soruya doğru cevap verdiği ortaya çıkmıştır. Üçüncü ve dördüncü sınıf tıp öğrencilerinin, gelişim becerileri ve uyarılma bilgilerinin yeterli düzeyde olmadığı görülmüştür. Üçüncü sınıfta verilen genel pediatri derslerinin dördüncü sınıf öğrencilerinin çocuk gelişimi hakkındaki bilgilerini artırmadığı da anlaşılmıştır.

Sonuç: Tıp öğrencilerinin çocuk gelişimi bilgilerini değerlendirmek bebeklik ve erken çocukluktaki gelişimsel gecikmelere aşina olmalarını ve gecikmeleri tespit edebilmelerini sağlamak için yapılacak müdahaleler ve çalışmalar için önem arz etmektedir.

Anahtar Sözcükler: Tıp Öğrencileri, Çocuk Gelişimi, Tıp Eğitimi, Gelişimsel Pediatri, Erken Çocukluk Gelişimi

INTRODUCTION

Childhood development is described as an interactive process that results in the progress of cognitive, language, motor, socio-emotional, and self-regulation skills. (1). In order for the early childhood period to be at an optimal level and the developmental trajectory that will continue throughout the life of the child, it is important to monitor development in health services, to identify developmental risks and difficulties early, and to provide individualized and family-centered support (2). The American Academy of Pediatrics recommends all children to be evaluated in terms of developmental risks at certain age periods and states that early diagnosis and intervention of developmental difficulties are critical for the well-being of children and this is the responsibility of physicians (3). Primary care physicians are positioned to play a crucial role in the system of early diagnosis and intervention for young children with developmental delays (4). However, studies show that the knowledge and confidence of primary health care workers are insufficient in the diagnosis and management of children with developmental delays (5).

The focus of the child pediatric traineeships and medical curriculum is acute illness and hospital care. This situation also shows the contradictory situation in medical education (6). Identification of children with developmental delay and health needs are rarely emphasized during medical education (7). Medical students and residents should learn basic concepts related to the development of the child, recognize developmental delays, and develop clinical reasoning skills with appropriate further evaluation (8, 9). There are studies showing that teaching about development and developmental delays improves the knowledge of medical students (8, 10). For example, in a study conducted in Australia at Western Sydney University Faculty of Medicine in 2018, the education and training of medical students regarding child development and developmental disability during the period of pediatric internships were organized in the last decade and it was found to be beneficial as a result (6). Students were more motivated to approach neurodevelopmental examination and developmental stages more competently after this training. This educational opportunity has helped most students to understand developmental follow-up and delay and to understand the shared care provided by educators, parents, and healthcare providers.

Most of the studies on " Knowledge of Child Development" have focused on mothers because the person who can make the diagnosis at the earliest is mothers (11). Apart from mothers, it was also studied with fathers, adults, both parents and pediatric residents (12-16). There are very few studies about medical students' knowledge.

Since today's students will be tomorrow's doctors, it is critical to assess medical students' knowledge of infancy and early childhood development. In this study, it was aimed to determine the level of knowledge of third and fourth year medical students on this subject.

MATERIALS and METHODS

3rd and 4th year students of İnönü University Faculty of Medicine between 2018 and 2019 were included in the study. Required approval was obtained from the university ethics committee. Written consent was obtained from the students. It was observed that 28 of 510 medical students in total did not complete the questionnaire and were excluded from the study. A total of 482 (94.50%) medical students were included in the study.

'Caregiver Knowledge of Child Development Inventory' (CKCDI) was given to 3rd and 4th year medical students who did not receive any training with knowledge of child development. In our faculty, four hours of theoretical and eight hours of practical training are given in the field of developmental pediatrics during the pediatric internship training in the 4th year. As of 2019, a one-

hour 'Introduction to Developmental Pediatrics and Monitoring Child Development' lecture has been started for all 3rd year.

Our study consists of 28 questions. The first 8 questions contain socio-demographic information. Remaining 20 questions consist of CKCDI questions developed in 2007 by Ertem et al (17). Section 1 is the Developmental Skills Component consisting of 10 questions and Section 2 is the Developmental Stimulation Component consisting of 10 questions.

Survey Instrument

CKCDI consists of 20 items, it is easy to apply, understandable and the application time takes about 10 minutes. The scale consists of two components; In the Developmental Skills Component, the person's knowledge about the basic developmental stages of their infants or children is measured. In the Developmental Stimulation Component, the knowledge of when caregivers should provide appropriate stimuli to support the development of their children is measured. The age range of each item in the scale is determined by reference to the "International Guide for Monitoring Child Development (GMCD)"(2). The answers given by the caregivers receive a score of "2" if they are within the specified age range for each item, and a score of "1" if they are 1 month younger or older than the specified age range. All other answers are considered incorrect and receive a score of "0". Results are between 0-40 and a high score is considered as high caregiver knowledge. The internal consistency of the instrument was measured with Cronbach α and its validity was verified with factor analysis (α: 0.61).

Statistical Evaluation of Data

Statistical evaluation of the data was made by using the "Statistical Package For Social Sciences (SPSS 25)" package program. Qualitative variables were expressed as numbers (percentage). Quantitative variables were summarized as mean ± standard deviation. Mann-Whitney U test was used for comparison of the groups. The bivariate relationships between categorical variables were examined using Pearson's Chi-square test. The results with p values below 0.05 were considered statistically significant.

RESULTS

Sociodemographic characteristics

A total of 482 medical students, 227 (47.09%) 3rd year and 255 (52.90%) 4th year, were included in the study. The average age of all students was 22.69 ± 1.42. 49.4% (n: 238) of the students were girls. There was no significant difference in both classes in terms of gender distribution, number of siblings, and family structure (p> 0.050). The sociodemographic information of the cases is given in Table I.

Table I: Descriptive Statistics on Sociodemographic Data

	3th year	4th year	Test statistics*
Number of participants n:482	227 (47.1)‖	255(52.9%)	
Gender			
Female	112 (49.3) ‖	126 (49.4)	p= 0.987
Male	115 (50.7)	129 (50.6)	
Age(years)	22 (20-28)†	23 (20-30)	p< 0.001
Number of siblings ‖			
No sibling	9 (0.003)	8 (0.03)	p= 0.871
One	52 (22.9)	74 (29.01)	
≥ Two	166 (73.1)	173 (67.8)	
Family Structure ‖			
Nuclear	216 (95.2)	236 (95.2)	p= 0.238
Extended	11 (4.84)	19 (7.5)	

**Mann-Whitney U test, †Median (min-max),‖ %*

The average CKCDI total score was 15.32±5.95 for all students, 14.44±5.89 for 3rd year students, and 16.10±5.90 for 4th year students (the highest out of 40). A significant difference was found between 3rd and 4th year students in terms of all scores. The mean score of the section 1 was 9.49±3.47 for all students, 8.85±3.52 and 10.05±3.33 for 3rd year and 4th year students (the highest out of 20). The mean score for section 2 was 5.83 ± 3.78 for all students, 5.59±3.64 and 6.04±3.89 for 3rd year and 4th year students. (the highest out of 20). The total CKCDI score of male students is 14.12±5.65, and the total score of female students is 16.55±6.0. The developmental skills component scores of female and male students were 9.58±3.44 and 9.13±3.47, respectively. A significant difference was found between the scores of the developmental skills component between female students and male students (p= 0.044). The scores of the developmental stimulation component of female and male students were 6.69±3.88 and 4.99±3.48, respectively. A significant difference was found between the scores of the developmental stimulation component (p <0.001), there was also a significant difference between the total CKCDI scores (p <0.001).

More than 50% of the 3rd and 4th year students correctly answered 5 of the 10 questions in the developmental skills component part. Most of the students had insufficient knowledge of the correct age of the developmental stages. It was revealed that only half of all students gave correct answers to only 2 questions out of 10 questions in the part of the developmental stimulation component. (teaching counting (55.0%) and teaching colors (50.2%)). Details are given in Table II.

When the study was evaluated in terms of 3rd year and 4th year students and gender, a significant difference was found between the developmental skills component of female students and male students and the correlation coefficients of the developmental stimulus component scores. In total students, a significant difference was found between correlation coefficients

Table II: The Caregiver Knowledge of Child Development Inventory questions.

	Correct Answers	Medical students' correct answers Total n: 482 n (%)
1. When does a child's brain begin to develop and learn?	in utero or birth	365 (75.7)
2. When do children begin to see?	in utero or birth	303 (62.9)
3. When do children begin to follow a moving person or toy, with their eyes?	birth to 2 months	169 (35.1)
4. When do children begin to vocalise in response to someone talking to them?	birth to 2 months	36 (7.5)
5. When do children begin to smile socially, that is smile into the face of another person?	birth to 2 months	69 (14.3)
6. When do children begin to say single meaningful words?	9–14 months	298 (61.8)
7. When do children begin to play imaginary play like feeding a doll or driving a toy car?	12–24 months	267 (55.4)
8. When do children begin to reach for a toy in front of them?	4–5 months	45 (9.3)
9. When do children begin to grasp tiny things like raisins, with their fingertips?	7–9 months	77 (16.0)
10. When do children begin to walk alone with good co-ordination?	10–15 months	321 (66.6)
11. When should mothers begin to talk to children?	in utero or birth	154 (32.0)
12. When should mothers begin to show colourful objects to children to help them practise reaching? ?	0–4 months	148 (30.7)
13. When should mothers begin to teach children to count?	12–24 months	265 (55.0)
14. When should mothers begin to teach children colours?	12–24 months	242 (50.2)
15. When should mothers start to give children a spoon or a fork to let them eat by themselves?	9–12 months	79 (16.4)
16. When should mothers begin to give children paper and crayons to draw and colour?	12–24 months	196 (40.7)
17. When should mothers begin to let children sit with support?	3–4 months	19 (3.9)
18. When should mothers begin to give children clean and safe objects or toys which they can mouth?	4–6 months	161 (33.4)
19. When should mothers begin to look at childrens' books with their children?	0–6 months	30 (6.2)
20. When should mothers begin to give children clean and safe household items to play with?	4–6 months	45 (9.3)

Table III: Correlations.

	The Developmental Skills Component total score Spearman's rho		
	n	r	p
Developmental Stimulation Component Total Score			
Third year	227	.338	0.000
Fourth year	255	.337	0.000
Boys	244	.315	0.000
Girls	238	.348	0.000
Total	482	.341	0.000

of the developmental skills component and the developmental stimulation component scores (r: 0.341 (p = 0.000)) (Table III)

DISCUSSION

This study is the first to examine the knowledge of medical students about child development in Turkey. The tool we use is in line with the "Care for Development" that WHO promotes worldwide and can be used in conjunction with this intervention (18). We planned to learn how much the 3rd and 4th year medical students know about early childhood basic developmental skills and supporting child development. As a result, while there was a significant difference between the developmental skills component and the total CKCDI scores in terms of both gender and medical education year, a significant difference was found between the scores of the developmental stimulus component scores only in terms of gender. Considering both gender and medical education year, it is seen that the total CKCDI average scores are low. Most of the students knew that brain development and vision began very early in life. They did not know when it should be normal to make sounds when spoken and developmental skills such as social smiling. It was not known by most of the students when the developmental stimulation components should be done.

In the study conducted by Ertem et al. (17), it was determined that many mothers in a representative mothers group in which

1055 mothers were included in two provinces of Turkey did not know when the basic developmental skills of infants and young children emerged and they did not know when to start simple practices that support child development. In this study by Ertem et al.(17), the average CKCDI questionnaire score was 19.2 ± 5.6; It has been found that mothers with higher education and fewer children have higher CKCDI scores. In countries where maternal development information was evaluated by using CKCDI, the total CKCDI scores were found in Turkey (19.2 ±5.6), Nepal (20±4.8) and Tanzania (at the beginning of the study they applied CKCDI to three different groups. The scores are 17.2 ± 4.4/ 13.8 ± 5.0/ 15.7±5.2) (17,19,20). However, in studies conducted in Pakistan (five questions about CKCDI and developmental steps taken by the North American Association of Pediatric Orthopedics on child development), no scores were specified (21). The fact that our scores are lower than mothers in our study can be associated with mothers' efforts to gain knowledge on this issue.

The questions most correctly answered by the students participating in our research in the developmental skills component are "When does a child's brain begin to develop and learn? (75.7% correct answer), When do children start walking? (66.0% correct answer) and When do children start seeing?" (62.9% correct answer). In the research of Ertem et al. (17), most of the mothers (80%) answered the question "When do children start walking?" correctly. In Nepal and Pakistan studies, "When do children start walking?" was the question answered most correctly by mothers (19,21). This can be interpreted as the strong social importance given to young children's mobility skills and the belief by society that the skills in these areas are a critical indicator of whether a child is developing "normally". It also suggests that caregivers may follow the basic developmental steps of movement development and keep them in mind for a long time.

The questions that the students who participated in our study answered at least correctly in the developmental skills component were "When do children begin to vocalize in response to someone talking to them?" (7.5% correct answer), "When do children begin to reach for a toy in front of them?" (9.3% correct answer). Similar to our study, the question " When do children begin to vocalize in response to someone talking to them?" was answered correctly by only one-fifth of the mothers in the study of Ertem et al. (17). In Nepal and Pakistan studies, these questions are among the least correct questions, very similar to our research (19,21). As the reasons for the least correct answers to these questions; children respond by using voices when talking to them over a long period of time, starting almost from the first months and it can be thought that the step of reaching out to the object in front of them may be difficult to observe and determine exactly when this behavior started, especially if the games are not played for this purpose.

The questions most correctly answered by the students participating in our research in the developmental stimulation component were " When should mothers begin to teach children to count? (55%) and " When should mothers begin to teach children colors?" (50.2%). Similarly, in the study of Ertem (17) and Shrestha et al. (19), these questions are among the most correctly answered questions. In the study of Rehman et al.(21), these questions were answered correctly by 57% of the mothers. The most incorrectly answered questions in the developmental stimulation component of the students participating in our research were " When should mothers begin to let children sit with support?" (3.9% correct answer) and " When should mothers begin to look at children's books with their children?" (6.2% correct answer). In the studies of Shrestha et al., these questions are among the least correctly answered questions, similar to our study (19). However, in the research of Rehman. et al. (21), the question "When should mothers begin to let children sit with support? was answered correctly by more than half of the mothers.

It was found that more than 50% of the students gave incorrect answers to 8 questions out of 10 in the section of developmental stimulation component. In the study of Sheresta et al. (19), similar to our study, more than half of the mothers gave incorrect answers in 7 out of 10 items of the developmental stimulation component. In the study of Rehman et al. (21), more than half of the mothers gave incorrect answers to six questions.

The result of not knowing when developmental skills emerge is a missed opportunity to detect developmental delay. In countries where a developmental survey is not easily provided in health services, determining the developmental delay in children falls to the first physician they meet. Primary healthcare providers play an important role in early childhood development, especially as an important access point for children and parents, especially in the process of monitoring child development and identifying children with delays (22). Early detection of developmental problems is an ongoing process of monitoring a child's development. The process, which starts from the moment the child receives primary health care, consists of high-impact strategies. (23). In the study conducted by Ertem et al. (17), mothers identified healthcare professionals as the first resource from which they wanted to get information about the development of their children. Parenting knowledge is thought to be associated with the cognitive and social-emotional development of children, as it allows caregivers to better understand and interact with their children in an appropriate and enriching manner (24).

Children's developmental problems are variable and some are easier to describe than others (25). Recognition of child development and developmental delay provides timely questioning and intervention for children with developmental delay. Despite this, child development and developmental delay were not emphasized in the medical curriculum (6). Little attention is paid to identifying children with developmental delay and their health needs (7). In the study conducted by Comley et al. (26), it was shown that there are important gaps

in knowledge about early child development among newly graduated family physicians. In the study of Çelen Yoldaş et al. (27); 86% of the pediatric residents stated that they did not have sufficient knowledge about child development and they encountered various difficulties in early diagnosis and learning of developmental guidelines. Potential gaps in the early childhood development curriculum were identified at the McMaster University School of Medicine, the Early Years Program was initiated and it was concluded that the overall purpose of this program was achieved (28) Medical faculties should play a very important role in the process of raising knowledgeable doctors about recognizing those with developmental delay, but the medical education curriculum in Turkey does not include teaching child development and developmental delays. Only three universities have a discipline of Developmental Behavioral Pediatrics, and medical students are trained on this subject in these universities (29,30)

In order for early diagnosis and intervention, physicians should be aware of basic diagnostic criteria and such information should be acquired during medical education. The findings in a study conducted by medical students at St George's Hospital Medical School in 2001 with all first and fourth year students show that even towards the end of medical school education, correct knowledge about autism is very limited (31). Primary care physicians play a central role in identifying children with developmental delays. They regularly see children in their early years and therefore have the opportunity to relate children with suspected developmental delay in their practice with appropriate services. However, physicians have acknowledged that they have a role in facilitating children's access to school-based special education services, but that they do not fully understand the eligibility requirements for these services, cannot rely on their knowledge or skills, and do not have the skills to identify children who may be eligible for special education services (32,33).

Identification of children who may be eligible to benefit from healthcare services requires understanding their development needs and special education eligibility criteria. It is also possible that some of the lack of confidence in their knowledge and skills is due to their failure to understand the eligibility criteria (32). This situation may be attributed to the lack of sufficient educational opportunities in child development during and after medical school education (33).

This study has some limitations. Instead of the direct observation method, we used a questionnaire reported from students, which may negatively affect the results to some extent. We did not check whether the knowledge of students increased by applying questionnaires again after the developmental behavioral pediatrics traineeship. We took a sample of students from a single university for the study, so we cannot generalize it for Turkey with these data. Despite these limitations, we believe our findings have invaluable implications for medical curriculum.

CONCLUSION

Medical students need to learn the basic concepts of child development and developmental delay, identify developmental delays and children with special needs through medical history taking and clinical examination and develop appropriate further evaluation and clinical reasoning skills. This study, which observes medical students' knowledge of child development, is important for interventions and studies that will enable medical students to become familiar with and detect developmental delays in infancy and early childhood.

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