ANKARA CITY HOSPITAL MEDICAL JOURNAL

VOLUME 4 NUMBER 3 SEPTEMBER 2025

ISSN :2822-5872

Contents

ACH Med J
(2025) 3: 070-076
ISSN:2822-5872
Doi : 10.5505/achmedj.2025.85570

RESEARCH ARTICLE

Patient Companions' Awareness Of Child Rights

Pinar Ozbudak[1], Can Demir Karacan[2]
[1]Ankara Etlik City Hospital, Department of Pediatric Neurology, Ankara, Türkiye
[2]Ankara City Hospital, Department of Pediatrics, Ankara, Türkiye

Article Info

Received Date: 24.06.2025
Revision Date : 24.06.2025
Accepted Date: 04.08.2025

Keywords:
Child,
Convention on the Rights of the Child,
Child rights,
Hospitalization,
Health rights

ORCIDs of the authors:
PO :0000-0003-3215-1738
CDK :0000-0001-5301-8106

Abstract

Introduction: The Convention on the Rights of the Child recognizes children as individuals entitled to fundamental rights, including the right to health. This right extends to children receiving inpatient care, ensuring their access to appropriate medical treatment and protection. However, the awareness of these rights among caregivers remains limited, which may influence the care children receive.

Methods: A descriptive, cross-sectional study was conducted at a tertiary pediatric hospital. A structured questionnaire was administered to accompanying persons of hospitalized children to evaluate their awareness of both the Convention on the Rights of the Child and national patient rights regulations. Sociodemographic data and response patterns were analyzed using descriptive statistics.

Results: Out of 200 participants, only 28% were aware of the Convention on the Rights of the Child, and just 35% had prior knowledge of the national Patient Rights Regulation. Common misconceptions included the child's right to refuse treatment, informed consent requirements, and the child's right to confidentiality. Awareness levels were significantly lower among participants with lower educational attainment ($p < 0.05$).

Discussion: The findings suggest that many caregivers lack sufficient knowledge of children's rights in medical contexts. This lack of awareness may hinder effective communication with healthcare professionals and limit the child's autonomy and participation in care decisions. Systematic caregiver education within hospital settings could help bridge this gap.

Conclusion: The goals outlined in the Convention on the Rights of the Child are not fully realized in clinical practice. Increasing awareness among caregivers is essential to promote child-centered care and uphold health-related rights during hospitalization. Future studies should focus on developing and evaluating interventions to improve understanding of child and patient rights.

Correspondence Address: Varlik Mah. Halil Sezai Erkut Cad.Ankara 06190 Ankara - Türkiye
Phone: +90 507 659 67 92 / **e-mail:** drpinaroz@yahoo.com

Copyright© 2025. Ozbudak et al. This article is distributed under a Creative Commons Attribution 4.0 International License.
Follow this and additional works at: https://achmedicaljournal.com

Introduction

Childhood has been one of the fundamental aspects of all cultures throughout history. Every civilization interprets infancy based on its cultural traits, indicating variations in this idea among different societies.[1]

In our present era, the importance and worth attributed to children in a society are linked to the level of development of that community and, it is the state's responsibility to ensure that children achieve their fundamental rights and freedoms. Therefore, the Convention on the Rights of the Child was signed by world leaders on November 20, 1989, at the General Assembly of the United Nations. This convention, which provides for the protection of children who are unable to meet their basic needs, are forced to work in unsuitable jobs, or are subjected to sexual abuse or exploitation, emphasizes the importance of children's well-being, development, participation, equality, health and education.

In addition to protective rights, the Convention includes personal rights such as access to adequate nutrition, health care, clean water, education and economic, social and cultural rights. Its aim is to elevate children's rights to the same level as the rights recognized for all individuals.

According to Article 24 of the Convention, signatory parties must strive to ensure that all children have access to medical care services. Children's health rights begin at gestation and continue through newborn, infancy, childhood, and adolescence. Essential health rights encompass a range of services, including monitoring the mother's health during pregnancy, terminating pregnancy in appropriate circumstances, providing additional nutrition after initial breastfeeding, ensuring balanced and sufficient nutrition, monitoring growth and development, administering complete vaccinations, delivering various health services, providing care and assistance during illness, safeguarding against neglect and abuse, and supplying adequate and appropriate stimuli.[2,3] The Convention asserts that children of all ethnicities should have access to health services. It also emphasizes that female children should receive equal and attentive care as male children. Additionally, it states that refugee children should have the same opportunities for health services as others, and that health services in rural regions should be equivalent to those in urban areas.[4] States should base their health service policy on the significant benefits for children, as stated by the Human Rights Joint Platform in 2012.

Waterson's study explores two approaches that doctors should consider for child health, one of which is a holistic approach. Doctors are responsible for ensuring that children have proper health and development, are not economically exploited, do not engage in harmful work, are not subjected to violence at home or in institutions, have access to education, and are not impacted by discrimination, poverty, or racism. Another study highlighted the significance of offering specialized care to children and adolescents while using alternative therapy modalities. The study emphasizes that interacting with children individually, informing them, and treating their opinions and thoughts with respect can result in more effective therapy outcomes.[2]

Health policy providers and healthcare workers have a primary responsibility to ensure that children and adolescents are treated in accordance with their rights. During hospitalization, caregivers who accompany children play a crucial role in maintaining the effectiveness of treatment. Caregivers of unwell children often experience high levels of anxiety and stress due to treatment processes.[5-7] Primary factors affecting caregivers include disruptions to family dynamics during a child's hospitalization, hospital routines, and difficulties understanding treatment information. The involvement of caregivers in the therapy process can have a positive impact on the treatment of sick children.[8] By including caregivers in the treatment process, they can reduce their own anxiety and tension while also expediting the child's treatment. This study aims to assess the amount of awareness among caregivers of children undergoing inpatient treatment in pediatric clinics on child and patient rights, their ability to enforce these rights, and the methods they employ to address challenges associated with these rights.

Material and Methods

The research was conducted using a correlational survey model, which is a type of survey methodology used to assess previous or current situations. This study examines patient companions who provided care to patients receiving inpatient treatment at the general pediatric clinics of the Dr. Sami Ulus Gynecology, Child Health and Diseases Training Research Hospital from January 1 to December 21, 2014.

The sample method used was simple random sampling, a type of probability sampling that ensures

each individual has an equal chance of being selected. The study included 100 voluntary patients. Excluded from the study were patient companions who did not provide care, caregivers of patients who were hospitalized multiple times within specific periods, and patients with chronic disorders such as oncologic or renal conditions.

The data collection instrument utilized was the 'Companion Child Rights Attitude Scale,' which comprises a 35-item, 5-point Likert scale, and 6 demographic questions. The study used the scale form to evaluate companions' perspectives on child rights, specifically focusing on the sub-dimensions of 'Basic Patient Rights' and 'Basic Child Rights.' The validity and reliability of the scale were established through studies, leading to its standardization. The results indicated that the scale accurately reflected the companions' attitudes towards child rights, with a reliability coefficient of 0.941. Informed consent was obtained from all participants and the authors declare that this study is consistent with the journal's ethical publication standards.

Statistical Analysis

All statistical analyzes were conducted using SPSS v28.0 [IBM Corporation]. P values less than 0.05 were considered statistically significant. Descriptive statistics included mean± standard deviation for continuous variables and frequency for categorical variables. The data were analyzed for both epileptic and non-epileptic groups using Mann-Whitney U tests for continuous variables and chi-square or Fisher exact tests for categorical variables.

Results

This section presents the data collected from the scale, the results of the analysis conducted, and corresponding remarks on the participants' personal information. Findings are presented in section 3.1.

Participants' Demographic Data

Table 1 presents information on the study's volunteers, including their age, degree of relation to the patient, city of residence, educational level, monthly income, and the sex of the patient they accompanied.

Of the 100 patient relatives, 22 (22%) were aged 15-25, 54 (54%) were aged 26-35, 20 (20%) were aged 35-45, and 4 (4%) were over 45 years old. In the study, 97% of the participants were mothers of the patient, while the remaining 3% were other relatives. Of the total participants, 70% reside in Ankara, which is equivalent to 70 individuals, while the remaining 30% live outside of Ankara, totaling 30 individuals. The volunteers in the study are distributed according to their educational levels as follows: 10% of the group, equivalent to 10 individuals, are illiterate. 40% or 40 individuals have completed primary education, 21% or 21 individuals have completed secondary school, 19% or 19 individuals have completed high school, and 10% or 10 individuals have graduated from university. 65% of participants are unemployed, 15% have a monthly income below 1000 TL, 10% have a monthly income between 1001 and 2000 TL, 5% have a monthly income between 2011 and 5000 TL, and 5% have a monthly income above 5000 TL. 66% of participants have 1 or 2 children, 20% have 3 or 4 children, and 14% have more than 4 children. 56% of the patients cared for by the volunteers in the study were female children, totaling 56 children, whereas 44% were male children, totaling 44 children. (Table 1)

Table 1 shows some of the participant features

Participants information	Variables	f	%
Participants Age	15- 25 years	22	22
	26-35 years	54	54
	36-45 years	20	20
	>45 years	4	4
Patient Affinity Degree	Patient's mother	97	97
	Relatives other than mother	3	3
Education Status	Illiterate	10	10
	Primary school graduate	40	40
	Secondary school graduate	21	21
	High school graduate	19	19
	College / University graduate	10	10
Monthly Income	No monthly income	65	65
	<1000 ₺	15	15
	1001-2000 ₺	10	10
	2001-5000₺	5	5
	>5000 ₺	5	5
Number of children	1-2	66	66
	3-4	20	20
	>4	14	14

Participants' Discovery of Fundamental Patient Rights

Table 2 presents the participants' perspectives on the process of diagnosing and hospitalizing the patients they accompanied.

The study initially examined whether the patients being assisted by the volunteers had prior hospitalizations. Of the patients, 63% had prior hospitalizations for inspection, diagnosis, and treatment, while 37% were hospitalized for the first time. In the study,

76 out of 100 caregivers (76%) were aware of their patient's diagnosis and reason for hospitalization, while 24 (24%) were not informed. The treatment periods varied: 32% of patients were treated for 0-3 days, 39% for 4-7 days, 17% for 8-14 days, 4% for 15-20 days, and 8% for more than 21 days. During the study, the patients' companions were asked about their knowledge of the names of the doctors who were attending to the patients. The results showed that 71% of the participants were unaware of their patient's doctor's name, while only 29% knew the doctor's name. Additionally, the study found that 70% of the voluntary caregivers were fully informed by the doctors about their patient's condition and disease, while 11% were not informed and the remaining 20% were not well educated. Of the sample, 76% received daily information from their doctors, while the remaining 24% did not. 96% of participants expressed satisfaction with the auxiliary health personnel.

55% of participants were aware of alternative treatments, while 27% had no information about them. 18% of the participants lacked sufficient knowledge about alternative treatments. Regarding the location where the patient's medical history was recorded, 63% of the participants mentioned it was done in a separate room, while 27% stated it was done in the patient's room. The participants were also surveyed about their preferences for the location of their patient's physical examination. During the information gathering and examination process, 24% of participants preferred to be in a separate room, while 76% indicated that it did not matter to them whether these procedures took place in a general or separate room. The text is grammatically correct and follows a clear and logical structure. When asked about their roles in making decisions about their patients' treatment, 18% claimed full authority, 67% left the decisions to the doctor, and 15% made decisions in consultation with their doctor. When asked about their roles in making decisions about their patients' treatment, 18% claimed full authority, 67% left the decisions to the doctor, and 15% made decisions in consultation with their doctor. Technical terms are explained when first used, and the language is clear, objective, and value neutral. The text adheres to conventional academic structure and formatting, including consistent citation and footnote style. The text is balanced and free from bias, and precise word choice is used throughout. No changes in content have been made. (Table 2)

Table 2. Opinions of participants on basic patient-child rights

Question	Variables	f	%
Do you know your patient's diagnosis?	Yes	24	24
	No	76	76
How long does your patients hospitalized?	0-3 days	32	32
	Between 4-7 days	39	39
	8-14 days	17	17
	Between 15-21 days	4	4
	More than 21 days	8	8
Do you know your doctor's name?	Yes	71	71
	No	29	29
How do you score to get general information from your doctor?	Sufficient	70	70
	Insufficient	19	19
	none	11	11
Do you have daily information from your doctor?	Yes	76	76
	No	24	24
Are you satisfied with the staff?	Yes	96	96
	No	4	4
Where do you prefer for telling patient history?	Private Room	63	63
	Doesn't matter	37	37
Where do you prefer for examination and taking information?	Private Room	24	24
	Doesn't matter	76	76
Who does decide the treatment?	Doctor	67	67
	Only patient's relatives	18	18
	Doctor and patients' relatives	15	15

Participants' Discovery of Fundamental Child Rights

Table 3 presents the participants' discoveries regarding fundamental child rights. The study examined the number of patients the participants preferred to share a room with. Of the participants, 3% preferred a single room, 16% preferred a double room, 31% preferred a room for 3-4 people, and 50% preferred staying in the wards. The study also examined the participants' opinions on the meals provided to the patients. In the survey, 79% of respondents believed that the food provided to patients was both age-appropriate and hygienic, while 9% thought it was age-appropriate but unhygienic. The remaining 12% reported that the food was neither age-appropriate nor hygienic. Additionally, 82% of participants expressed satisfaction with the service's hygienic conditions, while 18% found them inadequate. The poll also gathered the participants' views on the presence of the patients they escorted to their educational activities. 25% of the companions reported that their patients continued education, while 42% reported education interruption without the

chance for compensation. Additionally, 33% reported a negative impact on education with the possibility for compensation. In terms of safety, 86% of participants felt comfortable at the hospital, while 14% did not feel safe based on their responses to safety-related questions. The study also examined the participants' perspectives on the appropriate environment for the development and play of their patients. 96% of the respondents reported inadequate ambiance for their patients, while the remaining 4% mentioned creating a playful atmosphere using their own resources.(Table3)

Table 3. Findings of Participants on Basic Child Rights

Question	Variables	f	%
What is the number of patients you desire in the room?	Single room	3	3
	Double Room	16	16
	3-4 Person Room	31	31
	Ward Room	50	50
How do you describe hospital food for your patient?	Age inappropriate and not clean	-	-
	Age inappropriate but clean	12	12
	Age appropriate but not clean	9	9
	Age appropriate and clean	79	79
Do you find the hospital clean enough?	Sufficient	82	82
	Insufficient	18	18
Does your patient have any opportunity to continue education in hospital?	No but compensable	33	33
	No but in compensable	42	42
	Yes	25	25
Do you feel in confidence in hospital?	Yes	86	86
	No	14	14
Does your patient have any place to play in hospital?	Sufficient	-	-
	Insufficient	96	96
	Insufficient but compensation by own possibilities	4	4

Discussion

Child Rights refer to the entitlements and privileges given to all children without bias, in accordance with legal regulations and fundamental human rights from the time of conception. Although basic child rights are anticipated to progress with time compared to the past, the current global situation exposes new instances of child rights breaches.[11,12] Child rights, including living conditions, shelter, healthcare, and education, are being violated worldwide due to factors such as war, migration, poverty, and child labor. It is necessary to identify, raise awareness of, and address these shortcomings in order to preserve these rights.[13,14] The topic of health in child rights is underexplored. This study aims to determine the rights of children who are ill and the level of awareness their companions have regarding these rights. The study concluded that the volunteers accompanying the patients lack sufficient understanding of the patients' rights. The ages of the individuals attending to the patients were found to be rather young. At times, underage caregivers were seen accompanying the patients. The lack of knowledge among caregivers regarding patient rights is attributed to their similarity in age to the sick children.[15] When questioned about patient rights, participants indicated that they believed they were being treated favorably. This finding is similar to the research conducted by Eksen and Karadağ[11] which concluded that adult patients have the right to receive considerate, friendly, and compassionate health services. The majority of participants in the study were mothers of ill children. Mothers of unwell children have lower educational attainment. Participants' lack of knowledge about patient rights for unwell children is due to their poor education.

Conducting a thorough anamnesis is the crucial first step in patient assessment and plays a fundamental role in diagnosis and treatment.[16] The anamnesis process begins with the doctor introducing themselves in a way that ensures patient confidentiality. The process begins with open-ended inquiries within a framework of mutual trust. According to our survey, most participants are unaware of the name of the doctor in charge of their care. The survey also revealed that participants receive daily information from their doctor.[16] The majority of those who receive daily information from their doctor are either illiterate or have only completed primary school. Most patient companions are knowledgeable about alternative treatments for managing their patients. This case supports the idea that the most important aspect of patient rights is the provision of information.[16] The participants in the study reported that they received an adequate amount of information from their patients' doctors. During the decision-making process regarding treatments and alternative therapies, it was observed that 67% of participants entrusted the responsibility entirely to their attending doctor and did not exercise their right to participate in the treatment process. The participants stated that a separate room for conducting patient interviews and examinations is unnecessary while still considering patient privacy. This instance illustrates the lack of information among participants regarding patient privacy.

The perspectives of participants on essential children's rights revealed that patient companions prefer to stay in wards with six individuals.[16,17] Patients' partners with a high school education or lower

were noted to prefer wards more frequently. Additionally, patient companions living in households with five or more individuals show a greater preference for wards. When asked, they clarified that they do not feel bored in crowded spaces. Instead, they enjoy meeting new people, forming lasting connections, and providing mutual support in various situations. The situation was attributed to the sick companions' limited social circle, distance from relatives, and experience of loneliness.[18-20]

One of the participants' findings is that patients have limited access to education while in the hospital. In our study, 71% of participants have an educational level at or below secondary school. Of the patients accompanied by them, 25 individuals (25%) are able to continue their education, while 42 individuals (42%) have no opportunity to make up for interrupted education due to hospitalization. Additionally, 33 individuals (33%) believe that their patient's education has been negatively impacted but can still be recovered. It is important to increase the rate at which patients can continue their education and to improve the educational level of caregivers.[21]

Currently, there are no play areas for children in hospitals and inpatient facilities in our country. The existing playfields were developed through collaborative efforts between individuals and the hospital. Playing is a fundamental right for children, and play therapy is crucial in treating some illnesses. Most participants reported that the hospital does not provide play areas equipped with age-appropriate toys for children's growth and meeting hygienic standards. Most participants reported that the hospital does not provide play areas equipped with age-appropriate toys for children's growth and meeting hygienic standards. Most participants reported that the hospital does not provide play areas equipped with age-appropriate toys for children's growth and meeting hygienic standards. It is recommended that hospitals offer such facilities to promote children's well-being.

Conclusion

The study recommends that hospitals implement short-term, middle-term, and long-term strategies and techniques in their patient companion activities. Further investigations are necessary to support this premise. Ambiguity about treatments provided to unwell children in hospital inpatient services may cause caregivers to develop prejudices, which could adversely impact the medical care of the ill youngster. When parents accompany their sick children to hospitals, it is recommended to provide them with comprehensive information about the medical procedures that will be performed by healthcare professionals. Additionally, involving parents more extensively in the process can be beneficial.

References

1. Stearns PN. Çocukluğun tarihi. Dikmen H, Uçar B, çevirenler. İstanbul: Dedalus Yayınları; 2018.
2. Örün E, Tatlı MM. BM Çocuk Hakları Sözleşmesi'ne göre Türk çocuklarının sağlık ve sosyal hakları açısından durumu. Yeni Tıp Derg. 2012;29(3):132–7.
3. İnsan Hakları Ortak Platformu. Yaş ayrımcılığı: Kanun önünde eşitlik ve çocuk hakları politika belgesi. 2012.
4. Doupnik SK, Hill D, Palakshappa D, Worsley D, Bae H, Shaik A, et al. Parent coping support interventions during acute pediatric hospitalizations: A meta-analysis. Pediatrics [Internet]. 2017;140(3). https//doi:10.1542/peds.2016-4171
5. Çavuşoğlu H. Çocuk sağlığı hemşireliği. Ankara: Sistem Ofset Basımevi; 2013. p. 51–67.
6. Koçhan A. Engelli çocuğa sahip ebeveynlerin stres düzeyi, stresle başa çıkma tarzları, hastalık yükü algıları ve bilgece farkındalık düzeyleri arasındaki ilişkinin incelenmesi [Yüksek lisans tezi]. Ankara: Başkent Üniversitesi Sosyal Bilimler Enstitüsü; 2019.
7. Konuk Şener D, Karaca A. Mutual expectations of mothers of hospitalized children and pediatric nurses who provided care: Qualitative study. J Pediatr Nurs. 2017;34:e22–8.
8. Cimete G, Kuğuoğlu S, Çınar ND. Çocuk, hastalık ve hastane ortamı. In: Başbakkal Z, Yılmaz HB, Bolışık B, editors. Pediatri Hemşireliği. Ankara: Akademisyen Kitabevi; 2013.
9. Açıkgöz A, Ezen M, Söngüt S, Ulukuş A, Emir B. Çocuğu hastanede yatan annelerde anksiyete ve depresyon belirtilerinin değerlendirilmesi. ACU Sağlık Bil Derg. 2019;10(3):373–82.
10. Eksen M, Karadağ N, Işıkay Ç, Karakuş A, Seyhan D, Karanlık M. Hastaların hasta hakları konusundaki bilgi düzeylerinin belirlenmesi. Uluslararası İnsan Bilimleri Dergisi. 2004;1(1):1–12.
11. Erdem Ö. Sağlık personeli ve hastaların hasta hakları konusunda bilgi düzeyleri ve uygulanan müdahale yöntemlerinin etkinliğinin değerlendirilmesi [Uzmanlık tezi]. Ankara: Başkent Üniversitesi Tıp Fakültesi Halk Sağlığı AD; 2007.
12. Özer A. Kayseri il merkezinde çalışan hekim-

lerin hasta hakları konusundaki bilgi, tutum ve davranışları [Uzmanlık tezi]. Kayseri: Erciyes Üniversitesi Tıp Fakültesi Halk Sağlığı AD.
13. Değirmencioğlu S. Tersten katılım: Katılım hakkı üzerine bir değerlendirme. In: Birleşmiş Milletler Çocuk Haklarına Dair Sözleşme'nin 20. yılında Türkiye'de çocuk hakları. Ankara: Maya Akademi; 2010.
14. Erbay E. Çocukların katılım hakkı üzerine bir Türkiye değerlendirmesi. J Hum Soc Sci Res. 2013;2(1):52.
15. Şahin S, Polat O. Türkiye'de ve dünyadaki gelişmiş ülkelerde çocuk katılım hakkı algısının ve uygulamalarının karşılaştırılması. Hukuk ve İktisat Araştırmaları Dergisi. 2012;4(1):275–82.
16. Waterson T. Children's rights and child health: what role for paediatricians? Lancet. 2003;361:2226–30. https//doi: 10.1093/tropej/49.5.260
17. General Medical Council. Protecting children and young people: the responsibilities of all doctors. London: GMC; 2012.
18. Gündem Çocuk Derneği. Üçüncü Türkiye çocuk politikası: Sağlık sistemi. In: Gündem Çocuk: Türkiye Politikası. 2008.
19. Acar H. BM Çocuk Haklarına Dair Sözleşmenin 20. yılında Türkiye'de çocuk hakları. Ankara: Maya Akademi Yayınları; p. 97–100.
20. UNICEF. Türkiye'de çocuk ve genç nüfusun durumunun analizi. Ankara: UNICEF Türkiye Temsilciliği; 2012.
21. Aydın E. Çocuklarda aydınlatılmış onam sorunu. Çocuk Sağlığı ve Hastalıkları Dergisi. 2003;46:148–52.

ACH Med J
(2025) 3: 077-082
ISSN:2822-5872
Doi : 10.5505/achmedj.2025.46320

RESEARCH ARTICLE

Assessment of Birth and Perinatal Outcomes in Pregnant Women Aged 50 and Over

Gulcan Okutucu,[1] Dilek Sahin[1]
[1]Ankara Bilkent City Hospital, Department of Obstetrics and Gynecology, Perinatology Clinic

Article Info

Received Date: 14.08.2025
Revision Date : 02.09.2025
Accepted Date: 09.09.2025

Keywords:
Advanced maternal age,
Pregnancies over 50,
Perinatal outcomes,
Obstetric complications,
Neonatal intensive care.

ORCIDs of the authors:
GO :0000-0003-4618-8312
DS :0000-0001-8567-9048

Abstract

Introduction: This study aimed to evaluate birth and perinatal outcomes in pregnant women aged 50 years and older, a rarely studied and high-risk demographic group.

Methods: This retrospective study included 24 pregnancies in women aged ≥50 who delivered at Ankara Bilkent City Hospital between January 2019 and March 2025. Data were collected on maternal demographics, obstetric history, pregnancy complications, delivery characteristics, and neonatal outcomes.

Results: Out of 44,136 total births, 24 (0.054%) occurred in women aged 50 or older. The median maternal age was 50.5 years. Chronic comorbidities were present in 41.7%, with hypothyroidism, type 2 diabetes, and asthma being most common. Half of the cohort experienced pregnancy-related complications, primarily gestational diabetes and hypertension (16.6% each). Cesarean delivery was performed in 79.2% of cases. Preterm birth and low birth weight occurred in 37.5% of deliveries. Neonatal intensive care unit (NICU) admission was required in 58.3% of newborns, with a median stay of 2 days. Trisomy 21 was diagnosed prenatally in two cases through amniocentesis. Most pregnancies were spontaneous (75%); 25% followed assisted reproductive techniques, including conventional IVF (12.5%), frozen embryo transfer (8.3%), and oocyte donation (4.2%).

Conclusion: Pregnancies in women aged 50 years and older are associated with high rates of maternal and neonatal complications, including preterm birth, low birth weight, and NICU admission. The findings highlight the need for individualized prenatal care, comprehensive counseling, and close perinatal monitoring to mitigate risks in this growing but vulnerable population.

Correspondence Address: Üniversiteler Mahallesi 1604. Cadde No: 9 Çankaya Ankara - Türkiye
Phone: +90 553 009 78 23 / **e-mail:** gulcanokutucu@gmail.com

Copyright© 2025. Okutucu et al. This article is distributed under a Creative Commons Attribution 4.0 International License.
Follow this and additional works at: https://achmedicaljournal.com

Introduction

Advances in assisted reproductive technologies (ART) and improvements in maternal healthcare have enabled women to conceive and deliver at increasingly advanced ages. Although pregnancies in women over the age of 35, classified as advanced maternal age, have been extensively studied, conception and childbirth at or beyond the age of 50 remain rare and are often associated with substantial maternal and perinatal risks.[1,2] In recent decades, the number of such pregnancies has increased, largely due to oocyte donation, in-vitro fertilization (IVF), and embryo cryopreservation.[3,4]

Pregnancy at very advanced maternal age is physiologically challenging. Natural fertility declines sharply after the age of 40, with spontaneous conception beyond 50 years being exceptionally rare.[5] When conception does occur, either spontaneously or through ART, older mothers face higher rates of complications such as gestational hypertension, preeclampsia, gestational diabetes, and placental abnormalities.[6] Perinatal risks are also heightened, including preterm birth, low birth weight (LBW), intrauterine growth restriction, and increased rates of neonatal intensive care unit (NICU) admission.[3,4]

While the obstetric outcomes of women in their 40s have been investigated in large cohorts, there is limited literature specifically examining pregnancies in women aged 50 years and above. The rarity of such pregnancies means that most evidence is derived from small case series or single-center retrospective studies, often with heterogeneous populations and clinical practices.[2,7,8] Furthermore, the interplay between age-related comorbidities, the higher prevalence of ART, and the unique physiological demands of pregnancy at this age remain incompletely understood.

In Turkey, data on pregnancies in women aged 50 years and older are scarce. Given the growing accessibility of ART and shifting sociocultural attitudes toward delayed childbearing, it is important to characterize the clinical profiles, pregnancy complications, and neonatal outcomes in this demographic. The present study aims to describe the demographic features, obstetric histories, maternal complications, delivery characteristics, and perinatal outcomes of pregnant women aged 50 years and older who delivered at a tertiary referral hospital over a six-year period

Material and Methods

Design and study population

This study was conducted at the Perinatology Clinic of Ankara Bilkent City Hospital between January 2019 and March 2025. Institutional review board approval was obtained from the Ethics Committee of the Republic of Turkey Ministry of Health Ankara City Hospital (Approval number: TABED 1-25-1575; Date of approval: 13.08.2025). All stages of the study adhered to the principles of the Declaration of Helsinki.

The study included pregnant women aged 50 years or older who were followed up in the inpatient services of the high-risk pregnancy unit and delivered at the hospital. A retrospective review of hospital records was conducted to collect comprehensive data on all cases. This included demographic characteristics (age, smoking status, and presence of chronic illnesses), body mass index (BMI, [calculated by dividing weight in kilograms by the square of height in meters]), obstetric history (gravida, parity, history of abortion, number of living children, and history of vaginal bleeding), and use of assisted reproductive technologies. Information on the presence of multiple pregnancies, prenatal screening results (e.g., non-invasive prenatal testing [NIPT]), antenatal follow-up processes, and indications for labor (e.g., spontaneous onset, induction for maternal or fetal indications, or elective cesarean delivery) was recorded. Additional data included whether invasive diagnostic procedures (e.g., amniocentesis) or detailed second-trimester ultrasonographic evaluations were performed. Obstetric complications, placental pathologies (e.g., placenta previa, abruption, accreta spectrum), gestational age at delivery, and birth weight were also documented. Perinatal outcomes such as 1- and 5-minute APGAR scores, umbilical cord blood pH, neonatal intensive care unit (NICU) admission status, and duration of NICU stay were systematically extracted. Preterm birth was defined as delivery occurring before 37 completed weeks of gestation.[9] LBW was defined as a birth weight below 2500 grams.[10]

All patients were managed under high-risk pregnancy protocols. Low-dose aspirin (100 mg/day) was initiated before 16 weeks for preeclampsia prevention.[11] Gestational diabetes screening was performed between 24–28 weeks using either a two-step method (50 g glucose challenge test followed by a 100 g OGTT if positive) or a one-step 75 g OGTT,

depending on clinician preference and patient characteristics. Fetal surveillance included serial growth ultrasounds every 3–4 weeks and non-stress testing starting at 32 weeks. Follow-up visits occurred every 2–3 weeks in the second trimester and weekly thereafter. Antenatal corticosteroids and magnesium sulfate were administered when preterm birth was anticipated. Delivery was generally planned between 37–39 weeks unless earlier intervention was clinically indicated.

Statistical analysis

Statistical Package for Social Sciences (SPSS version 26.0; Chicago, IL, USA) was utilized for data analysis. Median (interquartile range [IQR]) or mean±standard deviation represented continuous variables, while counts (percentages, %) measured categorical variables. The study assessed the normal distribution of variables through the Kolmogorov–Smirnov test.

Results

During the study period, a total of 44,136 births were recorded at the hospital, of which 24 were to mothers aged 50 years or older, representing a prevalence of approximately 0.054%. The median age of the cases is 50.5 (IQR 12). Chronic diseases were present in 41.7%, most commonly hypothyroidism (12.5%), type 2 diabetes (8.3%), and asthma (8.3%). Smoking was reported by 12.5%. Median gravida and parity were 4 (IQR 5) and 2 (IQR 5), respectively.

Cesarean delivery occurred in 79.16%, with a median gestational age at delivery of 37 weeks (IQR 4). Preterm birth and LBW each occurred in 37.5%. Mean birth weight was 2799.4 ± 888 g. Median APGAR scores were 7 (IQR 1) and 9 (IQR 1) at 1 and 5 minutes, respectively. NICU admission was required in 58.3% of newborns, including 11 who were monitored for at least 10 days due to postnatal respiratory distress syndrome. The median NICU stay for all admitted newborns was 2 days (IQR 9). Detailed information on the clinical and demographic characteristics of pregnant women aged 50 years and older and their perinatal outcomes are presented in Table 1.

Table 1. Clinical and demographic characteristics and perinatal outcomes of pregnant women aged 50 years and older

Cases (n=24)	
Demographic characteristics	
Age	50.5(12)
BMI (kg/m2)	29.1(5.1)
Maternal chronic diseases	10(41.7%)
Smoking	3(12.5%)
Gravida	4(5)
Parity	2(5)
History of abortion	0(2)
Number of living children	2(4)
Antenatal period	
Combined first-trimester screening	13(54.2%)
NIPT	2(8.3%)
Amniocentesis	2(8.3%)
Mid-trimester obstetric US	10(41.7%)
Aneuploidy (Trisomy 21)	2(8.3%)
Obstetric and perinatal outcomes	
Cesarean section	19(79.16%)
GA at delivery (weeks)	37(4)
Preterm birth	9(37.5%)
Low birth weight (<2500g)	9(37.5%)
Birth weight (g)	2799.4±888
APGAR score (1st min.)	7(1)
APGAR score (5th min.)	9(1)
Umbilical cord arterial pH	7.34(0.11)
NICU admission	14(58.3%)
NICU hospitalization (day)	2(9)

BMI: body mass index, GA: gestational age, NICU: neonatal intensive care unit, NIPT: non-invasive prenatal testing, US: ultrasound.
Values are presented as mean ± standard deviation, median (IQR) or number (percentage).

Combined first-trimester screening tests were performed in 54.2% of cases. Only two women agreed to undergo prenatal diagnostic testing, both with singleton pregnancies. Amniocentesis was performed in both. In one case, the first trimester prenatal screening test revealed both an age-related risk and a trisomy 21 risk greater than 1/50, and mid-trimester obstetric ultrasound detected inlet and muscular ventricular septal defects in the fetal heart. In the second case, the NIPT result indicated a high risk for trisomy 21, and the first-trimester ultrasound raised suspicion of an atrioventricular septal defect, which was confirmed in a subsequent scan. Prenatal diagnostic testing in both pregnancies confirmed trisomy 21. No aneuploidy has been detected in any newborns except for these cases.

Pregnancy complications affected 50%, including gestational diabetes and hypertension (16.6% each), placental pathologies (12.5%), intrahepatic cholestasis (12.5%), antenatal bleeding (8.3%), preeclampsia (8.3%), fetal growth restriction (8.3%), and PPROM (4.2%). Among cesarean indications (n=19), the most frequent were prior cesarean (25%) and non-reassuring fetal heart tracing (20.8%), followed by severe preeclampsia (12.5%), multiple gestation (12.5%), and prior myomectomy (8.3%) (Table 2).

Table 2. Chronic and obstetric comorbidities and indications for cesarean section in pregnant women aged 50 years and older

Cases (n=24)		
	n	**%**
Maternal chronic diseases:10		
Hypothyroidism	3	12.5%
Type 2 diabetes mellitus	2	8.3%
Asthma	2	8.3%
Hypertension	1	4.2%
Malignancy	1	4.2%
Hepatitis C	1	4.2%
Obstetric complications:12		
Gestational diabetes	4	16.6%
Class A1	1	4.2%
Class A2	3	12.5%
Gestational hypertension	4	16.6%
Placental pathologies	3	12.5%
Placental hematoma	1	4.2%
Placenta previa	2	8.3%
Antenatal vaginal bleeding	2	8.3%
Intrahepatic cholestasis	3	12.5%
Preeclampsia	2	8.3%
Fetal growth restriction	2	8.3%
PPROM	1	4.2%
Cesarean indications:19		
Prior cesarean section	6	25%
Non-reassuring fetal heart tracing	5	20.8%
Severe preeclampsia	3	12.5%
Multiple gestation	3	12.5%
Prior myomectomy	2	8.3%

PPROM: preterm premature rupture of membranes.

Most pregnancies were spontaneous (75%); 25% followed ART, including conventional IVF (12.5%), frozen embryo transfer (8.3%), and oocyte donation (4.2%). Singleton pregnancies comprised 75%, twins 20.8%, and triplets 4.2%, with one multifetal reduction performed (Table 3). The case of a dichorionic triamniotic triplet pregnancy resulted in two newborns being monitored for transient tachypnea after birth, while one newborn required a 28-day NICU stay for neonatal sepsis. In another case, a woman with preterm premature rupture of membranes at 30 weeks underwent cesarean delivery at 32 weeks due to severe preeclampsia; the newborn developed retinopathy of prematurity and required a 41-day NICU stay.

Table 3. Pregnancy characteristics and number of fetuses in pregnant women aged 50 years and older

Cases (n=24)		
	n	**%**
Pregnancy characteristics		
Spontaneous	18	75%
ART pregnancies	6	25%
Conventional IVF	3	12.5%
Frozen embryo transfer	2	8.3%
IVF with oocyte donation	1	4.2%
Number of fetuses in pregnancies		
Singleton	18	75%
Twin	5	20.8%
Dichorionic diamniotic	3*	12.5%
Monochorionic diamniotic	1	4.2%
Monochorionic monoamniotic	1	4.2%
Triplet	1	4.2%
Dichorionic triamniotic	1	4.2%

ART: assisted reproductive techniques, IVF: in-vitro fertilization.
* In one case, a triplet gestation underwent multifetal pregnancy reduction during the first trimester.

Discussion

This study presents one of the few datasets from Turkey evaluating obstetric risks and perinatal outcomes in women aged 50 years and older, a population in which pregnancy is rare but appears to be increasing with the wider availability of ART. In our cohort, such pregnancies accounted for 0.054% of all births over a six-year period, similar to the low prevalence reported in prior studies from other regions.[3,8]

Consistent with previous literature, the majority of women in this age group had significant comorbidities, particularly hypothyroidism, type 2 diabetes, and asthma.[3,6,7] Maternal age-related chronic conditions likely contribute to the elevated risk of pregnancy complications observed in this population. Half of our cohort developed obstetric complications, most

commonly gestational diabetes and gestational hypertension, which aligns with prior studies showing a two- to three-fold increase in these conditions among women of very advanced maternal age.[2,6,8]

The cesarean section rate in our study was high (79.16%), comparable to reports by Paulson et al. [1] and Kort et al. [7], where rates exceeded 80%. The leading indications, previous cesarean section and non-reassuring fetal heart tracing, reflect both the high prevalence of prior uterine surgery in this population and cautious obstetric management due to perceived fetal and maternal risks.

Perinatal outcomes were notable for a 37.5% incidence of preterm birth and LBW, in line with earlier findings from Salihu et al. [3] and Maoz-Halevy et al. [8], who reported preterm delivery rates between 30–45% in women ≥50 years. In addition, Simchen et al. [12] found that women aged ≥50 had significantly higher rates of preterm birth, LBW, and NICU admission compared with women aged 40–49, even after adjusting for parity and ART use. NICU admission was required in 58.3% of neonates, a figure higher than in general obstetric populations but consistent with the increased burden of respiratory distress and other complications in this age group. In our cohort, 11 newborns required NICU monitoring for ≥10 days due to respiratory distress syndrome, underscoring the vulnerability of infants born to very advanced-age mothers.

Aneuploidy risk is a key concern in this demographic. While most of our cohort did not undergo invasive prenatal testing, both women who consented to amniocentesis were found to have fetuses with trisomy 21, consistent with the established age-related increase in chromosomal abnormalities.[5,6] This finding supports previous recommendations for thorough counseling and offering diagnostic testing to women of advanced maternal age.[2,5]

Of note, our study included two illustrative cases highlighting the potential severity of neonatal complications: one dichorionic triamniotic triplet pregnancy complicated by neonatal sepsis and another case of preterm premature rupture of membranes followed by severe preeclampsia, in which the newborn developed retinopathy of prematurity requiring prolonged NICU care. Such cases illustrate that in addition to baseline risk factors, multifetal gestations and pregnancy complications can further worsen outcomes in this population.

It is important to note that oocyte donation is legally prohibited in Turkey, in accordance with national regulations governing assisted reproductive technologies.[13] Despite this restriction, one case in our study involved a pregnancy achieved through oocyte donation performed abroad. The patient, a 52-year-old woman with a history of primary infertility, underwent embryo transfer using a donor oocyte in a foreign clinic and returned to Turkey for antenatal follow-up and delivery. She delivered by cesarean section due to an unreassuring fetal heart rate trace during the term period. This case underscores the complex ethical, legal, and clinical challenges posed by cross-border reproductive care and highlights the need for standardized counseling and follow-up protocols for patients engaging in fertility treatments abroad.

Our findings are consistent with the broader literature in showing that pregnancies at age ≥50 are associated with high maternal and perinatal morbidity. While ART has enabled conception in this age group, it also carries a higher likelihood of multiple pregnancies, which independently increases obstetric risk.[4,7] This reinforces the importance of careful embryo transfer policies and individualized counseling.

The main strengths of this study include the focus on a rare and understudied population, detailed clinical documentation, and inclusion of both spontaneous and ART-conceived pregnancies. Limitations include its retrospective single-center design, the small sample size inherent to the rarity of the condition, and the absence of a younger control group for direct outcome comparison. The limited number of cases restricts the statistical power of subgroup analyses and may not capture the full spectrum of clinical variability in this population. As the number of pregnancies in women aged ≥50 continues to rise with the increased use of ART, the findings presented here may be revisited and strengthened through future studies with larger, multicenter cohorts.

Conclusion

The pregnancies in women aged 50 years and older carry substantial risks for both mother and newborn, with high rates of obstetric complications, cesarean delivery, preterm birth, and NICU admission. These findings highlight the importance of preconception counseling, close antenatal surveillance, and multidisciplinary perinatal care for this growing but high-risk patient population.

Funding: None

Acknowledgments: Special thanks to all the health care staff of our hospital who work devotedly for the health of our community.

Declaration of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Paulson RJ, Boostanfar R, Saadat P, et al. Pregnancy in the Sixth Decade of LifeObstetric Outcomes in Women of Advanced Reproductive Age. JAMA. 2002;288(18):2320-2323. doi:10.1001/jama.288.18.2320
2. Sauer MV. Reproduction at an advanced maternal age and maternal health. Fertility and Sterility. 2015;103(5):1136-1143. doi:10.1016/j.fertnstert.2015.03.004
3. Salihu HM, Shumpert MN, Slay M, Kirby RS, Alexander GR. Childbearing beyond maternal age 50 and fetal outcomes in the United States. Obstet Gynecol. Nov 2003;102(5 Pt 1):1006-14. doi:10.1016/s0029-7844(03)00739-7
4. Kanmaz AG, İnan AH, Beyan E, Ögür S, Budak A. Effect of advanced maternal age on pregnancy outcomes: a single-centre data from a tertiary healthcare hospital. J Obstet Gynaecol. Nov 2019;39(8):1104-1111. doi:10.1080/01443615.2019.1606172
5. te Velde ER, Pearson PL. The variability of female reproductive ageing. Human Reproduction Update. 2002;8(2):141-154. doi:10.1093/humupd/8.2.141
6. Yaman FK, Ezveci H, Dogru S, Harmanci MS, Bahçeci P, Gezginç K. The Impact of Advanced Maternal Age on Pregnancy Complications and Neonatal Outcomes. Journal of Clinical Medicine. 2025;14(15):5387.
7. Kort DH, Gosselin J, Choi JM, Thornton MH, Cleary-Goldman J, Sauer MV. Pregnancy after age 50: defining risks for mother and child. Am J Perinatol. Apr 2012;29(4):245-50. doi:10.1055/s-0031-1285101
8. Maoz-Halevy E, Pariente G, Sheiner E, Wainstock T. Perinatal Outcomes of Women Aged 50 Years and Above. Am J Perinatol. Jan 2020;37(1):79-85. doi:10.1055/s-0039-1700859
9. Goldenberg RL, Culhane JF, Iams JD, Romero R. Epidemiology and causes of preterm birth. Lancet. Jan 5 2008;371(9606):75-84. doi:10.1016/s0140-6736(08)60074-4
10. Cutland CL, Lackritz EM, Mallett-Moore T, et al. Low birth weight: Case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data. Vaccine. Dec 4 2017;35(48 Pt A):6492-6500. doi:10.1016/j.vaccine.2017.01.049
11. Rolnik DL, Wright D, Poon LC, et al. Aspirin versus Placebo in Pregnancies at High Risk for Preterm Preeclampsia. New England Journal of Medicine. 2017;377(7):613-622. doi:doi:10.1056/NEJMoa1704559
12. Simchen MJ, Yinon Y, Moran O, Schiff E, Sivan E. Pregnancy outcome after age 50. Obstet Gynecol. Nov 2006;108(5):1084-8. doi:10.1097/01.AOG.0000240139.46018.bd
13. KARABACAK O, GÜNAYDIN G. Oosit Donasyonu ve Başarıyı Etkileyen Faktörler. Turkiye Klinikleri Journal of Surgical Medical Sciences. 2007;3(13):72-76.

ACH Med J
(2025) 3: 083-088
ISSN:2822-5872
Doi : 10.5505/achmedj.2025.53215

RESEARCH ARTICLE

Which method, cardiac surgery or interventional catheter angiography, causes parents' anxiety levels to worsen?

Meryem Beyazal,[1] Muhammed Ali Eksi,[1] Meral Baris,[1] Mustafa Yilmaz,[1] Denizhan Bagrul[1]
[1]Ankara Bilkent City Hospital, Ankara, Türkiye

Article Info

Received Date: 04.07.2025
Revision Date : 08.09.2025
Accepted Date: 09.09.2025

Keywords:
Parents' anxiety,
Surgery,
Catheter,
Children,
Congenital heart disease

ORCIDs of the authors:
MB :0000-0002-5626-9055
MAE :0000-0002-4317-3345
MB :0000-0002-8926-9932
MY :0000-0002-3212-2673
DB :0000-0003-0375-1726

Abstract

Introductıon: As the high levels of parental, especially maternal, anxiety may result in some neurodevelopmental problems in their children, we aim to assess the anxiety levels of parents during the preprocedural period for different interventions.

Methods: The study included a total of 131 participants, 73 of whom underwent catheter intervention while 58 of them underwent surgery. State-Trait Anxiety Inventory-2 (STAI-2) and The Beck Anxiety Inventory (BAI) were used. The participants were divided into 3 anxiety classes: mild, moderate, and severe, according to their BAI scores.

Results: Although there were no significant differences between groups regarding the mean STAI-2 score, the mean BAI score was statistically significantly lower in the catheter interventional group than in the surgery group (p=0.002). In the total population, we demonstrated that BAI scores were significantly higher in parents with boys than in parents with girls (p=0.030). In a separate analysis, the BAI scores of parents with girls were not different in the surgery and catheter groups. However, the BAI scores of parents with boys were almost significantly higher in the surgery group than in the catheter group (p=0.064). As the distance between home and hospital increased, the probability of moderate or severe anxiety according to The BAI class increased only in the catheter group (p=0.017). However, the same was not seen in the surgery group.

Conclusion: The fact that parents whose children had catheter intervention had lower anxiety levels than those whose children had surgery, may guide the physicians regarding which procedure to choose.

Correspondence Address: Üniversiteler Mahallesi 1604. Cadde No: 9 Çankaya Ankara - Türkiye
Phone: +90 530 592 43 04 / **e-mail:** meryembeyazal@gmail.com

Copyright© 2025. Beyazal et al. This article is distributed under a Creative Commons Attribution 4.0 International License.
Follow this and additional works at: https://achmedicaljournal.com

Interventional or surgical methods can be used in the treatment of congenital heart diseases. Where both methods are applicable, determining whether to use the surgical or angiographic approach depends on the clinician's experience and preference. Both the catheter and the surgical approach increase the level of depression and anxiety in families.[1,2] High levels of maternal anxiety can cause neurodevelopmental problems in children.[3,4] According to a study, the factors affecting the anxiety level of mothers before the invasive cardiac procedure were as follows: the father's anxiety level, the severity of heart disease (RACHS-1 score), and the distance between home and hospital.[5] The RACHS-1 score is calculated by taking into account the patient's age, the severity of the cardiac disease, and the intervention type.[6]

In this study, we aim to measure the anxiety levels of parents before the invasive cardiac procedure and determine whether there is a difference between surgery and catheter angiographic intervention. It is thought that the result obtained will guide physicians in the selection of the procedure best suited to their patients.

Material and Methods

Study population

This is an analytical cross-sectional study conducted in a single centre. Parents of patients under 5 years of age (n=126) who were to undergo invasive cardiac intervention were included in the prospective study. The participants were divided into 2 groups: group 1 (n=68) parents of patients who underwent the catheter interventional procedure and group 2 (n=58) parents of patients who underwent surgical treatment. Foreign parents who do not speak Turkish and parents diagnosed with psychiatric disorders were excluded.

The medical records of the patients, including age, gender, weight, height, and the age, gender, and level of education of parents were obtained. Additionally, the distance between the home and hospital and the RACHS-1 score were recorded. RACHS-1 scores were given on a scale of 1 to 6 according to a previously determined scoring system.[6]

The questionnaire

The participants were surveyed prospectively before the invasive procedure using the State-Trait Anxiety Inventory (STAI-2) and the Beck Anxiety Inventory (BAI). They were asked to fill out the questionnaire forms given by the same researcher. Then, the scales were measured without knowing which group they belonged to.

STAI was developed by Spielberger in 1970 [7] and the validity and reliability of the Turkish version were confirmed by Le Compte and Oner in 1985.[8] Since then, it has been used in different Turkish studies.[9,10] Anxiety is observed in two forms: state and trait. State anxiety is a more transient response to a negative situation, while trait anxiety is a personality characteristic that affects how we experience events.[11] Accordingly, there are 2 subscales within this measure: the State-Anxiety and Trait-Anxiety subscales. The STAI has 40 items, with 20 items allocated to each subscale. First, the State Anxiety Scale (S-Anxiety) measures the participants' current state of anxiety by asking them how they feel "right now." For this purpose, items measuring subjective feelings such as worry, tension, nervousness, anxiety, and activation/arousal of the autonomic nervous system are used. On the other hand, the Personality Anxiety Scale (T-Anxiety) assesses the participants' tendency to experience anxiety despite their current circumstances. Participants rate statements on a 4-point scale: never (1 point), sometimes (2 points), a lot of times (3 points), and always (4 points). STAI-2 scale includes 13 direct and 7 reverse questions. When the reverse questions are extracted from the direct questions and the number 35 is added to the obtained value, the STAI-2 value is found. As the anxiety level increases, higher STAI-2 values are obtained.

The BAI was developed by Beck et al. in 1988.[12] It includes 21 items which describe common symptoms of anxiety. Using a 4-point scale, participants are asked to rate how bothered they have been by each symptom over the past 7 days. Scores may range from 0 to 63 and reflect different levels of anxiety as follows: minimal (0–7), mild (8–15), moderate (16–25), and severe (26–63). In the current study, after completing BAI, the participants were divided into three anxiety classes, instead of four, as participants with minimal and mild levels of anxiety were grouped together in what we simply referred to as mild BAI anxiety class.

Statistical Analysis

All data were analysed by using the "SPSS (Statistical Package for Social Sciences) for Windows 25" program (IBM Corp., Armonk, N.Y., USA). Normality analysis was performed using histogram, coefficient of variation, Skewness and Kurtosis values and Kolmogorov-Smirnov test. Data that did not follow a normal distribution was presented as median (interquartile range) while data with normal distri-

bution was shown as mean±standard deviation. According to normality analysis, parametric or non-parametric test selection was made. Consequently, Independent-Samples T or Mann-Whitney U Test and One-Way ANOVA test were used for the comparison of numerical data. Chi-square or Fisher's Exact Test was used for the comparison of categorical data. The partial correlation tests were used for the relationship of numerical data. The logistic regression test was used to determine the risk factors through these dependent variables; patients' age, gender, parents' age, education level and RACHS-1 scores. Patients in the mild BAI class and patients in the moderate-to-severe BAI class were used as the independent variables for the logistic regression analysis . The statistical significance limit was accepted as p <0.05.

The study was approved by the Bilkent City Hospital Ethics Committee at the 23.11.2022 with the number; E2-22-2871

Results

Of the total patient population, 46.8% (n=59) were girls and the median age was 16 (1.5-60) months. Detailed characteristics of the participants based on groups are given in Table 1.

Table 1: The basic characteristics of the study population

Data*		Catheter	Surgery	p value
Total number		(n=68)	(n=58)	
Patients' gender; n (%)				
	Boys	26 (38.8%)	41 (61.2%)	**0.001a**
	Girls	42 (71.2%)	17 (28.8%	
The patients' age; months		18.5 (2-60)	13 (1.5-60)	0.182b
The mean weight; kg		10 (3.4-23)	8.5 (3.5-20)	0.169b
The mean height; cm		80 (50-120)	74 (51-121)	0.280b
The parents' age; years,		29.5 (18-44)	27.5 (19-43)	0.260b
Parents' gender; n (%)				
	Men	2 (22.2%)	7 (77.8%)	0.079a
	Women	66 (56.4%)	51 (43.6%)	
Parents' education level; n (%)				
	Primary or Middle school	31 (50.8%)	30 (49.2%)	
	High school	21 (55.3%)	17(44.7%)	0.751a
	Post Secondary (including University)	16 (59.3%)	11 (40.7%)	

*Data were presented as n (%) for categorical variables and median (minimum-maximum) or mean±standard deviation for continuous variables.
a= Chi-square test; b= Mann-Whitney U Test
N= number; Kg= kilogram; SD= Standard deviation; Cm= Centimetre; Min= minimum; Max= Maximum

There were no statistically significant differences in the groups regarding the parents' gender, age, education level, and the patients' age, weight and height. However, the number of girls was statistically significantly higher in the catheter group (p=0.001)

At first, we compared the groups' STAI-2 and BAI scores. We found a poor positive correlation between the two scales (r=0.346, p= 0.001) as shown in Figure 1. A separate analysis of the groups based on gender revealed that there were no significant differences in terms of the mean STAI-2 scores between surgery and catheter group. Similarly, no difference was observed between the groups in terms of BAI score in girls (p=0.712). However, the BAI score was significantly lower in the catheter group for boys (p=0.029). Table 2 shows anxiety scores by groups.

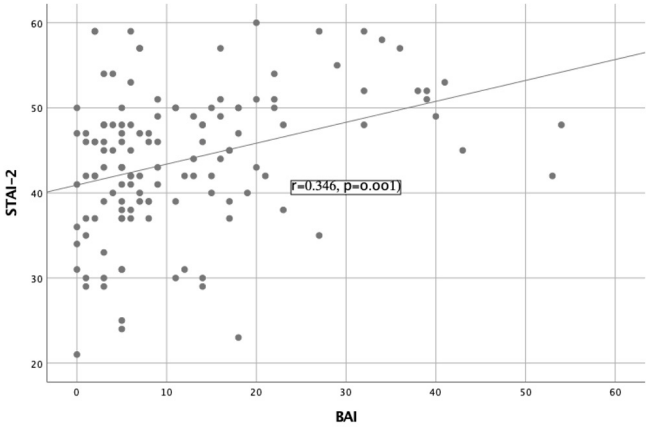

Figure 1: The correlation analysis between Beck anxiety inventory (BAI) and State-Trait Anxiety Inventory-2 (STAI-2).

Table 2: Anxiety scores according to groups

	Catheter (n=73)		Surgery (n=58)		p	p1
	Boys (n=41)	Girls (n=26)	Boys	Girls		
STAI-2 score (mean±SD)	42.46±7.31	45.21±7.04	43.80±7.73	43.59 ±13.14	0.482a	0.540[a]
BAI score (median, min-max)	5 (0-53)	6 (1-39)	14 (0-54)	8 (0-27)	0.029b	0.712[b]

Significant difference (p < 0.05)
p= p value for boys; p1=p value for girls
a= Independent-Samples T test; b= Mann-Whitney U test
STAI-2= The State-Trait Anxiety Inventory; BAI=-Beck anxiety inventory; SD= Standard deviation

The catheter interventional and surgery groups were compared according to their BAI score classes for each gender. Since few participants belonged to the severe BAI anxiety class, we compared the mild anxiety class with moderate-to-severe anxiety class.

Accordingly, no difference was found between the surgery and catheter groups in terms of BAI class in either boys or girls (p=0.226, and p=0.384, respectively)

When looking at the factors affecting the anxiety level of all the parents, we found that the mean of both STAI-2 and BAI scores for different education levels and parents' genders were not significantly different. Also, the partial correlation analysis done for the total population when controlling for patients' age, showed that there was no significant relationship between RACHS score, parents' age, the distance between home and hospital, and either STAI-2 or BAI scores.

We also performed univariate logistic regression analysis after separating the groups to uncover the factors associated with moderate to severe BAI scores. In the surgery group, patients' age, gender, parents' age, education level, RACHS scores and the presence of comorbidities were not significant predictors of membership in the moderate to severe BAI class. However, interestingly, in the catheter group, the home-hospital distance among these variables was a significant predictor of belonging in the moderate to severe BAI class. As the distance between home and hospital increased, the probability of moderate or severe anxiety levels significantly increased (OR=1.005, p=0.017). Moreover, in the total population, as the RACHS score increased from 1 to 3, the BAI score also increased, although this was not statistically significant. A decrease in BAI score was observed in those participants with a RACHS score of 4.

Discussion

In the current study, we used two different anxiety scales: STAI-2 and BAI. STAI-1, though we did not use it in this study, indicates situational anxiety. STAI-2 shows trait anxiety. A study comparing STAI and BAI showed that, while STAI-1 and Beck's scale had a moderate positive correlation, STAI-2 and Beck's scale had a poor positive correlation in preoperative patients.[13] Although we found a poor positive correlation between STAI-2 and BAI, concurring with Peker K.'s study, a significant difference between the catheter and surgery groups was demonstrated only in the BAI score values. According to the literature, the STAI is also highly correlated with depression. Because it has not been able to distinguish anxious patients from depressed ones, it has a poor discriminant validity for individuals with and without anxiety disorders, especially in the elderly.[14,15] On the other hand, the BAI is used in efforts to obtain a purer measure of anxiety that is relatively independent of depression. Therefore, the significant difference found in BAI scores in this study is valuable because it is more accurate in indicating anxiety.

We investigated the anxiety of parents with kids under the age of 5 because addressing parental anxiety and depression is crucial in preventing early mental health disorders for this age group.[17] In some cases, there is still no consensus on whether surgery or catheter should be performed in the treatment of children with congenital heart defects.[18,19] While there was no difference in RACHS scores between the groups, the higher BAI scores observed in the surgical group among parents of boys may be attributed to the type of procedure. Before the procedure, parents should be assessed for anxiety and informed about the potential risks and benefits of the procedure.

The BAI score was lower only in parents of boys who had catheters than surgical intervention, but there was no difference in parents of girls. We attributed this notable difference to sociocultural characteristics. Some factors such as living in rural areas, being born to mothers with little education, and coming from poor families may lead parents to favor sons.[20] Therefore, having boys undergo surgery may cause more anxiety in families than girls because the possible loss of boys raises anxiety.

Unlike Werner O et al. 's study,[5] we did not find significantly higher anxiety scores in parents whose children have comorbidity, higher RACHS-1 scores, and higher distance between home and hospital. Only one-quarter of parents had a secondary degree. Low education levels may explain difficulties in perceiving the seriousness of the disease and in having awareness of comorbidities. However, our results may be more reliable due to our larger study population. Furthermore, we found in a separate analysis of the catheter group that the distance between home and hospital was a significant predictor of membership in the moderate to severe BAI class. The patients' parents may think that surgery permanently solves the problems, unlike catheter angiography. Therefore, living far from the hospital may not have been seen as an issue.

Study limitations

We did not use the STAI-1 scale. The STAI-1 scale would give more information to compare the state and trait anxiety of the parents along BAI. Ano-

ther limitation is that in our country, mothers are the primary caregivers, so we could not compare fathers' anxiety with that of mothers. Also, this is a single-centre study so the available data is limited.

Conclusion

To our knowledge, there are no studies discussing this issue. The fact that the parents' BAI scores were lower in the catheterization group than in the surgery group, may guide the clinician in choosing the procedure for some patients. Future studies with a larger number of patients using the STAI-1 scale along with the STAI-2 would be beneficial.

Conflict of Interest: The authors have no conflicts of interest to declare.

Support and Acknowledgment: No financial support was received from any institution or person.

Researchers" Contribution Rate Statement:
Concept/Design: M.BE.; Analysis/Interpretation: M.BE ; Data Collection: M.A.E, M.Y and M. BA; Writer: M.B; Critical Review: D.B, AA; Approver: M.BE, M.A.E, M.BA, M.Y and D.B.

Ethics Committee Approval: The study protocol was approved by the Ankara Bilkent City Hospital Clinical Research Ethics Committee (Date:23.11.2022, Number: E2-22-2871)

References

1. Üzger A, Başpınar O, Bülbül F, Yavuz S, Kılınç M. Evaluation of depression and anxiety in parents of children undergoing cardiac catheterization. Turk Kardiyol Dern Ars. 2015;43(6):536-541. doi:10.5543/tkda.2015.28928
2. Lisanti AJ, Kumar A, Quinn R, Chittams JL, Medoff-Cooper B, Demianczyk AC. Role alteration predicts anxiety and depressive symptoms in parents of infants with congenital heart disease: a pilot study. Cardiol Young. 2021;31(11):1842-1849. doi:10.1017/S1047951121001037
3. Roberts SD, Kazazian V, Ford MK, et al. The association between parent stress, coping and mental health, and neurodevelopmental outcomes of infants with congenital heart disease. Clin Neuropsychol. 2021;35(5):948-972. doi:10.1080/13854046.2021.1896037
4. Phua DY, Kee MZL, Meaney MJ. Positive Maternal Mental Health, Parenting, and Child Development. Biol Psychiatry. 2020;87(4):328-337. doi:10.1016/j.biopsych.2019.09.028
5. Werner O, El Louali F, Fouilloux V, Amedro P, Ovaert C. Parental anxiety before invasive cardiac procedure in children with congenital heart disease: Contributing factors and consequences. Congenit Heart Dis. 2019;14(5):778-784. doi:10.1111/chd.12777
6. Jenkins KJ, Gauvreau K, Newburger JW, Spray TL, Moller JH, Iezzoni LI. Consensus-based method for risk adjustment for surgery for congenital heart disease. J Thorac Cardiovasc Surg. 2002;123(1):110-118. doi:10.1067/mtc.2002.119064
7. Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. . Manual for the State-Trait Anxiety Inventory. Polo Alto, CA: Consulting Psychologists. 1970.
8. Oner N, Le Compte A. Durumluk-Sürekli kaygı envanteri el kitabı, 20. Basım İstanbul: Boğaziçi Üniversitesi Yayınları, 1985. s.3-5.
9. Civan A, Arı R, Görücü A, Özdemir M. Bireysel ve takım sporcularının müsabaka öncesi ve sonrası durumluk ve sürekli kaygı düzeylerinin karşılaştırılması. Uluslararası İnsan Bilimleri Dergisi 2010; 7:193-206. 20.
10. Çakmak Ö, Hevedanlı M. Eğitim ve fen edebiyat fakülteleri biyoloji bölümü öğrencilerinin kaygı düzeylerinin çeşitli değişkenler açısından incelenmesi. Elektronik Sosyal Bilimler Dergisi 2005; 14: 115-127
11. Saviola F, Pappaianni E, Monti A, Grecucci A, Jovicich J, De Pisapia N. Trait and state anxiety are mapped differently in the human brain. Sci Rep. 2020;10(1):11112. Published 2020 Jul 6. doi:10.1038/s41598-020-68008-z
12. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. J Consult Clin Psychol. 1988;56(6):893-897. doi:10.1037//0022-006x.56.6.893
13. Peker K. Comparison of Beck and State-Trait Anxiety Scales in the Evaluation of Preoperative Anxiety. Journal of Anesthesiology and Reanimation Specialists' Society. 2020; 28 (2). doi: 10.5222/jarss.2020.50570
14. Kabacoff RI, Segal DL, Hersen M, Van Hasselt VB. Psychometric properties and diagnostic utility of the Beck Anxiety Inventory and the State-Trait Anxiety Inventory with older adult psychiatric outpatients. J Anxiety Disord 1997;11:33– 47. 17.
15. Kennedy BL, Schwab JJ, Morris RL, Beldia G. Assessment of state and trait anxiety in subjects with anxiety and depressive disorders. Psychiatric Quarterly 2001;72:263–76.

16. Julian L. J. (2011). Measures of anxiety: State-Trait Anxiety Inventory (STAI), Beck Anxiety Inventory (BAI), and Hospital Anxiety and Depression Scale-Anxiety (HADS-A). Arthritis care & research, 63 Suppl 11(0 11), S467–S472. https://doi.org/10.1002/acr.20561
17. Izett E, Rooney R, Prescott SL, De Palma M, McDevitt M. Prevention of Mental Health Difficulties for Children Aged 0-3 Years: A Review. Front Psychol. 2021;11:500361. Published 2021 Sep 29. doi:10.3389/fpsyg.2020.500361
18. Wilder TJ, Van Arsdell GS, Benson L, et al. Young infants with severe tetralogy of Fallot: Early primary surgery versus transcatheter palliation. J Thorac Cardiovasc Surg. 2017;154(5):1692-1700.e2. doi:10.1016/j.jtcvs.2017.05.042
19. Sheth SP, Loomba RS. Haemodynamic and clinical variables after surgical systemic to pulmonary artery shunt placement versus arterial ductal stenting. Cardiol Young. 2023;33(10):2060-2065. doi:10.1017/S104795112200395X
20. Le K, Nguyen M. Son preference and health disparities in developing countries. SSM Popul Health. 2022;17:101036. Published 2022 Jan 26. doi:10.1016/j.ssmph.2022.101036

ACH Med J
(2025) 3: 089-092
ISSN:2822-5872
Doi : 10.5505/achmedj.2025.52724

RESEARCH ARTICLE

Use of Suprathel for Deep Dermal Burns: Our Clinical Experience

Emin Yilmaz,[1] Emre Simsek,[1] Alparslan Ertenlice,[2] Ali Emre Akgun,[1] Merve Akin[1]
[1]Department Of General Surgery, Ankara Bilkent City Hospital, Ankara, Türkiye
[2]Department Of General Surgery, Ankara Yıldırım Beyazıt University, Ankara, Türkiye

Article Info

Received Date: 11.07.2025
Revision Date : 30.08.2025
Accepted Date: 13.09.2025

Keywords:
Suprathel,
Deep Dermal Burns,
Epithelialization Time

ORCIDs of the authors:
EY :0009-0000-2835-647X
ES :0000-0002-2253-5992
AE :0000-0002-8227-5328
AEA :0000-0002-0389-4922
MA :0000-0001-7224-4774

Abstract

Introductıon: Standard treatment includes immediate debridement of non-viable tissue and closure of the wound with dressings that provide favorable conditions for reepithelialization. Since superficial and deep areas may coexist in second-degree burns, the choice of dressing is also very important in second-degree burns.
The aim of this retrospective study was to summarize our experience with Suprathel® in the Burn Center and to examine the contribution of Suprathel® to wound healing in heterogeneous second-degree burns.

Methods: : Patients with superficial and deep second-degree burns hospitalized in Ankara City Hospital Burn Treatment Center between April 1, 2019 and December 31, 2020 were retrospectively analyzed. Age, gender, burn etiology, total burn surface area(TBSA), depth of injury were recorded. Patients were grouped according to dressing options or treatment regimen with Suprathel. Epithelialization time, skin grafting time, if performed, and graft harvest rates were compared within groups.

Results: Of 130 patients hospitalized for second-degree burns (deep dermal burns), 58 were closed with Suprathel®. 43 of the patients who did not receive Suprathel underwent a graft operation. Eight patients underwent grafting after Suprathel application. The remaining 29 patients underwent escharectomy and conventional dressing methods.

Conclusion: When the patient groups with and without Suprathel application were compared, there was no significant difference in terms of gender, burn etiology and burn localization. However, there were younger patients in the suprathel group. Epithelialization time was shorter and graft acceptance was higher in suprathel treated patients.

When the total burned body surface areas were compared according to the treatment methods applied, it was observed that the burn area requiring graft was significantly smaller in suprathel treated patients.

Correspondence Address: Üniversiteler Mahallesi 1604. Cadde No: 9 Çankaya Ankara - Türkiye
Phone: +90 544 209 20 17 / **e-mail:** eminyilmaz10@hotmail.com

Copyright© 2025. Yilmaz et al. This article is distributed under a Creative Commons Attribution 4.0 International License.
Follow this and additional works at: https://achmedicaljournal.com

Introduction

Burns are a worldwide public health concern, causing mortality and morbidity.[1] The result of burn trauma is the loss of the barrier between the external environment and the body:Skin. Loss of the epidermal barrier has serious adverse physiologic effects. Direct and evaporative fluid losses are immediately seen. If wounds are large, this quickly leads to dehydration and shock.[2] Moreover, injuries due to burns are associated with extreme pain and suffering that can impair a patient's quality of life.[3] Standard treatment involves immediate debridement of nonviable tissue and coverage of the wound with dressings that provide favorable conditions for reepithelialization, prevent excess amount of fluid, mitigates the risk of infection, easy to use, and controls pain.[4]

Depending on its duration and intensity, the thermal insult can affect both the epidermal and dermal layers of the skin.[5,6] Following a burn, necrosis occurs at the center of the injury and becomes progressively less severe at the periphery. Jackson's description in 1953 of the three zones of injury remains our conceptual understanding of heterogeneous burn wound.[7] Therefore choosing the best dressing is challenging for clinicians that the dressing applied to wound should be proper for all Jackson's zones. Since superficial and deep areas may present together in second degree burns, the choice of dressing is very important in second degree burns either.

One of such dressings which display the properties of the natural epithelium is Suprathel® (PolyMedics Innovations GmbH,Germany). This is an absorbable new-generation dressing based on a co-polymer of three compounds:DL-lactide, trimethylene carbonate and ε-caprolactone.[8] The specific structure and chemical composition of the dressing guarantee its elasticity, water permeability, transparency after application to the wound and biodegradability. It has been successfully used in superficial, mixed, and deep partial-thickness burns in adult and pediatric patients.[9]

The goal of this retrospective study summarize our experiences at Burn Center with Suprathel® and contribution of Suprathel® to wound healing in heterogeneous second-degree burns was examined.

Material and Methods

The records of patients with superficial and deep second-degree burns who were hospitalized in Ankara City Hospital Burn Treatment Center between April 1, 2019 and December 31, 2020 were analyzed retrospectively. Age, gender, burn etiology, total burn surface area (TBSA), depth of injury were recorded. Patients were grouped according to the treatment regimen whether conventional dressing options or Suprathel application were done. Epithelialization time, time of skin grafting if done and graft take rates compared within the groups. This retrospective observational study was approved by the local Institutional Review Board (IRB) (E.Kurul-E1-20-1175/25/11/2020).

Statistical Analysis

Descriptive and demographic data were analysed with ratios and means. Groups were compared with chi-square test and p-value has accepted significant when higher than 0.05.

Suprathel® Application

After admission of patients to the burn ward within 24-48 hours of injury, escharectomy and debridement performed under sedation or general anesthesia in the operating room. Sharp debridement was performed to all patients until hemorrhagic vital wound bed occur. Hydrosurgery (VersaJet®)also used when required. Thereafter, a Suprathel® film was cut to adequate dimensions to cover the complete burned area and fixed with staples. Single layer of gauze and a surgical elastic net bandage applied upon the Suprathel® sheet. Patients advised to keep the wound area dry and dressing change didn't performed. The wound followed-up until the Suprathel® gets transparent and start to getting pilled-off. If the Suprathel® was completely detached from the unhealed wound bed, it has removed and decision made for whether reapplication of Suprathel® indicated, or skin grafting needed or not. Other patients who did not undergo suprathel application were dressed with silver cream or paraffin sponge.

Usability of Suprathel® was evaluated by its adherence to the wound bed Effectiveness of Suprathel® was evaluated in terms of epithelialization time and need for further applications. Epithelialization time was defined as the number of days until at least 95 % epithelialization of the wound, judged by an experienced burn surgeon. The number of burn wounds that were treated with Suprathel® and required secondary (surgical) intervention were also determined.

Results

During the study period total 130 patients hospitalized for their second-degree (derin dermal yanıklar)burn.. Of those patients, 58 of them covered with Suprathel® . Graft operation was performed in

43 of the patients without suprathel. Eight patients underwent grafting after Supratel application. The remaining 29 patients underwent escharectomy and conventional dressing (antibiotic impregnated sponge, paraffin impregnated gauze dressing, silver wound dressing). The mean age of the patients was 40.1 years (18-93). 78 of the patient were male and 52 of them were female. Patients mean total burned surface area were 8.02% (1%-70%), where mean Suprathel applied TBSA was 6.62 %(1%-30%) (p=0,000). Sixty-nine (53.1%) of the patients burned hot liquid (scalding). Most of the wounds were localized at lower limb (46.2%), and followed by upper limb and hand (27.7% and 12,3% respectively) (Figure 1).

Figure 1: Clinical and Demographic Characteristics of Patients

Patient Count, N	130
Gender	
Female	52
Male	78
Age, average	40,1 (18-93)
TBSA, average%	%8,02 (%1-%70)
Burn Etiology,n(%)	
Hot Liquid	69 (53,1)
Flame	38 (29,2)
Chemical	10 (7,7)
Contact	10 (7,7)
Electrical	3 (2,3)
Burn Location	
Lower Extremity	60 (46,2)
Upper Extremity	36 (27,7)
Hand	16 (12,3)
Trunk	11 (8,5)
Face	7 (5,4)
Burn Depth	
Superficial Dermal Burns	60 (46,2)
Deep Dermal Burns	70 (53,8)
Operation	
Escharotomy	12 (9,2)
Convantional Dressing	17(13,1)
Suprathel	58 (44,6)
Graft	51
Epithelialization Time	
Escharotomy + Conventional Dressing	16,06 gün
Suprathel	17,34 gün
Graft	23,16 gün
Suprathel + Graft	23,12 gün

When the patient groups with and without suprathel application were compared, there was no significant difference in terms of gender, burn etiology and burn localization. However, there were younger patients in the suprathel group. Epithelialization time was shorter and graft acceptance was higher in patients treated with suprathel(p=0,021, p=0,000) (Figure 2)

Figure 2: Characteristics of Patient Groups With and Without Suprathel Application

	Suprathel Not Applied	Suprathel Applied	P-value
Gender			0,51
Female	27	25	
Male	45	33	
Age, average	43,04	36,6	0,025
TBSA %, average	%5,12	%6,62	0,000
Burn Etiology,n(%)			0,98
Hot Liquid	39(56,5)	30(43,5)	
Flame	16 (42,1)	22 (57,9)	
Chemical	6 (60,0)	4 (40,0)	
Contact	9 (90,0)	1 (10,0)	
Electrical	2 (66,7)	1(33,3)	
Burn Localization			0,11
Lower Extremity	40(66,7)	20(33,3)	
Upper Extremity	15 (41,7)	21 (58,3)	
Hand	9 (56,3)	3 (43,8)	
Trunk	4 (36,4)	7 (63,6)	
Face	4 (57,1)	3 (42,9)	
Graft Lysis			0,000
Positive	2	-	
Epithelialization Time	23,16 days	18,14 days	0,021

When the total burned body surface areas were compared according to the applied treatment methods, it was observed that the burn area requiring graft was significantly reduced in patients who were applied Suprathel(Figure 3).

Figure 3: Total Body Surface Area(TBSA) Changes According to Treatment

	Patient Count	TBSA(%)	P-value
All Patients	130	8,02	**0,000**
Conventional Methods	29	6,28	**0,000**
Suprathel Application	58	6,62	**0,000**
Graft Application	43	5,12	**0,000**
Graft Application after Suprathel	8	3,38	**0,000**

Discussion

In burn wounds where the dermis is affected, wound healing is directly related to the amount of dermis affected. Management of burn areas with combined superficial and deep dermal damage is challenging for burn surgeons. If deeply burned areas

are considered superficial and epithelialization is waited with conventional treatment methods, this may cause delays that may lead to loss of function, especially in areas where functional integrity is important, such as the hands and face. In this study, it was observed that the use of Suprathel in burn wounds with superficial and deep dermal damage together made the deep burn areas that may need grafts ready for graft application in a shorter time compared to the use of conventional wound closure methods and even epithelialized in a shorter time compared to patients who received autograft without using an epidermis skeleton. In this type of burns, the use of an epidermal scaffold makes the wound bed suitable for graft application in full-thickness burn areas, thus reducing the epithelialization time. It has also been shown to provide a significant reduction in the size of the burned area that needs to be transplanted (Figure 3).

Underestimation of deep areas may result in loss of function in functional areas. In this case, by using Suprathel, even if there is no epithelialization in the deep areas, the superficial area of the burn area becomes epithelialized in the time required for Suprathel application, while the deep area becomes ready for grafting and the total repithelialization time does not change.

It is thought that especially in large surface area burns, suprathelin can be applied after effective escharectomy of the burn area even if there is a full-thickness burn in a part of the wound. Wound healing is accelerated thanks to the moist environment provided by Suprathelin in the wound and the local ischemia warning of the lactic acid it contains. The fact that there was no significant difference in the epithelialization time between patients who received grafts using conventional methods and those who received Suprathel (16.06 and 17.34 days) suggests that Suprathel can be used for early wound closure in deep dermal burns and even in mixed depth burns including full-thickness burn areas.

Limitations

In this study there were not follow-up visits for the patients. Also the number of the groups were limited and the study was retrospective. To discuss the effectiveness of Suprathel on mixed degree burns and scar appearance further prospective randomized studies should be performed.

References

1. World Health Organization. Burns. 2018. https://tinyurl.com/y2pt6u5n (accessed 26 November 2020)
2.Skin Substitutes and 'the next level'; Esther Middelkoop, Robert L. Sheridan Total Burn Care, 15, 167-173.e2
3. Rahimi F, Rezayatmand R. Use of a biosynthetic wound dressing to treat burns: a systematic review. J Wound Care. 2020 Dec 1;29(Sup12):S16-S22. doi: 10.12968/jowc.2020.29.Sup12.S16. PMID: 33320760.
4. Hundeshagen G, Collins VN, Wurzer P, Sherman W, Voigt CD, Cambiaso-Daniel J, Nunez Lopez O, Sheaffer J, Herndon DN, Finnerty CC, Branski LK. A Prospective, Randomized, Controlled Trial Comparing the Outpatient Treatment of Pediatric and Adult Partial-Thickness Burns with Suprathel or Mepilex Ag. J Burn Care Res. 2018 Feb 20;39(2):261-267. doi: 10.1097/BCR.0000000000000584. PMID: 28557869; PMCID: PMC5700875.
5. Lewis GM, Heimbach DM, Gibran NS. Evaluation of the burn wound: management decisions. In: Herndon DN, editor. Total
Burn Care. 4th ed. Philadelphia: Elsevier; 2012. p. 125–30.
6. Gee Kee E, Kimble RM, Cuttle L, Stockton K. Comparison of three different dressings for partial thickness burns in children:study protocol for a randomised controlled trial. Trials
2013;14:403.
7. Evaluation of the Burn Wound: Management Decisions; Elisha G. Brownson, Nicole S. Gibran;Total Burn Care, 10, 87-92.e2
8. Nolte SV, Xu W, Rodemann HP et al.: Suitability of biomaterials for cell delivery in vitro. Osteo Trauma Care 2007; 15: 41-46.
9. Mądry R, Strużyna J, Stachura-Kułach A, Drozdz Ł, Bugaj M. Effectiveness of Suprathel® application in partial thickness burns, frostbites and Lyell syndrome treatment. Pol Przegl Chir. 2011 Oct;83(10):541-8. doi: 10.2478/v10035-011-0086-5. PMID: 22189281.

ACH Med J
(2025) 3: 093-100
ISSN:2822-5872
Doi : 10.5505/achmedj.2025.20591

RESEARCH ARTICLE

Risk Factors in Cases of ESBL-Positive E. coli Isolated from Urine Cultures in Community-Acquired Urinary Tract Infections in Children

Selma Oktay Ergin,[1] Feyza Mediha Yildiz[1]
[1]Department of Child Health And Diseases, Zeynep Kamil Women And Children Diseases Traning And Research Hospital, Istanbul, Türkiye

Article Info

Received Date: 11.09.2025
Revision Date : 29.09.2025
Accepted Date: 29.09.2025

Keywords:
ESBL-Positive E. coli,
Urine Cultures,
Urinary Tract Infections

ORCIDs of the authors:
SOE :0000-0001-8908-9598
FMY :0000-0002-8684-0101

Abstract

Introductıon: Extended-spectrum β-lactamase (ESBL)-producing Escherichia (E.) coli has become an increasing concern in pediatric community-acquired urinary tract infections (UTIs). The primary aim of this study is to investigate and identify the clinical, demographic, and medical history-related risk factors associated with ESBL-producing E. coli strains isolated from urine cultures of pediatric patients diagnosed with community-acquired UTIs.

Methods: : We retrospectively reviewed 100 pediatric patients with ESBL-positive E. coli UTIs hospitalized between 2008–2012, all of whom received meropenem therapy. Risk factors, clinical manifestations, urine collection methods, comorbidities, and prior antibiotic exposure were collected.

Results:ESBL-positive E. coli UTIs were more frequent in boys during the neonatal period but became predominant in girls thereafter, with the highest prevalence under two years of age. Clinical manifestations vary with age, ranging from nonspecific symptoms such as fever and vomiting in infants to typical complaints like abdominal pain and dysuria in older children. E. coli was identified as the leading pathogen, while high resistance rates to commonly used antibiotics (ampicillin, amoxicillin/clavulanate, TMP-SMX) were observed. Carbapenems remained the most effective agents, though their use should be reserved due to cost and hospitalization requirements. Underlying urinary tract abnormalities, vesicoureteral reflux, recurrent infections, and recent antibiotic exposure were major risk factors for ESBL (+) UTIs.

Conclusion: Our results highlight the clinical significance of ESBL-producing E. coli in pediatric UTIs. Early recognition of risk factors, careful diagnostic evaluation, and rational antibiotic selection are crucial for optimal management.

Correspondence Address: Bahçelievler Mahallesi, E-5 Karayolu / Kültür Sok No: 1 34180 İstanbul - Türkiye **Phone: +90** 532 281 66 07 / **e-mail:** selmaoktayergin@mail.com

Copyright© 2025. Ergin et al. This article is distributed under a Creative Commons Attribution 4.0 International License.
Follow this and additional works at: https://achmedicaljournal.com

Introduction

Urinary tract infections (UTIs) are among the most frequently encountered bacterial infections in the pediatric population.[1,2] They occur in approximately 3–5% of girls and 1% of boys.[3] In developing countries, including Türkiye, UTIs in children are of particular concern due to their potential to cause long-term renal damage.[4] Pyelonephritis, especially when recurrent and associated with vesicoureteral reflux (VUR), is recognized as a major cause of secondary hypertension and chronic kidney disease (CKD) in childhood.[5,6] For this reason, early diagnosis, appropriate empirical treatment, and identification of risk factors play a vital role in minimizing both acute complications and chronic sequelae.

The emergence of extended-spectrum beta-lactamase (ESBL)-producing Escherichia coli strains has significantly changed the epidemiology and treatment approach to UTIs.[7,8] ESBL enzymes, first described in Klebsiella pneumoniae isolates from nosocomial infections in the 1980s, have since been detected in E. coli and other Enterobacteriaceae.[9] These enzymes confer resistance to penicillins, third-generation cephalosporins, and monobactams, complicating the selection of effective empirical antibiotics. Although carbapenems and cephamycins are generally effective against ESBL-producing organisms, their use is often reserved for severe infections to avoid further resistance development.[10,11] According to the Clinical and Laboratory Standards Institute (CLSI), ESBL-producing strains should be reported as resistant to all penicillins and cephalosporins (excluding cephamycins), even if in vitro susceptibility is observed.[12]

ESBL-producing organisms were initially associated with hospital-acquired infections. However, their increasing prevalence in community-acquired infections, particularly UTIs in children, has raised serious concerns.[13] Risk factors for colonization or infection with these resistant strains include prior hospitalization, recent antibiotic exposure (especially broad-spectrum beta-lactams), underlying urinary tract anomalies, invasive procedures, and prolonged catheterization.[14,15] Given the growing incidence of ESBL-positive E. coli in outpatient settings, especially in pediatric patients, appropriate surveillance and identification of high-risk groups have become essential.[16] Despite the clinical significance of ESBL-producing E. coli, most of the existing literature focuses on adult populations, and pediatric data remain limited.[17] Moreover, current treatment guidelines do not always address the distinct epidemiological and clinical features observed in children.

The primary aim of this study is to investigate and identify the clinical, demographic, and medical history-related risk factors associated with ESBL-producing E. coli strains isolated from urine cultures of pediatric patients diagnosed with community-acquired UTIs.

Material and Methods

Study Design and Ethical Approval

This retrospective study was conducted at the Department of Child Health And Diseases, Zeynep Kamil Women And Children Diseases Traning And Research Hospital. The study protocol was reviewed and approved by the institutional Ethics Committee (Date: 12.09.2012, Decision No. 17780). All procedures were performed in accordance with the Declaration of Helsinki and the principles of Good Clinical Practice.

Study Population

Patients hospitalized in the Department of Child Health and Diseases between January 2008 and December 2012 were retrospectively evaluated. One hundred pediatric patients who were hospitalized during the study period and whose cultures showed growth of ESBL-producing E. coli were included in the study. Exclusions included concomitant infections at other sites, receipt of antibiotic therapy for indications known malignancy or rheumatologic disease, use of immunosuppressive treatment for any reason, and acute or chronic liver or renal failure. Additionally, patients who had not received meropenem therapy were excluded from the statistical analyses.

Data Collection

Demographic, clinical, laboratory, and imaging data were retrospectively obtained from patient medical records. Urine culture results, ultrasonographic findings, and prior antibiotic use were reviewed and systematically documented. Prolonged antibiotic use was defined as ≥14 days of continuous therapy

Statistical Analysis

The data of the study were evaluated using the Statistical Package for the Social Sciences (SPSS) version 15.0. In addition to descriptive statistical methods, Chi-square and Fisher's exact tests were used for the analysis of categorical variables between groups. The results were assessed at a 95% confidence interval, and a p-value <0.05 was considered statistically significant.

Results

A total of 100 patients were included in the study, of whom 66% were female and 34% were male. The age distribution of the patients was as follows: 27% were aged 0-11 months, 36% were 12-59 months, and 37% were 60 months and older (Table 1 and Figure 1). When analyzed by age groups, the proportion of females was 33.3% (n=9) in the 0-11 months group, increasing to 61.1% in the 12-59 months group, and reaching 94.6% (n=35) in the 60 months and older group. Symptomatic presentation was observed in 64% of the patients, while 36% were asymptomatic. Females were significantly more likely to be symptomatic compared to males (71.2% vs. 50%; p=0.036). When evaluated by age, the proportion of symptomatic patients was 59.3% (n=16) in the 0-11 months group, 61.1% (n=22) in the 12-59 months group, and 70.3% (n=26) in those aged 60 months and above. The most common presenting symptom was fever (43%), followed by vomiting (23%), abdominal pain (21%), dysuria (14%), irritability (10%), decreased appetite (4%), and enuresis (2%). Multiple symptoms were reported in 38 patients.

Table 1. Clinical Characteristics Related to Antibiotic Use, Infection, and Hospitalization History in the Last 3 Months

Variables	n	%
Prolonged antibiotic use (over 14 days)	10	10.0
Prolonged hospital stay (over 14 days)	4	4.0
Antibiotic use in the last 3 months	51	51.0
Cephalosporin	25	25.0
Penicillin	39	39.0
Quinolone	0	0.0
Carbamazepine	5	5.0
Aminoglycoside	3	3.0
Combined therapy	20	20.0
Infection history in the last 3 months	58	58.0
Urinary tract infection (UTI)	47	47.0
Cystitis	7	7.0
Upper respiratory tract infection (URTI)	18	18.0
Hospitalization history in the last 3 months	27	27.0
Due to UTI	23	23.0
Other reasons	9	9.0

Gender-specific analysis revealed that dysuria (19.7% vs. 2.9%; p=0.031) and abdominal pain (30.3% vs. 2.9%; p=0.001) were significantly more frequent in females than males. No statistically significant differences were found between genders for other symptoms. Regarding age groups, fever (40.7%), irritability (29.6%), and vomiting (25.9%) were predominant in the 0-11 months group, whereas abdominal pain, dysuria, enuresis, and decreased appetite were absent. In the 12-59 months group, fever (44.4%), vomiting (22.2%), abdominal pain (22.2%), dysuria (11.1%), decreased appetite (8.3%), and irritability (5.6%) were reported; enuresis was not observed. Among children aged 60 months and above, fever (43.2%), abdominal pain (35.1%), dysuria (27%), vomiting (21.6%), enuresis (5.4%), and decreased appetite (2.7%) were reported; irritability was absent in this group. Only 34% of patients presented with positive urine cultures. The rate of positive cultures was significantly higher in males compared to females (50% vs. 25.8%; p=0.015).

The majority of patients (78%) had underlying conditions, with nine patients presenting multiple comorbidities. Urinary system disorders were the most prevalent underlying diseases (69%), with recurrent urinary tract infections (UTIs) being the most common (33%). Vesicoureteral reflux (VUR) was the second most frequent urinary pathology (15%), followed by urinary tract anomalies such as urethral strictures and duplicated collecting systems (14%). Two patients had multiple concurrent urinary system abnormalities. Beyond urinary disorders, cardiological diseases accounted for 6% of cases, while gastrointestinal diseases and sepsis each represented 4%. Prolonged antibiotic use, defined as usage exceeding 14 days, was observed in 10% of patients, and extended hospital stays (>14 days) in 4%. Among the 27 patients hospitalized within the past three months, 23 admissions were related to UTIs, with five patients having multiple hospitalization causes. Antibiotic use within the last three months was documented in 51% of patients; penicillins were the most commonly prescribed (39%), followed by cephalosporins (25%) and combination therapies (20%). Usage of carbamazepine and aminoglycosides was reported in 5% and 3% of patients, respectively, while no patients had a history of quinolone use. A history of infection within the previous three months was noted in 58% of patients, predominantly UTIs (47%), followed by upper respiratory tract infections (18%) and cystitis (7%). Fourteen patients experienced multiple infections during this period (Table 1).

None of the patients had received immunosuppressive therapy. However, a history of urinary catheterization was present in 3 patients, invasive procedu-

res in 2 patients, blood and blood product transfusions in 2 patients, neutropenia in 2 patients, central venous catheter use in 2 patients, and total parenteral nutrition (TPN) administration in 1 patient. All patients underwent urinary ultrasonography (USG), with abnormalities detected in 34% of cases. Among these, 17% exhibited renal shape, size, or localization anomalies, 7% showed parenchymal damage, and 10% had combined findings. Urine samples for culture were obtained via midstream catch in 53% of patients, catheterization in 34%, urine bag collection in 9%, and suprapubic aspiration in 3%.

When comparing patients presenting with positive urine cultures to those presenting with symptoms, no statistically significant difference was observed in age distribution ($p > 0.05$). However, symptomatic presentation was significantly more frequent in females compared to culture-positive cases ($p < 0.05$). Underlying diseases were significantly more prevalent in culture-positive patients than symptomatic patients ($p < 0.05$); specifically, urinary system disorders were significantly higher in the culture-positive group ($p < 0.01$), while no significant differences were found regarding the types of urinary diseases or other systemic conditions ($p > 0.05$). No statistically significant differences were detected between the two groups concerning prolonged antibiotic use or extended hospitalization ($p > 0.05$).

Culture-positive patients showed significantly higher rates of antibiotic use within the last three months, infection history in the same period, and hospital admissions within the past three months compared to symptomatic patients ($p < 0.01$). Moreover, penicillin treatment ($p < 0.01$), combined antibiotic therapy ($p < 0.01$), history of urinary tract infections ($p < 0.01$), and hospitalization due to UTIs ($p < 0.001$) in the last three months were all significantly more frequent in culture-positive patients. No statistically significant differences were found between the groups regarding TPN, central venous catheter use, urinary catheterization, invasive procedures, blood transfusions, neutropenia, or USG findings ($p > 0.05$) (Table 2).

Table 2: Comparison Between Patients With Positive Urine Culture and Those Presenting With Symptoms

Variables	Positive Urine Culture		Symptomatic Presentation		Chi-Square	p
	n	%	n	%		
Age Group						
0-11 months	9	26,5	18	27.3	1.750	0.417
12-59 months	15	44.1	21	31.8		
≥60 months	10	29.4	27	40.9		
Gender						
Female	17	50.0	49	74.2	5.877	**0.015***
Male	17	50.0	17	25.8		
Comorbidity						
Absent	3	8.8	19	28.8	5.212	**0.022***
Present	31	91.2	47	71.2		
Urinary System Disorders (Total)	31	91.2	38	57.6	11.844	**0.001****
Anatomical anomalies	8	23.5	6	9.1	-	0.068
VUR	8	23.5	7	10.6	2.939	0.086
Functional abnormalities	2	5.9	4	6.1	-	0.999
Recurrent UTI	15	44.1	18	27.3	2.880	0.090
Other (nephrolithiasis, etc.)	0	0.0	3	4.5	-	0.549
Cardiological diseases	2	5.9	4	6.1	-	0.999
Neurological diseases	0	0.0	1	1.5	-	0.999
GI diseases	1	2.9	3	4.5	-	0.999
Respiratory system diseases	0	0.0	2	3.0	-	0.547
Endocrinological diseases	0	0.0	2	3.0	-	0.547
Hematological diseases	0	0.0	1	1.5	-	0.999
Sepsis	0	0.0	4	6.1	-	0.296
Prolonged antibiotic use	3	8.8	7	10.6	-	0.999
Prolonged hospitalization (over 14 days)	2	5.9	2	3.0	-	0.603

Table 2: Comparison Between Patients With Positive Urine Culture and Those Presenting With Symptoms (Continue)

Variables	Positive Urine Culture		Symptomatic Presentation		Chi-Square	p
	n	%	n	%		
Prolonged antibiotic use	3	8.8	7	10.6	-	0.999
Prolonged hospitalization (over 14 days)	2	5.9	2	3.0	-	0.603
EU use in the last 3 months	24	70.6	27	40.9	7.910	0.005**
Cephalosporin	11	32,4	14	21.2	1.485	0.223
Penicillin	20	58.8	19	28.8	8.509	0.004**
Carbamazepine	3	8.8	2	3.0	-	0.334
Aminoglycoside	2	5.9	1	1.5	-	0.266
Combined	12	35.3	8	12.1	7.531	0.006**
History of infection in the last 3 months	27	79.4	31	47.0	9.695	0.002**
UTI	24	70.6	23	34.8	11.507	0.001**
Smoking	3	8.8	4	6.1	-	0.687
URTI	5	14.7	13	19.7	0.379	0.538
Hospitalization in the last 3 months	15	44.1	12	18.2	7.658	0.006**
UTI-related	15	44.1	8	12.1	12.972	0.0001**
Other causes	2	5.9	7	10.6	-	0.714
TPN use	0	0.0	1	1.5	-	0.999
Central venous catheter	1	2.9	1	1.5	-	0.999
Urinary catheter	1	2.9	2	3.0	-	0.999
Invasive intervention (surgery, etc.)	1	2.9	1	1.5	-	0.999
Blood and blood product transfusion	1	2.9	1	1.5.	-	0.999
Neutropenia	1	2.9	1	1.5	-	0.999
Abnormalities in urinary ultrasound	14	41.2	20	30.3	1.182	0.277
Parenchymal damage	3	8.8	4	6.1	-	0.687
Renal shape, size, and location anomalies	7	20.6	10	15.2	0.470	0.493
Combined	3	8.8	4	6.1	-	0.687

Discussion

In this study, we evaluated urinary UTIs caused by extended-spectrum β-lactamase (ESBL)-producing Escherichia coli in pediatric patients, focusing on risk factors, clinical manifestations, and therapeutic outcomes. Our findings confirm that ESBL-positive E. coli UTIs represent a clinically important subgroup of pediatric infections. While these infections can also contribute to complications such as renal scarring and chronic kidney disease, the present study was limited to ESBL-positive cases and should be interpreted in this context.

Urinary tract infections (UTIs) are among the most common childhood infections and may cause serious complications such as renal scarring and chronic kidney disease if not properly managed. In recent years, the increasing prevalence of extended-spectrum β-lactamase (ESBL)-producing Escherichia coli has significantly complicated treatment due to high levels of antimicrobial resistance.[18] In our ESBL-positive E. coli cohort, infections were more frequent in boys during the neonatal period but became predominant in girls thereafter. These results should be interpreted as specific to ESBL-positive UTIs, not all pediatric UTIs. Clinical manifestations vary with age, ranging from nonspecific symptoms such as fever and vomiting in infants to typical complaints like abdominal pain and dysuria in older children. E. coli was identified as the leading pathogen, while high resistance rates to commonly used antibiotics (ampicillin, amoxicillin/clavulanate, TMP-SMX) were observed. Carbapenems remained the most effective agents, though their use should be reserved due to cost and hospitalization requirements. Underlying urinary tract abnormalities, vesicoureteral reflux, recurrent infections, and recent antibiotic exposure were major risk factors for ESBL (+) UTIs. These results emphasize the importance of early recognition, rational antibiotic use, and careful follow-up to prevent long-term complications.

Consistent with previous reports,[19-21] the emergence of ESBL-producing organisms poses a major therapeutic challenge due to multidrug resistance, particularly against penicillins and cephalosporins. In our cohort, UTI prevalence showed a clear sex- and age-related distribution: during the neonatal period, infections were more common in males, whereas beyond the first month of life, females were dispropor-

tionately affected. These findings are in agreement with previous studies.[22-24] Moreover, UTI prevalence decreased with age, with the highest rates observed in children under two years, in line with prior evidence.[24-26]

Clinical presentations were age-dependent. While older children more frequently presented with classical symptoms such as abdominal pain and dysuria, younger children, especially infants, exhibited non-specific features such as fever, irritability, and vomiting. Fever was the most frequent symptom, corroborating earlier reports.[27,28] Importantly, 36% of our patients were asymptomatic, underlining the potential for silent progression of UTIs in pediatric populations and emphasizing the need for vigilance in early diagnostic evaluation.

Regarding microbiology, E. coli was the most commonly isolated pathogen, consistent with both national and international data.[29] High resistance rates to ampicillin, amoxicillin/clavulanate, and trimethoprim-sulfamethoxazole were observed, which is in accordance with other studies from Turkey and abroad.[30-32] Particularly concerning was the near-universal resistance to cephalosporins among ESBL-producing isolates. Although carbapenems remained highly effective, their limitations—including cost, intravenous administration, and the need for hospitalization—necessitate judicious use. These findings further support the urgent need for rational antibiotic stewardship to prevent further resistance development.

Radiological evaluation revealed urinary tract abnormalities in approximately one-third of patients, most frequently renal parenchymal changes and structural anomalies. This aligns with previous studies,[33] which demonstrated that ultrasound alone may be insufficient to detect vesicoureteral reflux (VUR) or renal scarring. Therefore, complementary investigations such as voiding cystourethrography (VCUG) and dimercaptosuccinic acid (DMSA) scintigraphy are warranted in selected cases to ensure accurate diagnosis and follow-up.

Our study also confirmed the strong association between UTIs, VUR, and renal scarring, as reported in prior literature.[34] Children with underlying urinary tract anomalies, recurrent infections, or recent antibiotic exposure were found to be at significantly higher risk for ESBL (+) UTIs. These findings are in line with data from Hacettepe University [35] and international adult studies,[36] which identified comorbidities, prior hospitalizations, and antibiotic use as major predictors of ESBL infections.

This study has several limitations that should be acknowledged. First, only patients with ESBL-positive E. coli infections who received meropenem therapy were included, which may have introduced selection bias and limits the generalizability of the findings to all ESBL-positive UTIs. Second, due to the relatively small sample size, we were unable to perform multivariate regression analyses to clearly determine independent risk factors, restricting our ability to control for potential confounding variables. Third, the lack of a control group of ESBL-negative UTI patients precluded direct comparative analyses, which would have strengthened the conclusions. Finally, the data were collected between 2008 and 2012, and thus may not fully reflect the current antimicrobial resistance patterns. Despite our findings provide important information on risk factors such as recurrent UTIs, vesicoureteral reflux, and prior antibiotic exposure, which can guide empirical antibiotic selection and patient follow-up. Future large-scale, prospective studies are needed to validate these observations and to optimize diagnostic and therapeutic strategies in pediatric practice.

In conclusion, our results highlight the clinical significance of ESBL-producing E. coli in pediatric UTIs. Early recognition of risk factors, careful diagnostic evaluation, and rational antibiotic selection are crucial for optimal management. Given the high prevalence of antimicrobial resistance, local epidemiological surveillance is essential to guide empirical therapy and prevent treatment failures. Furthermore, our study contributes to the limited pediatric literature on ESBL (+) UTIs, offering valuable insights for both clinical practice and future research.

References

1. Oliveira, E.A. and R.H. Mak, Urinary tract infection in pediatrics: an overview. Jornal de pediatria, 2020. 96: p. 65-79.
2. Tullus, K. and N. Shaikh, Urinary tract infections in children. The Lancet, 2020. 395(10237): p. 1659-1668.
3. Hanna-Wakim, R.H., et al., Epidemiology and characteristics of urinary tract infections in children and adolescents. Frontiers in cellular and infection microbiology, 2015. 5: p. 45.

4. Velioglu, A., et al., Incidence and risk factors for urinary tract infections in the first year after renal transplantation. PLoS One, 2021. 16(5): p. e0251036.
5. Murugapoopathy, V., C. McCusker, and I.R. Gupta, The pathogenesis and management of renal scarring in children with vesicoureteric reflux and pyelonephritis. Pediatric Nephrology, 2020. 35(3): p. 349-357.
6. Breinbjerg, A., et al., Risk factors for kidney scarring and vesicoureteral reflux in 421 children after their first acute pyelonephritis, and appraisal of international guidelines. Pediatric Nephrology, 2021. 36(9): p. 2777-2787.
7. Ena, J., et al., Epidemiology of urinary tract infections caused by extended-spectrum beta-lactamase-producing Escherichia coli. Urology, 2006. 68(6): p. 1169-1174.
8. Pitout, J.D., Infections with extended-spectrum β-lactamase-producing Enterobacteriaceae: changing epidemiology and drug treatment choices. Drugs, 2010. 70(3): p. 313-333.
9. Padmini, N., et al., Extended spectrum β-lactamase producing Escherichia coli and Klebsiella pneumoniae: critical tools for antibiotic resistance pattern. Journal of basic microbiology, 2017. 57(6): p. 460-470.
10. Karaiskos, I. and H. Giamarellou, Carbapenem-sparing strategies for ESBL producers: when and how. Antibiotics, 2020. 9(2): p. 61.
11. Tamma, P.D., et al., Infectious Diseases Society of America 2022 guidance on the treatment of extended-spectrum β-lactamase producing Enterobacterales (ESBL-E), carbapenem-resistant Enterobacterales (CRE), and Pseudomonas aeruginosa with difficult-to-treat resistance (DTR-P. aeruginosa). Clinical Infectious Diseases, 2022. 75(2): p. 187-212.
12. Salihu, M., A. Yarima, and H. Atta, Methods for the phenotypic detection of extended spectrum beta lactamase (ESBL)-producing bacteria. Nigerian Journal of Biotechnology, 2020. 37(2): p. 113-125.
13. Ekpunobi, N., et al., Antimicrobial Resistance in Pediatric UTIs: Molecular Profiles, Clinical Burden, and Public Health Implications of ESBL-Producing Uropathogens. 2025.
14. Isiaka, H.S., Diversity and Antibiotic Susceptibility of Bacteria from Urine Samples of Catheterized Patients at the University of Ilorin Teaching Hospital. 2022, Kwara State University (Nigeria).
15. Mancuso, G., et al., Urinary tract infections: the current scenario and future prospects. Pathogens, 2023. 12(4): p. 623.
16. Alzomor, O.A., Community Acquired Urinary Tract Infections in Children: Prevalence and Predictive Factors for ESBL Status of Uropathogen in a Tertiary Care Center in Saudi Arabia. 2024, Alfaisal University (Saudi Arabia).
17. McDonald, K.L., et al., Measures used to assess the burden of ESBL-producing Escherichia coli infections in humans: a scoping review. JAC-antimicrobial resistance, 2021. 3(1): p. dlaa104.
18. Peirano, G. and J.D. Pitout, Extended-spectrum β-lactamase-producing Enterobacteriaceae: update on molecular epidemiology and treatment options. Drugs, 2019. 79(14): p. 1529-1541.
19. ARMAN, D.Ç., Çocukluk Çağı Üriner Sistem İnfeksiyonlarina Yol Açan Etkenlerin Dağılmı Ve Antibiyotik Duyarlılıklarının Araştrılması. Uzmanlık Tezi, Zeynep Kamil Kadın ve Çocuk Hastalıkları Eğitim ve Araştırma Hastanesi, İstanbul; 2008: 40-58.
20. GÖK, F. and D.Ö. Hacihamdioğlu, İdrar Yolu Enfeksiyonlu Çocukta Yaklaşım ve Tedavi. Turkiye Klinikleri Urology-Special Topics, 2010. 3(2): p. 27-38.
21. Yalçinkaya, F.F., Çocukluk Çağında İdrar Yolu Enfeksiyonları ve Vezikoüreteral Reflü. Turkiye Klinikleri Pediatric Sciences-Special Topics, 2008. 4(1): p. 42-48.
22. Yüksel, S., et al., Antibiotic resistance of urinary tract pathogens and evaluation of empirical treatment in Turkish children with urinary tract infections. International journal of antimicrobial agents, 2006. 28(5): p. 413-416.
23. Roberts, K.B. and O.B. Akintemi, The epidemiology and clinical presentation of urinary tract infections in children younger than 2 years of age. 1999, SLACK Incorporated Thorofare, NJ. p. 644-649.
24. Mir, S., et al., Çocukluk çağı idrar yolu enfeksiyonlarında ilk tedavi seçeneği ne olmalıdır. Türk Nefrol Diyal Transplant Derg, 1997. 2(3-4): p. 149-53.
25. Alpay, H., et al., Clinical and metabolic features of urolithiasis and microlithiasis in children. Pediatric nephrology, 2009. 24(11): p. 2203-2209.
26. Elzouki, A., N. Mir, and O. Jeswal, Symptomatic urinary tract infection in pediatric patients--a developmental aspect. The International Journal of Pediatric Nephrology, 1985. 6(4): p. 267-270.
27. Başhan, İ., Pediatrik Hasta Üriner Sistem Enfeksiyonlarının Birinci Basamaktaki Yönetimi.

Turkiye Klinikleri Family Medicine-Special Topics, 2012. 3(5): p. 36-41.
28. Anis-ur-Rehman, J.M., T.S. Siddiqui, and M. Idris, Frequency and clinical presentation of UTI among children of Hazara Division, Pakistan. J Ayub Med Coll Abbottabad, 2008. 20(1): p. 63.
29. Bouallègue, O., et al., Bacteriologic features of urinary tract infections in children in the Sousse area, Tunisia. La Tunisie Medicale, 2004. 82(8): p. 742-746.
30. Haller, M., M. Brandis, and R. Berner, Antibiotic resistance of urinary tract pathogens and rationale for empirical intravenous therapy. Pediatric nephrology, 2004. 19(9): p. 982-986.
31. Afsharpaiman, S., et al., Bacterial pathogens and resistance patterns in children with community-acquired urinary tract infection: a cross sectional study. Journal of Comprehensive Pediatrics, 2012. 3(1): p. 16-20.
32. Yilmaz, R., et al., Çocuklarda idrar yolları enfeksiyonu etkenleri ve antibiyotik duyarlılıkları. Çağdaş Tıp Dergisi, 2012. 2(1): p. 17-21.
33. Hoberman, A., et al., Imaging studies after a first febrile urinary tract infection in young children. New England Journal of Medicine, 2003. 348(3): p. 195-202.
34. Karımov, S., Akut Pyelonefrit Geçirmiş 0-5 Yaş Arası Çocuklarda Renal Skar Tanısında Prokalsitoninin Prediktiv Değeri. 2016, Ankara Universitesi (Turkey).
35. Boyraz, M.S., Genişlemiş Spektrumlu Beta-Laktamaz (ESBL) Üreten Mikroorganizmalarla Gelişen Üriner Enfeksiyonlu Çocukların Klinik ve Laboratuvar Bulguları. 2014.
36. Rodríguez-Bano, J., et al., Epidemiology and clinical features of infections caused by extended-spectrum beta-lactamase-producing Escherichia coli in nonhospitalized patients. Journal of clinical microbiology, 2004. 42(3): p. 1089-1094.

ACH Med J
(2025) 3: 101-107
ISSN:2822-5872
Doi : 10.5505/achmedj.2025.32032

RESEARCH ARTICLE

Frequency and indication of blood and blood product use in general surgery practice during the pandemic period compared to the pre-pandemic period

Metin Yalçın,[1] Belkıs Koçtekin[2]

[1]Department of General Surgery, University of Health Sciences, Antalya Research and Training Hospital, Antalya, Türkiye
[2]Department of Transfusion Centre and Physiology, University of Health Sciences, Antalya Research and Training Hospital, Antalya, Türkiye

Article Info

Received Date: 10.09.2025
Revision Date : 29.09.2025
Accepted Date: 29.09.2025

Keywords:
Blood products,
Blood transfusion,
Pandemic,
Surgical procedures

ORCIDs of the authors:
MY :0000-0003-2843-3556
BK :0000-0001-5413-5523

Abstract

Introductıon: This study aims to investigate whether there has been a measurable change in the use and indications of blood and blood products during the COVID-19 pandemic compared to the pre-pandemic period

Methods: A total of 1,050 patients were retrospectively analyzed, including 563 in the pre-pandemic period and 487 during the pandemic. Patients monitored for emergency benign diseases, elective benign diseases, trauma, transplantation, and malignancy were included in the study, while those with bleeding due to coagulopathy or suicide attempts were excluded. The blood products used included erythrocyte suspension, fresh frozen plasma, platelet apheresis, and pooled platelet suspension.

Results: The mean hemoglobin threshold for transfusion was significantly lower during the pandemic (7.9 ± 1.3 g/dL vs. 8.7 ± 1.8 g/dL, $p < 0.001$). During the pandemic, there was a statistically significant shift in blood and blood product usage patterns among surgical patients. The proportion of patients receiving one-unit erythrocyte suspension increased (22.8% vs. 12.6%, $p < 0.001$), while two-unit transfusions decreased. FFP use declined, it increased significantly in emergency benign diseases, colorectal/GI surgery, surgical debridement, and transplantation. Apheresis platelet transfusions increased during the pandemic (3.1% vs. 0.7%, $p = 0.005$), while pooled platelet use remained unchanged. Mortality was higher during the pandemic (12.5% vs. 9.4%), but the difference was not statistically significant.

Conclusion: The COVID-19 pandemic was associated with measurable shifts in blood product utilization patterns in general surgery, influenced by changes in surgical priorities and healthcare constraints.

Correspondence Address: Varlik Mah, Kazim Karabekir Cad 07100 Antalya - Türkiye
Phone: +90 535 585 61 63 / **e-mail:** metin.yalcin@mail.com

Copyright© 2025. Ozbudak et al. This article is distributed under a Creative Commons Attribution 4.0 International License.
Follow this and additional works at: https://achmedicaljournal.com

Introduction

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, has profoundly disrupted healthcare systems worldwide, influencing clinical practices, resource allocation, and patient management strategies across nearly all medical disciplines.[1-4] One of the less frequently highlighted but critical aspects affected by the pandemic is the utilization of blood and blood products.[5-7] Due to the widespread postponement of elective surgeries, reduction in trauma cases during lockdowns, and changes in hospital admission patterns, the overall demand for transfusion products underwent significant fluctuations.[5, 8, 9]

Simultaneously, blood donation activities faced considerable challenges due to public health restrictions, donor hesitancy, and logistical constraints, leading to variable and sometimes critically low blood supply levels.[10, 11] These dynamics prompted healthcare institutions to revise transfusion protocols, adopt more restrictive transfusion strategies, and re-evaluate the indications for blood and blood product usage.

Moreover, emerging evidence during the pandemic has suggested potential hematological complications associated with COVID-19, such as coagulopathies and increased thrombotic events, which may have influenced the clinical indications for transfusion in infected patients.[12-14] Understanding whether these changes represent transient adaptations or signal a long-term shift in transfusion practices is vital for informing future policies and preparedness.

This study aims to investigate whether there has been a measurable change in the use and indications of blood and blood products during the COVID-19 pandemic compared to the pre-pandemic period. By analyzing transfusion trends and clinical justifications across these two distinct periods, this research seeks to provide insight into the impact of a global health crisis on transfusion medicine.

Material and Methods

This study was conducted as a retrospective cross-sectional study at the General Surgery Clinic of Antalya Research and Training Hospital. Ethical approval was obtained from the hospital's Clinical Research Ethics Committee (Decision No: 11/5, Date: 02/06/2022). The study was designed in accordance with the Declaration of Helsinki and Good Clinical Practice guidelines.

Patients monitored for emergency benign diseases, elective benign diseases, trauma, transplantation, and malignancy before and during the pandemic period were included in the study. COVID-19 positive surgical patients and those with bleeding due to coagulopathy or suicide attempts were excluded.

Clinical, demographic, laboratory findings, blood product usage amounts, and indications of the included patients were recorded retrospectively from medical records. Patients were categorized into five diagnostic groups: emergency benign diseases, elective benign diseases, trauma, transplantation, and malignancy. Surgical procedures were classified as abscess drainage, appendectomy, bariatric surgery, bridectomy, cholecystectomy, colorectal/gastrointestinal surgery, hernia surgery, soft tissue surgery, splenectomy, surgical debridement, transplantation surgery, trauma surgery, and tumor resection. Emergency benign diseases included acute surgical conditions requiring urgent intervention (appendicitis, acute cholecystitis, perforated viscus, strangulated hernia, etc.), whereas elective benign diseases referred to scheduled, non-malignant procedures such as bariatric surgery or planned hernia repair. Gastrointestinal bleeding cases were included under colorectal/GI surgery.

The blood products used included erythrocyte suspension, fresh frozen plasma, platelet apheresis, and pooled platelet suspension.

Statistical analysis

All data were analyzed with IBM SPSS Statistics for Windows 20.0 (IBM Corp., Armonk, NY, USA). Numerical data determined to be normally distributed based on the results of Kolmogorov-Smirnov tests are given as mean ± standard deviation (SD) values while non-normally distributed variables are given as median (25th-75th quartile) values. Comparisons between the pre-pandemic and pandemic groups were performed using independent-sample tests or Mann-Whitney U tests for continuous variables and Chi-square tests for categorical variables. Significance was accepted at $P < 0.05$ (*) for all statistical analyses.

Results

Table 1 demonstrates the demographic and clinical characteristics of patients who received blood and blood products before and during the COVID-19 pandemic. The mean age of patients was similar between the two periods (60.4 ± 15.4 years before the pandemic vs. 58.8 ± 16.7 years during the pandemic, $p = 0.577$). Gender distribution also did not differ significantly ($p = 0.070$), although a slight

increase in female patients was observed during the pandemic period. A significant change was noted in the distribution of primary diagnoses. The proportion of patients treated for emergency benign diseases increased markedly during the pandemic (from 17.4% to 28.3%, p < 0.001), while the rates of transplant-related cases and elective benign diseases decreased. This shift likely reflects the widespread deferral of elective procedures and transplant programs due to pandemic-related healthcare constraints.

Table 1. Demographic characteristics of patients who used blood and blood products before and during the pandemic

Variables	Before pandemic	Pandemic period	P-value
Age, years	60.4 ± 15.4	58.8 ± 16.7	0.577
Gender, n (%)			
Male	287 (51.0)	221 (45.4)	0.070
Female	276 (49.0)	266 (54.6)	
Diagnosis, n (%)			
Emergence benign diseases	98 (17.4)	138 (28.3)	<0.001*
Elective benign diseases	107 (19.0)	69 (14.2)	
Trauma	19 (3.4)	20 (4.1)	
Transplant	43 (7.6)	19 (3.9)	
Tumor	296 (52.6)	241 (49.5)	
Surgery types, n (%)			
Abscess drainage	7 (1.2)	11 (2.3)	0.011*
Appendectomy	5 (0.9)	5 (1.0)	
Bariatric surgery	42 (7.5)	25 (5.1)	
Bridectomy	21 (3.7)	35 (7.2)	
Cholecystectomy	36 (6.4)	49 (10.1)	
Colorectal / GI surgery	58 (10.3)	59 (12.1)	
Hernia surgery	12 (2.1)	6 (1.2)	
Soft tissue surgery	1 (0.2)	2 (0.4)	
Splenectomy	14 (2.5)	7 (1.4)	
Surgical debridement	9 (1.6)	8 (1.6)	
Transplantation surgery	43 (7.6)	19 (3.9)	
Trauma	19 (3.4)	20 (4.1)	
Tumor resection	296 (52.6)	241 (49.5)	

Data were shown as mean ± SD, or median (IQR) or number (percentages). * P-value <0.05 shows statistical significance.

Regarding surgical interventions, a statistically significant difference was observed in the types of surgeries performed (p = 0.011). Procedures such as bridectomy and cholecystectomy were more frequently performed during the pandemic, whereas bariatric surgery and transplantation surgeries decreased. Table 2 presents the clinical findings related to blood and blood product usage before and during the COVID-19 pandemic. Blood type distributions remained statistically similar between the two periods (p = 0.459).

However, significant changes were observed in hematological parameters and transfusion practices. The mean hemoglobin level at the time of transfusion was significantly lower during the pandemic period (7.9 ± 1.3 g/dL) compared to the pre-pandemic period (8.7 ± 1.8 g/dL) (p < 0.001). Although platelet counts appeared numerically lower during the pandemic, this difference was not statistically significant (p = 0.413). A marked difference was also noted in the amount of blood products administered. The proportion of patients receiving one unit of erythrocyte suspension (ES) increased significantly during the pandemic (22.8% vs. 12.6%), while those receiving two units decreased (32.0% vs. 41.0%) (p < 0.001) (Table 2).

Table 2. Clinical findings of patients who used blood and blood products before and during the pandemic.

Variables	Before pandemic	Pandemic period	P-value
Request blood type, n (%)			
0 Rh-	16 (2.8)	14 (2.9)	0.459
0 Rh+	163 (29.0)	141 (29.0)	
A Rh-	24 (4.3)	19 (3.9)	
A Rh+	237 (42.1)	200 (41.1)	
AB Rh-	7 (1.2)	1 (0.2)	
AB Rh+	36 (6.4)	26 (5.3)	
B Rh-	8 (1.4)	6 (1.2)	
B Rh+	72 (12.8)	80 (16.4)	
Hemoglobin, g/dL	8.7 ± 1.8	7.9 ± 1.3	<0.001*
Platelets, x103	121 (65-149)	87 (49-139)	0.413
Erythrocyte suspension, n (%)			
0	30 (5.3)	35 (7.2)	<0.001*
1	71 (12.6)	111 (22.8)	
2	231 (41.0)	156 (32.0)	
3	231 (41.0)	185 (38.0)	
Fresh frozen plasma, n (%)			
0	305 (54.2)	213 (43.7)	<0.001*
1	50 (8.9)	83 (17.0)	
2	100 (17.8)	95 (19.5)	
3	108 (19.2)	96 (19.7)	
Apheresis platelet, n (%)	4 (0.7)	15 (3.1)	0.005*
Pooled platelet suspension, n (%)	17 (3.0)	14 (2.9)	0.999
Place of transfusion, n (%)			0.393
In operation	434 (77.1)	386 (79.3)	
In operation and service	129 (22.9)	101 (20.7)	
Mortality, n (%)	53 (9.4)	61 (12.5)	0.106

Data were shown as mean ± SD, or median (IQR) or number (percentages). * P-value <0.05 shows statistical significance.

Similarly, fresh frozen plasma (FFP) usage patterns changed, with a higher percentage of patients receiving 1–2 units during the pandemic, and fewer patients receiving no FFP at all ($p < 0.001$). Additionally, the use of apheresis platelets significantly increased during the pandemic (3.1% vs. 0.7%, $p = 0.005$), while pooled platelet usage remained unchanged ($p = 0.999$). No significant difference was observed in the place of transfusion ($p = 0.393$), with the majority of transfusions occurring intraoperatively in both periods. Mortality rates showed an increase during the pandemic period (12.5% vs. 9.4%), although this was not statistically significant ($p = 0.106$) (Table 2).

Table 3 illustrates the comparison of blood product usage across different diagnoses and surgical procedures before and during the COVID-19 pandemic. The blood products evaluated include ES, FFP, apheresis platelets, and pooled platelet suspension. There was no statistically significant change in the use of ES across most diagnostic groups or surgical procedures between the two periods ($p > 0.05$ for all groups). A significant increase in FFP usage was observed in several categories during the pandemic: Emergency benign diseases (from 46.9% to 63.8%, $p = 0.012$), bridectomy (from 28.6% to 68.6%, $p = 0.006$), colorectal/GI surgery (from 52.2% to 80.0%, $p = 0.041$), surgical debridement (from 22.2% to 87.5%, $p = 0.015$). Significant increase was noted only in transplantation surgeries during the pandemic (from 2.3% to 21.1%, $p = 0.028$). Although some increases were observed numerically (e.g., in emergency benign diseases), no statistically significant differences were found in the use of pooled platelets across the groups ($p > 0.05$). While erythrocyte usage remained stable, the use of plasma and platelets, particularly in emergency and high-risk surgeries, showed an upward trend during the pandemic.

Table 3. Changes in the use of blood products during the pandemic compared to before the pandemic.

Diagnosis/Surgery	Erythrocyte suspension		P-value	Fresh frozen plasma		P-value	Apheresis platelet		P-value	Pooled platelet suspension		P-value
	Before pandemic	Pandemic period		Before pandemic	Pandemic period		Before pandemic	Pandemic period		Before pandemic	Pandemic period	
Tumor resection	284(95.9)	230(95.4)	0.832	144(48.6)	127(52.7)	0.386	-	4(1.7)	0.085	4(1.4)	5(2.1)	0.524
Emergence benign diseases	88(89.8)	122(88.4)	0.834	46(46.9)	88(63.8)	0.012*	-	7(5.1)	0.043*	2(2.0)	8(5.8)	0.201
Abscess drainage	6(85.7)	10(90.9)	0.732	5(71.4)	5(45.5)	0.367	-	-	-	-	-	-
Appendectomy	3(60.0)	3(60.0)	0.999	5(100.0)	3(60.0)	0.444	-	-	-	-	-	-
Bridectomy	20(95.2)	33(94.3)	0.999	6(28.6)	24(68.6)	0.006*	-	3(8.6)	0.284	-	3(8.6)	0.284
Cholecystectomy	21(84.0)	28(75.7)	0.534	13(52.0)	17(45.9)	0.796	-	1(2.7)	0.999	1(4.0)	2(5.4)	0.999
Colorectal / GI surgery	22(95.7)	33(94.3)	0.999	12(52.2)	28(80.0)	0.041*	-	1(2.9)	0.999	1(4.3)	2(5.7)	0.999
Hernia surgery	6(100.0)	2(100.0)	0.999	1(16.7)	1(50.0)	0.464	-	-	-	-	-	-
Splenectomy	1(50.0)	5(100.0)	0.286	2(100.0)	3(60.0)	0.999	-	2(40.0)	0.999	-	1(20.0)	0.999
Surgical debridement	9(100.0)	8(100.0)	0.999	2(22.2)	7(87.5)	0.015*	-	-	-	-	-	-
Elective benign diseases	103(96.3)	65(94.2)	0.713	32(29.9)	28(40.6)	0.192	2(1.9)	-	0.521	4(3.7)	-	0.156
Bariatric surgery	41(97.6)	25(100.0)	0.999	12(28.6)	12(48.0)	0.123	-	-	-	-	-	-
Cholecystectomy	10(90.9)	10(83.3)	0.999	4(36.4)	6(50.0)	0.68	-	-	-	-	-	-
Colorectal / GI surgery	35(100.0)	23(95.8)	0.407	10(28.6)	8(33.3)	0.777	1(2.9)	-	0.999	1(2.9)	-	0.999
Hernia surgery	4(66.7)	3(75.0)	0.999	1(16.7)	2(50.0)	0.5	-	-	-	2(33.3)	-	0.467
Soft tissue surgery	1(100.0)	2(100.0)	0.999	-	-	-	-	-	-	-	-	-
Splenectomy	12(100.0)	2(100.0)	0.999	5(41.7)	-	0.505	1(8.3)	-	0.999	1(8.3)	-	0.999
Trauma	19(100.0)	19(95.0)	0.999	13(68.4)	18(90.0)	0.127	1(5.3)	-	0.487	-	1(5.0)	0.999
Transplantation surgery	39(90.7)	16(84.2)	0.757	23(53.5)	13(68.4)	0.403	1(2.3)	4(21.1)	0.028*	7(16.3)	-	0.093

Data were shown as mean ± SD, or median (IQR) or number (percentages). * P-value <0.05 shows statistical significance. GI, gastrointestinal.

Discussion

This retrospective study aimed to analyze the impact of the COVID-19 pandemic on blood and blood product usage, focusing on the clinical indications and surgical procedures associated with transfusion practices before and during the pandemic.

The changes in the frequency and indications of blood and blood product usage in surgical patients during the pandemic can be attributed to several factors.[5-7] Firstly, elective surgeries were widely postponed to allocate healthcare resources to COVID-19 patients, leading to a decrease in blood use associated with these procedures.[15, 16] Meanwhile, emergency and oncological surgeries were prioritized due to their urgent nature and higher bleeding risk, which altered blood demand patterns.[17] Additionally, hospital admissions and surgical volumes declined overall, further impacting blood utilization. Blood supply shortages caused by reduced donor turnout necessitated stricter transfusion criteria and more cautious use of blood products.[5, 18] Moreover, treatment protocols were adapted during the pandemic to minimize unnecessary transfusions. Lastly, the reallocation of healthcare resources, including intensive care beds and staff, toward COVID-19 care limited the capacity for surgical interventions, thereby influencing blood product consumption.[19-21] Collectively, these factors reflect the dynamic shifts in clinical priorities, patient profiles, and healthcare system pressures that affected transfusion practices in surgical settings during the pandemic.

The findings reveal significant alterations in patient profiles and surgical case types, which directly influenced blood utilization patterns during this unprecedented global health crisis. In parallel, significant changes were observed in the types of surgical interventions performed. Procedures such as abscess drainage, bridectomy, cholecystectomy, and colorectal or gastrointestinal surgeries increased in frequency, whereas bariatric and transplant surgeries decreased. This shift reflects the prioritization of urgent and oncologic surgical cases over elective and complex surgeries during the pandemic. Emergency surgeries tend to be associated with higher transfusion requirements due to the acuity and complexity of the cases, which may have contributed to fluctuations in blood product demand.

These evolving clinical patterns emphasize how the COVID-19 pandemic forced healthcare systems to adapt rapidly, reallocating resources and modifying surgical practices.[16, 22, 23] The reduction in elective and transplantation surgeries likely contributed to a decreased demand for blood products in those categories, whereas the increase in emergency procedures may have offset this decrease to some extent.[24] Such dynamics underscore the need for flexible blood management strategies that can respond to shifting clinical priorities during public health emergencies.[8]

Our demographic analysis showed no statistically significant differences in age or gender distribution between the pre-pandemic and pandemic periods. This suggests that the demographic characteristics of patients requiring transfusions remained relatively stable despite the systemic disruptions caused by the pandemic. However, the diagnostic categories of patients showed notable shifts. Specifically, there was a marked increase in emergency benign disease cases during the pandemic period (28.3% vs. 17.4%, $p < 0.001$), while elective benign diseases and transplantation cases decreased. This trend is likely attributable to the widespread postponement and cancellation of elective surgeries and transplantation procedures aimed at reducing hospital occupancy and minimizing exposure risks during the pandemic, in line with recommendations from health authorities worldwide.

This study investigated how the COVID-19 pandemic affected blood and blood product usage and its clinical indications. Results indicated a significant increase in emergency benign diseases and a concurrent decrease in elective benign diseases and transplantation surgeries during the pandemic. These findings align with global trends where elective procedures were postponed to prioritize urgent and oncologic surgeries, which generally require more blood transfusions. The reduction in transplantation activities, likely due to donor shortages and resource constraints, also impacted blood product demand. Additionally, the pandemic caused challenges in blood supply due to decreased donations, necessitating adaptive blood bank management strategies to meet changing clinical needs. These shifts underscore the importance of coordinated multidisciplinary approaches and patient blood management to optimize transfusion practices.

Despite the valuable insights, this study has limitations. Its retrospective design and single-center setting may restrict the generalizability of the findings. Additionally, the study did not evaluate the exact quantities of blood products used per patient or clinical outcomes related to transfusion, which could

provide further depth to understanding pandemic-related changes in transfusion practices. During the pandemic, surgical case selection was significantly influenced by Ministry of Health regulations, which restricted elective interventions and prioritized urgent and oncologic procedures. This external factor likely contributed to the observed shifts in transfusion practices. Given the heterogeneity of surgical indications, we restricted our statistical analysis to descriptive and univariate comparisons. Multivariate models were not performed, which may limit adjustment for potential confounders. Future prospective multicenter studies are warranted to validate these findings and explore long-term trends in blood utilization as the healthcare landscape continues to evolve post-pandemic.

Conclusion

In conclusion, the COVID-19 pandemic significantly influenced the clinical landscape of blood product use, driven by changes in patient diagnoses and surgical priorities. Compared with the pre-pandemic period, erythrocyte transfusions during the pandemic became more restrictive, with lower hemoglobin thresholds and more frequent one-unit usage. While overall FFP use decreased, it rose significantly in urgent and complex surgical procedures. Apheresis platelet transfusion increased, whereas pooled platelet use remained stable. These findings underscore how transfusion practices adapted to pandemic-related challenges. Understanding these trends is critical for optimizing blood supply management, ensuring patient safety, and maintaining healthcare system resilience during ongoing and future crises.

References

1. Stawicki, S.P., et al., The 2019–2020 novel coronavirus (severe acute respiratory syndrome coronavirus 2) pandemic: A joint american college of academic international medicine-world academic council of emergency medicine multidisciplinary COVID-19 working group consensus paper. Journal of global infectious diseases, 2020. 12(2): p. 47-93.
2. Filip, R., et al., Global challenges to public health care systems during the COVID-19 pandemic: a review of pandemic measures and problems. Journal of personalized medicine, 2022. 12(8): p. 1295.
3. Davis, B., B.K. Bankhead-Kendall, and R.P. Dumas, A review of COVID-19's impact on modern medical systems from a health organization management perspective. Health and technology, 2022. 12(4): p. 815-824.
4. Erel, Ö., et al., A sensitive indicator for the severity of COVID-19: thiol. Turkish journal of medical sciences, 2021. 51(3): p. 921-928.
5. Stanworth, S.J., et al., Effects of the COVID-19 pandemic on supply and use of blood for transfusion. The Lancet Haematology, 2020. 7(10): p. e756-e764.
6. Baron, D., et al., Patient blood management during the COVID–19 pandemic: a narrative review. Anaesthesia, 2020. 75(8): p. 1105-1113.
7. Chegini, A., Evaluating the importance of patient blood management during COVID-19 pandemic. Anesthesiology and Pain Medicine, 2022. 11(6): p. e112910.
8. Van Denakker, T.A., et al., Managing blood supplies during natural disasters, humanitarian emergencies, and pandemics: lessons learned from COVID-19. Expert review of hematology, 2023. 16(7): p. 501-514.
9. Alzerwi, N.A., et al. Optimizing surgical care amidst COVID-19: a scoping review of practices and policies. Healthcare, 2023. 12(1): p. 96.
10. Gasparovic Babic, S., A. Krsek, and L. Baticic, Voluntary blood donation in modern healthcare: Trends, challenges, and opportunities. Epidemiologia, 2024. 5(4): p. 770-784.
11. Singh, A.P., R. Saxena, and S. Saxena, Professional blood donors: Ethical concerns and complexities. Journal of International Research in Medical and Pharmaceutical Sciences, 2024. 19(1): p. 17-23.
12. Rahi, M.S., et al., Hematologic disorders associated with COVID-19: a review. Annals of hematology, 2021. 100(2): p. 309-320.
13. Agbuduwe, C. and S. Basu, Haematological manifestations of COVID-19: from cytopenia to coagulopathy. European journal of haematology, 2020. 105(5): p. 540-546.
14. Levi, M., Pathophysiology of coagulopathy in hematological malignancies and in COVID-19. HemaSphere, 2021. 5(6): p. e571.
15. Mehta, A., et al., Elective surgeries during and after the COVID-19 pandemic: case burden and physician shortage concerns. Annals of Medicine and Surgery, 2022. 81: p. 104395.
16. Mattingly, A.S., et al., Trends in US surgical procedures and health care system response to policies curtailing elective surgical operations during the COVID-19 pandemic. JAMA Network Open, 2021. 4(12): p. e2138038-e2138038.

17. Coccolini, F., et al., Strategies to prevent blood loss and reduce transfusion in emergency general surgery, WSES-AAST consensus paper. World Journal of Emergency Surgery, 2024. 19(1): p. 26.
18. Stein, D.M., et al., National blood shortage: a call to action from the trauma community. Journal of Trauma and Acute Care Surgery, 2022. 93(3): p. e119-e122.
19. Lee, C., et al., Battling COVID-19: critical care and peri-operative healthcare resource management strategies in a tertiary academic medical centre in Singapore. Anaesthesia, 2020. 75(7): p. 861-871.
20. Douglas, I.S., A. Mehta, and J. Mansoori, Policy Proposals for Mitigating Intensive Care Unit Strain: Insights from the COVID-19 Pandemic. Annals of the American Thoracic Society, 2024. 21(12): p. 1633-1642.
21. Tyrrell, C.S., et al., Managing intensive care admissions when there are not enough beds during the COVID-19 pandemic: a systematic review. Thorax, 2021. 76(3): p. 302-312.
22. Pappas, H. and P. Frisch, Leveraging technology as a response to the COVID pandemic: Adapting diverse technologies, workflow, and processes to optimize integrated clinical management. 2022: CRC Press.
23. George, I., et al., The rapid transformation of cardiac surgery practice in the coronavirus disease 2019 (COVID-19) pandemic: insights and clinical strategies from a centre at the epicentre. European Journal of Cardio-Thoracic Surgery, 2020. 58(4): p. 667-675.
24. Ahn, C., et al., Global transplantation COVID report March 2020. Transplantation, 2020. 104(10): p. 1974-1983.

ACH Med J
(2025) 3: 108-109
ISSN:2822-5872
Doi : 10.5505/achmedj.2025.18480

LETTER TO THE EDITOR

Evaluation of Accreditation Processes from the Perspective of Medical Biochemistry Laboratory: The Ankara Bilkent City Hospital Example

Gamze Gok[1], Mehmet Fatih Alpdemir[1], Ali Cınar[2],Ozcan Erel[3]

[1]Ankara Bilkent City Hospital, Department of Medical Biochemistry, Ankara, Türkiye

[2]Ankara Bilkent City Hospital, Deputy Head Physician, Ankara, Türkiye

[3]Ankara Yıldırım Beyazıt University, Faculty of Medicine, Department of Medical Biochemistry, Ankara, Türkiye

Article Info

Received Date: 09.02.2025
Revision Date : 30.03.2025
Accepted Date: 04.04.2025

Keywords:

Accreditation,
Medical Biochemistry Laboratory,
Panic Value.

ORCIDs of the authors:

GG :0000-0002-2804-5548
MFA :0000-0003-3015-1478
AC :0009-0005-4006-0184
OE :0000-0002-2996-3236

Dear Editor,

Accreditation can be defined as the evaluation of a health institution's achievement of accreditation standards by an independent health accreditation institution, taking into account the relevant performance levels, and sharing it with the public.[1] In many countries, accreditation plays a role in the evaluation of the health system and is indispensable for the health system.[2]

The mission of Ankara Bilkent City Hospital is to deliver high-quality healthcare services that are timely, efficient, and sustainable. Our commitment is built on principles of equity, ensuring trust and satisfaction for both patients and employees. Additionally, we aim to be a leader in medical education, offering continuous opportunities for the advancement of healthcare. The vision of Ankara Bilkent City Hospital is to be the premier healthcare institution recognized globally for providing exceptional healthcare services to everyone. We prioritize patient care, scientific research, the development of skilled human resources, success in medical education, and the effective use of healthcare technology.[3]

The accreditation process in our hospital started in 2022. Until today, the accreditation surveys of the physical therapy hospital, gynecology hospital, general hospital, cardiovascular hospital, children's hospital, neurology orthopedic hospital, and oncology hospital located in different towers within our hospital have been completed.

Our laboratory serves all hospital units and has undergone numerous surveys during the accreditation process. We would like to share our experiences regarding the accreditation journey with our valued readers.

Accreditation and quality groups were established in our clinic, and chairmen and officers were determined for each group. Meetings were usually held regularly and urgently when necessary, and information flow was ensured. Ideas were exchanged at each meeting, and these meetings positively affected the accreditation process.

The test guide, forms, instructions, and other documents related to our laboratory were reviewed.

Correspondence Address: Üniversiteler Mahallesi 1604. Cadde No: 9 Çankaya Ankara - Türkiye
Phone: +90 505 378 67 03 / **e-mail:** gamze_gok@outlook.com

Copyright© 2025. Gok et al. This article is distributed under a Creative Commons Attribution 4.0 International License.
Follow this and additional works at: https://achmedicaljournal.com

During the accreditation survey process, the most frequently evaluated situations by the inspectors are as follows:

Education;

Information was requested regarding our clinic's annual education plan, including the training conducted and its content.

Indicators;

The performance of our laboratory is indicator-based. The indicators followed within our laboratory were evaluated. In particular, internal quality and external quality indicators were evaluated in detail in each survey. Information was requested about the activities carried out in case the target values were not reached.

Risk Management;

The reasons that may cause risk and their solutions have been questioned. The risk analysis performed in our hospital is located on the desktop of each employee's computer.

Tracing;

The patient determined via the laboratory information system was traced by specifying a spontaneous date and time range. In tracing, the patient's sample collection, laboratory admission times, analysis and result reporting stages, calibration of the day the sample was analyzed, and internal quality control results were evaluated. In our hospital, panic value notification is made by the panic value notification instructions. During the surveys, while tracking patients with panic values, information such as the laboratory specialist who made the panic value, the method and time of the notification, and which clinician the panic value notification was sent to were evaluated in detail.

Documents;

The test guide, forms, procedures, and instructions related to our laboratory on our hospital's intra-hospital communication portal were examined. Information was requested about the revisions of the revised documents and the reasons for the revision.

Point of Care Tests;

During the accreditation survey, point-of-care test devices, device guides, and training certificates of the users were evaluated.

Environmental Conditions;

During the survey, our laboratory's temperature and humidity values were checked, and old records of temperature and humidity were evaluated.

Information about devices and device users;

The training certificates of device users, maintenance files of devices, and technical service fault record documents were questioned.

We aim to contribute to the literature with our experience.

Best regards…

References

1. Mansour W, Boyd A, Walshe K. The development of hospital accreditation in low and middle-income countries: a literature review. Health policy and planning. 2020;35(6):684-700.

2. KAVAK, Demet Gökmen. Türkiye Sağlik Hizmetleri Kalite Ve Akreditasyon Enstitüsü (Tüska) Sağlikta Akreditasyon Standartlari. Sağlıkta Kalite ve Akreditasyon Dergisi, 2018, 1.1: 14-20.

3.https://ankarasehir.saglik.gov.tr/EN-388236/our-mission-and-vision.html(Access date:15.01.2025)