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Awareness, Knowledge, Attitudes, and Behaviors of Pediatric Hematology and Oncology Specialists on Preserving Reproductive Health in Children with Cancer: Barriers and Suggestions

Çocuk Hematoloji Onkoloji Uzmanlarının Kanser Tanısı Alan Çocuklarda Üreme Sağlığını Koruma Konusundaki Farkındalık, Bilgi, Tutum ve Davranışları: Engeller ve Öneriler

Melek Yaman Ortaköylü[1], Sonay İncesoy Özdemir[2], Nurdan Taçyıldız[2], Handan Dinçaslan[2], Emel Cabi Ünal[2]

[1]Department of Pediatric Hematology and Oncology, Malatya Training and Research Hospital, Malatya, Türkiye
[2]Department of Pediatric Oncology, Ankara University Faculty of Medicine, Ankara, Türkiye

ABSTRACT

Objective: To evaluate the awareness, knowledge, attitude, and current practices of pediatric hematology oncology specialists about protecting reproductive health that can be offered to children diagnosed with cancer; to identify the obstacles they encounter in this regard and to make suggestions for the current situation.

Methods: From January 15, 2022, to June 15, 2022, we conducted a cross-sectional survey involving 23 participants recruited via social media who completed electronic surveys.

Results: The majority (78.26%) of participating physicians were female. Most of the participants (95.65%) worked in a metropolitan area. Nearly all (95.65%) of the physicians reported discussing long-term fertility issues with the family of a newly diagnosed cancer patient, with 82.60% always or routinely and 17.39% sometimes recommending fertility preservation methods. The main issues reported in applying fertility-preservation methods were: urgency of treatment (78.26%), financial difficulties and insurance barriers for patients (60.86%), absence of institutional or national standards (60.86%), physicians' inadequate knowledge of surgical methods applicable to pre-adolescent patients (39.13%), and high physician workload (21.73%).

Conclusion: Although 86.95% of surveyed pediatric oncologists agreed to refer all adolescent males to a reproductive health specialist prior

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Amaç: Çocuk hematoloji onkoloji uzmanlarının, kanser tanısı alan çocuklara sunulabilecek üreme sağlığını koruma konusundaki farkındalık, bilgi, tutum ve mevcut uygulamalarını değerlendirmek, bu konuda karşılaştıkları engelleri saptamak ve mevcut duruma yönelik önerilerde bulunmaktır.

Yöntemler: Kesitsel anket çalışması olan araştırma, 15 Ocak 2022 ve 15 Haziran 2022 tarihleri arasında, elektronik anketlerin sosyal medya aracılığı ile ulaştırılması sonucunda, araştırmaya katılmayı kabul eden 23 kişi ile gerçekleştirilmiştir.

Bulgular: Araştırmaya katılan hekimlerin %78,3'ü kadın, %21,7'si erkekti. Katılımcıların %95,7'si büyükşehirde çalışmakta, %52,2'si üniversite hastanesinde hizmet vermekteydi. Hekimlerin %95,7'si yeni tanı alan kanserli çocuğun ailesine uzun dönemde yaşanabilecek fertilite ile ilgili sorunları anlattığını, %82,6'sı her zaman/rutin olarak, %17,4'ü bazen fertilite koruma yöntemlerini önerdiğini bildirmiştir. Hekimler en fazla post-pubertal çocuklarda sperm ve oosit kriyoprezervasyonu yöntemlerini kullandıklarını bildirmişlerdir. Fertilite koruma yöntemlerini uygulama konusunda yaşanılan en sık problemler olarak; tedavinin aciliyeti (%76,2), hastaya ait maddi zorluk/sigorta engelleri (%61,9), kurumsal veya ulusal bir standardın olmaması (%61,9), hekimlerin ergenlik öncesi hastalar için uygulanabilecek

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Address for Correspondence/Yazışma Adresi: Assoc. Prof. Sonay İncesoy Özdemir, MD, Department of Pediatric Oncology, Ankara University Faculty of Medicine, Ankara, Türkiye
E-mail / E-posta: sincesoy@yahoo.co.uk
ORCID ID: orcid.org/0000-0003-2863-901X

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ABSTRACT

to cancer treatment, only 47.82% reported implementing this practice. Only 43.47% of physicians followed the American Society of Clinical Oncology's 2006 guidelines for preserving fertility in patients with cancer. Identifying barriers in this regard is expected to improve future efforts to preserve reproductive health in our country.

Keywords: Knowledge, behavior, cancer, pediatric oncology, fertility preservation, barriers

ÖZ

cerrahi yöntemler konusunda yeterli bilgiye sahip olmaması (%38,1) ve hekimin iş yükü fazlalığı (%23,8) bildirilmiştir.

Sonuç: Çalışma, ankete cevap veren pediatrik onkologların %86'sının tüm ergenlik çağındaki erkekleri onkolojik tedaviden önce üreme sağlığı konusunda uzmanlaşmış bir doktora sevk etme önerisine katılmalarına rağmen, yalnızca %46'sının bunu uyguladığını bildirdi. Hekimlerin sadece %44'ü, Amerikan Klinik Onkoloji Derneği tarafından 2006 yılında kanser hastalarında doğurganlığın korunması için yayınlanan önerilere uyum bildirmiştir. Ülkemizde çocuk hematoloji ve onkoloji uzmanlarının büyük çoğunluğunun bu konuda bilgi, tutum ve mevcut uygulamalarının literatüre göre olumlu olduğu görülmektedir. Bu konuda yaşanan engellerin saptanmasının, ülkemizde gelecekteki üreme sağlığının korunması çabalarını geliştireceği öngörülmektedir.

Anahtar Sözcükler: Bilgi, davranış, kanser, pediatrik onkoloji, doğurganlığın korunması, engeller

INTRODUCTION

As a result of advances in modern multidisciplinary treatment approaches and supportive care, the cure rate for childhood cancer has exceeded 80% (1). As the number of survivors of childhood cancer continues to rise, there is increasing emphasis on the future quality of life of these individuals in adulthood. One of the primary challenges faced by childhood cancer survivors in adulthood is the risk of infertility (2). Compromised reproductive capacity is a profound consequence of life-preserving interventions for pediatric malignancies (3).

This study aims to assess the knowledge, attitudes, and current practices of pediatric hematology-oncology specialists in our country regarding methods to preserve reproductive health in patients with cancer. The study also aims to identify the obstacles they encounter in this context. Increasing survival rates among childhood cancer survivors highlight the need for a proactive approach to addressing the long-term consequences of cancer treatments, particularly regarding reproductive health. Understanding the perspectives and practices of healthcare professionals in our country is crucial to developing strategies to mitigate the impact of potential infertility on the quality of life of childhood cancer survivors in their adult years.

MATERIALS AND METHODS

The cross-sectional survey, conducted between January 15 and June 15, 2022, was distributed via social media involved 23 participants who consented. The survey instrument, developed by the researchers, was distributed to 152 physicians through social media networks (e-mail, WhatsApp). During the study period, 23 responses were collected, resulting in a response rate of 15%. Electronically administered surveys, completed on a voluntary basis, were automatically recorded in the database and analyzed. This study was conducted in accordance with the Declaration of Helsinki. Ethical approval for this study was obtained from the Ethics Committee of Ankara University (approval number: 2022/24, date: 12.01.2022). The medical doctors who agreed to participate were informed about the study.

RESULTS

Of the participating physicians, 18 (78.3%) were female and 5 (21.7%) were male. All but one participant worked in metropolitan areas. Twelve (52.1%) of the participating physicians provided services in university hospitals. Twenty-two physicians (95.7%) reported discussing long-term fertility-related issues with the families of children newly diagnosed with cancer; 19 (82.6%) reported routinely or always recommending fertility preservation (FP) methods, while 4 (17.4%) reported suggesting these methods occasionally (Table 1). Among the 22 physicians recommending FP, 18 (81.8%) stated that they always applied these methods before starting treatment. Two physicians reported applying these methods until the end of the first course of treatment. Physicians reported using sperm and oocyte cryopreservation methods most frequently for post-pubertal children. 20 (90.9%) of the physicians mentioned recommending sperm cryopreservation, 7 (31.8%) recommended testicular tissue cryopreservation, 15 (68.1%) recommended oocyte cryopreservation, 9 (40.9%) recommended ovarian tissue cryopreservation, and 2 (9%) recommended ovarian suppression with gonadotropin-releasing hormone agonists. No physician reported recommending embryo cryopreservation. The most common problems encountered in implementing FP methods were urgency of treatment (76.2%), financial difficulties/insurance barriers for the patient (61.9%), absence of institutional or national standards (61.9%), inadequate physician knowledge about surgical methods applicable to pre-adolescent patients (38.1%), and physician workload (23.8%) (Table 2).

To improve services provided to preserve reproductive health, physicians recommend establishing an official protocol approved by the Ministry of Health and creating public oncofertility centers.

Statistical Analysis

Statistical analyses were performed using SPSS 22.0 (SPSS Inc., Chicago IL, USA). Descriptive statistics were used to summarize the data. Continuous variables were presented as mean ± standard deviation or median (minimum–maximum) according to data distribution, while categorical variables were expressed as numbers and percentages. The normality of continuous variables was

assessed using visual methods (histograms and probability plots) and the Shapiro–Wilk test.

DISCUSSION

This study provides valuable insight into the knowledge, attitudes, and practices of pediatric hematology and oncology specialists regarding the preservation of reproductive health among children with cancer in Türkiye, a country where data on this subject remain limited. The survey reveals both encouraging results and barriers to practice. These findings underscore the need for institutional support and centralized oncofertility units.

The awareness, knowledge, attitudes, and behaviors of pediatric hematology and oncology specialists regarding the preservation of reproductive health in children with cancer are crucial factors that significantly affect patient care and outcomes. Understanding the barriers and recommendations related to this issue can improve the quality of care for pediatric cancer patients.

Pediatric hematology and oncology specialists are typically well aware of the potential impact of cancer treatments on children's reproductive health. They possess knowledge about the mechanisms through which chemotherapy, radiation therapy, and other cancer treatments can affect fertility. However, the depth of awareness and knowledge may vary among practitioners, influenced by factors such as training, experience, and exposure to recent research findings (4,5). Attitudes toward discussing reproductive health preservation in pediatric cancer patients may vary among specialists. While some practitioners may prioritize these discussions and actively engage with patients and their families, others may perceive FP as a less immediate concern than cancer treatment. Attitudes may also be influenced by cultural factors, personal beliefs, and perceptions of the child's and the family's capacity to comprehend reproductive health issues (6). Discussing FP with pediatric patients and their families can be challenging due to the topic's sensitive nature, the need for age-appropriate communication, and varying levels of understanding (7). Pediatric oncologists often face time constraints during clinic visits,

Table 1. General characteristics of the physicians participating in the study.

Characteristics	Number (%)
Median age of physicians (year) (least-most)	45 (32-63)
Gender distribution of physicians (male/female)	5/18
Professional title/duty of physicians	
Specialist	8 (34.8)
Dr. faculty member	4 (17.4)
Associate professor	5 (21.7)
Professor	6 (26.1)
Institution where physicians work	
Training and research hospital	11 (47.9)
University hospital	9 (39.1)
Private/foundation university hospital	3 (13)
Annual number of newly diagnosed patients by physicians	
20-40	4 (17.4)
40-60	7 (30.4)
60-80	5 (21.7)
80-100	3 (13)
Over 100	4 (17.4)
Admission age of newly diagnosed patients	
0-18 years	22 (95.7)
0-23 years	1 (4.3)
Is there a reproductive health clinic as a separate unit in the center where you work?	
Yes	15 (65.2)
No	8 (34.8)
Are you informing the family, whose child recently diagnosed with cancer, about potential long term fertility issues?	
Always/routinely	22 (95.7)
If there are questions from the patient and his/her family	1 (4.3)
Do you recommend fertility preservation methods to the family of your newly diagnosed child with cancer?	
Yes	19 (82.6)
No	0 (0.0)
Sometimes	4 (17.4)

Table 2. Distribution of problems experienced by physicians in applying fertility preservation methods. (One physician reported more than one problem).

Problems	Number (%)
Urgency of treatment	16 (76.2)
The lack of infrastructure (reproductive health center) and shortage of physicians in the institution and/or region being worked in	13 (61.9)
The absence of a corporate or national standard	13 (61.9)
Patient age	13 (61.9)
Financial difficulties/insurance obstacles of the patient	13 (61.9)
I do not have sufficient knowledge about surgical methods that can be applied to pre-adolescent patients	8 (38.1)
Psychosocial difficulties	5 (23.8)
Insurance problem for refugee patients	5 (23.8)
Physician's high workload	5 (23.8)
Cultural and religious challenges	3 (14.3)
Lack of patient awareness	2 (9.5)
I do not have sufficient information about the use and effectiveness of fertility preservation methods for female patients	2 (9.5)
Other	1 (4.8)
Legal obstacles	0 (0.0)

which may limit their ability to thoroughly discuss reproductive health preservation and explore patients' concerns or preferences (8,9). Time constraints during initial consultations, often dominated by urgent treatment decisions, may preclude in-depth discussions concerning future reproductive plans. This underscores the need for institutional support, such as referral pathways, dedicated fertility liaisons, or integrated oncofertility clinics, to streamline the process.

In 2006, the American Society of Clinical Oncology (ASCO) published its recommendations for the preservation of fertility in cancer patients. These recommendations state that oncologists should discuss FP with patients shortly after the initial cancer diagnosis and, if appropriate, refer them to an FP specialist as soon as possible (10,11). In 2011, a study was conducted to determine pediatric oncologists' attitudes and practice models following the publication of ASCO guidelines. The study found that although 86% of pediatric oncologists who responded to the survey agreed with the recommendation to refer all adolescent males to a specialist in reproductive health before oncological treatment, only 46% reported implementing this practice. Additionally, only 44% reported adherence to ASCO guidelines (12). It's necessary to address the areas in which adherence to guidelines is challenging. Effective FP care requires structured protocols that ensure consistent screening for FP needs, facilitate seamless referrals between oncology and fertility services, provide timely access to fertility consultations and preservation options, and offer guidance on navigating financial aspects (13).

In our country, most pediatric hematology and oncology specialists appear to have knowledge, attitudes, and practices consistent with the literature on this issue. This positive outcome could create a hopeful foundation for strengthening efforts to preserve reproductive health. In 2015, the Society of Reproductive Health and Infertility aimed to increase awareness of FP among healthcare professionals by preparing a guide on preserving fertility in Türkiye. The aim of this project is to inform and guide patients based on current scientific evidence and to ensure access to centers implementing this practice. FP in patients diagnosed with cancer requires a multidisciplinary approach. In addition to fertility specialists involved in the care of patients requiring FP, awareness and knowledge should be increased among healthcare professionals across specialties who care for patients diagnosed with cancer (14,15).

In our study, the majority of respondents were female physicians (78.3%). Although our study did not perform statistical analyses of gender-based differences in practice, the physician's gender may influence the likelihood of initiating discussions on sensitive issues such as reproductive health. Future research could investigate whether this factor affects the frequency or depth of FP counseling in pediatric oncology.

The integration of reproductive health preservation into pediatric cancer care may face various obstacles, with resource limitations constituting a primary challenge. Access to FP services, such as sperm or egg banking facilities, may be limited in certain geographic areas or healthcare settings, posing logistical challenges for patients and providers. In the United Kingdom (UK), the Children's Cancer and Leukemia Group's Late Effects Working Group examined disparities in the provision of FP options to young patients with cancer. They found variability in the provision of FP for children with cancer across the country. The absence of dedicated government funding to support adherence to global standards has led to inconsistent care depending on location within the UK (16).

To overcome these barriers and improve the integration of reproductive health preservation into pediatric cancer care, several suggestions are proposed. Providing pediatric hematology and oncology specialists with ongoing education and training on FP techniques, guidelines, and communication strategies can improve their confidence and competence in addressing reproductive health concerns (17). Children's Oncology Group (COG) has developed a stratification system for gonadal dysfunction and infertility based on leukemia and lymphoma phase 3 protocols conducted between 2000 and 2022, to provide a standardized guide for assigning

gonadotoxic risk. This comprehensive guide serves as a valuable tool to enhance and standardize reproductive health counseling for patients undergoing COG-based leukemia/lymphoma care, both at diagnosis and during survivorship (18). The PanCareLIFE Consortium, in collaboration with the International Late Effects of Childhood Cancer Guideline Harmonization Group, developed a clinical practice guideline tailored for young female patients with cancer diagnosed during childhood, adolescence, or young adulthood (up to age 25). This guideline offers comprehensive advice on evaluating fertility risks and outlines various options for preserving fertility (19). Numerous guidelines have been issued regarding this matter (20-22). Each country should develop similar guidelines tailored to their own protocols. To improve the integration of FP into clinical care, participants suggested national protocols and centralized oncofertility units. Facilitating collaboration between pediatric oncology teams, fertility specialists, and other relevant healthcare professionals can enhance the comprehensive care of pediatric cancer patients, ensuring that their reproductive health needs are addressed holistically. The creation of referral algorithms endorsed by Turkish pediatric hematology and oncology groups could also foster uniformity in care. Patient education and family education also play a crucial role in this process. Developing culturally sensitive, age-appropriate educational materials and resources for pediatric cancer patients and their families can empower those families to make informed decisions about FP options and to advocate for their reproductive health needs. Embedding fertility education into survivorship care plans may further reinforce its importance. Healthcare institutions can support the integration of the preservation of reproductive health into pediatric cancer care by allocating resources to FP services, establishing referral pathways to fertility specialists, and fostering a culture of open communication regarding reproductive health. By addressing these suggestions and overcoming barriers, pediatric hematology and oncology specialists can enhance their ability to provide comprehensive, patient-centered care that considers the long-term reproductive health outcomes of children with cancer. Ultimately, prioritizing the preservation of reproductive health in pediatric cancer care can improve quality of life and survivorship outcomes for pediatric cancer patients.

Study Limitations

Our study has some limitations. One of these is the need to reach a greater number of pediatric oncologists nationwide to comprehensively assess their knowledge, attitudes, and practices regarding this matter. Additionally, a prospective study on this subject that would prevent recall bias will provide more reliable data. (23,24).

CONCLUSION

Identifying existing barriers and strengthening related efforts can help to develop more effective strategies for preserving the reproductive health of individuals undergoing cancer treatment in our country in the future. In this context, measures such as education and awareness-raising efforts among healthcare professionals, policy changes, and resource allocation can be implemented.

Ethics

Ethics Committee Approval: This study was conducted in accordance with the Declaration of Helsinki. Ethical approval for this study was obtained from the Ethics Committee of Ankara University (approval number: 2022/24, date: 12.01.2022).

Informed Consent: The medical doctors who agreed to participate were informed about the study.

Footnotes

Authorship Contributions

Concept: S.İ.Ö., Design: S.İ.Ö., Data Collection or Processing: S.İ.Ö., Analysis or Interpretation: S.İ.Ö., N.T., H.D., E.C.Ü. Literature Search: M.Y.O., S.İ.Ö., Writing: M.Y.O., S.İ.Ö.

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