RESEARCH ARTICLE / ARAŞTIRMA

DOI: 10.4274/mjima.galenos.2021.2021.35
Mediterr J Infect Microb Antimicrob 2021;10:35
Erişim: http://dx.doi.org/10.4274/mjima.galenos.2021.2021.35

Trends of Inpatient Antibiotic Consumption in a Children's Clinic

Bir Çocuk Kliniğinde Yatan Hastalarda Antibiyotik Tüketim Değişimleri

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Abstract

Introduction: Antimicrobials are the most commonly used medications among inpatient children. Moreover, a direct correlation exists between the magnitude of antibiotic consumption and the prevalence of resistant organisms. Surveying the trends of antibiotic consumption is crucial for establishing initiatives that are aimed at combating antibiotic-resistant infections by enhancing the rational use of antimicrobials. The objective of this study is to assess the trends of antibiotic consumption among hospitalized children for contributing toward future studies and establishing promising awareness-raising policies for appropriate antimicrobial use.
Materials and Methods: The study was conducted retrospectively in a tertiary research hospital's pediatric ward of 50 beds. Using the hospital pharmacy and administrative databases between January 1, 2014, and December 31, 2019, all hospitalized children who received antimicrobials in that period were included. Data regarding antimicrobial use were evaluated according to anatomical therapeutic chemical/defined daily doses (ATC/DDD) index methodology, described in "World Health Organisation Guidelines for ATC classification and DDD assignment 2020." Data of antibiotic consumptions were revealed with a unit as DDD/1,000 patient-days (PD). The time trends of antibiotic consumption were statistically analyzed by linear regression.
Results: Data of 11,519 pediatric inpatients were recorded, in which 6,103 (53.0%) were boys and 5,416 patients (47.0%) were girls. The median age of the patients was two years. Ceftriaxone was the most commonly used antibiotic throughout the study period. Ceftriaxone utilization has increased by 19.5% between 2014 and 2019. Despite being the most commonly used carbapenem in the study, meropenem consumption decreased significantly from 2014 to 2019 (ATC/DDD index in 2014=46.22/1,000 PD; in 2019=11.62/1,000 PD) (p=0.008). Amikacin consumption was greater than gentamicin use by 2017, but vice versa from 2017 onward. The total antibiotic consumption peaked by 2016 (856.35/1,000 PD), amid a slight drop from 2014 to 2019 (p=0.667).
Conclusion: Assessing regional antimicrobial consumptions periodically is critical for establishing current antibiotic stewardship initiatives that enable the rational use of antibiotics for combating bacterial resistance.
Keywords: Antimicrobial consumption, antibiotic consumption, inpatient children, hospitalized children

Öz

Giriş: Antimikrobiyaller hastanede yatan çocuklarda en sık kullanılan ilaçlardır. Antibiyotik tüketiminin yüksekliği, dirençli organizmaların görülme sıklığı ile doğrudan ilişkilidir. Antibiyotik tüketim değişimlerinin değerlendirilmesi, antibiyotik dirençli enfeksiyonlarla savaşta, akılcı antimikrobiyal kullanımını sağlayan yöntemlerin oluşturulmasında önemlidir. Bu çalışmanın amacı, uygun antimikrobiyal kullanımına yönelik umut veren dikkat çekici uygulamaların oluşturulmasını amaçlayan ileri çalışmalara katkı sağlamak üzere, hastanede yatan çocuklarda antibiyotik tüketim değişimlerinin belirlenmesidir.
Gereç ve Yöntem: Bu çalışma, bir üçüncü basamak araştırma hastanesi elli yataklı çocuk servisinde retrospektif olarak yapılmıştır. Çalışmaya, 1 Ocak 2014 ve 31 Aralık 2019 arasındaki hastane eczanesi ve idari verileri kullanılarak belirlenen, yatarak antimikrobiyal almış olan tüm çocuklar dahil

Cite this article as: Şimşek B, Şenbayrak S, Balık R, Nuhoğlu Ç. Trends of Inpatient Antibiotic Consumption in a Children's Clinic. Mediterr J Infect Microb Antimicrob. 2021;10:35

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Received/Geliş Tarihi: 20.04.2021 **Accepted/Kabul Tarihi:** 10.06.2021

Published: 14 June 2021

Öz

edilmiştir. Antimikrobiyal kullanımı ile ilgili veriler, Dünya Sağlık Örgütü 2020 yılı tedavi edici kimyasal (ATC) sınıflaması ve belirlenmiş günlük doz (DDD) tanımlanması kılavuzunda tanımlanan ATC/DDD indeksi metodolojisine göre değerlendirilmiştir. Antibiyotik tüketim verileri DDD/1000 hasta günü (PD) birimi ile ifade edilmiştir. Antibiyotik tüketimlerinin zamansal değişimleri istatistiksel olarak linear regresyon analizi ile değerlendirilmiştir.
Bulgular: Toplamda, 11.519 yatan pediatrik hasta, 6.103 (%53) erkek, 5.416 (%47) kız olmak üzere çalışmaya alınmıştır. Hastaların medyan yaşı 2 idi. Altı yıllık süre boyunca seftriakson en yaygın kullanılan antibiyotik idi. Seftriakson tüketimi, 2014-2019 yılları arasında %19,5 arttı. Çalışmada en yaygın kullanılan karbapenem olduğu halde meropenem tüketimi, 2014'ten 2019'a kadar anlamlı şekilde düştü (ATC/DDD indeksi 2014 yılı=46.22/1.000 PD; 2019 yılı=11.62/1.000 PD) (p=0,008). Amikasin tüketimi 2017'ye kadar gentamisin tüketiminden fazla iken; 2017'den sonra durum tam tersi olmuştur. Toplam antibiyotik tüketimi 2016'da (856.35/1.000 PD) zirveye yükselmiş, 2014'ten 2019'a kadar ise hafif bir düşüş göstermiştir (p=0,667).
Sonuç: Aralıklı olarak, bölgesel antimikrobiyal tüketimlerinin değerlendirilmesi, bakteri direnci ile mücadelede akılcı antibiyotik kullanımını amaçlayan, güncel antibiyotik kullanım yöntemlerinin belirlenmesinde oldukça önemli bir yer tutar.
Anahtar Kelimeler: Antimikrobiyal tüketim, antibiyotik tüketimi, hastanede yatan çocuklar, yatan çocuklar

Introduction

Antimicrobials have been the most commonly consumed drugs among inpatient children, although there is wide variability among diverse countries[1-3]. Turkey ranked first among the "Organisation for Economic Co-operation and Development" (OECD) countries with its highest antibiotic consumption rate[1,2]. However, over half of hospitalized children (54.6%) have been receiving one or more antibiotics in Turkey, whereas; about one-third of paediatric patients were on antimicrobials in hospitals in Europe[4].

A clear correlation has been established between the magnitude of antibiotic consumption and the prevalence of resistant organisms among children[2-4]. Bacterial resistance and inappropriate use of antimicrobials have emerged as a global health problem; posing increased healthcare related expenses, therapy failures and complications in recent years[3]. Surveying trends of antibiotic consumption in hospitals is crucial to determine the latest situation and establish initiatives to combat antibiotic-resistant infections by enhancing rational use of antimicrobials. Although a substantial amount of antibiotics have been consumed in children, research or information over antimicrobial consumption in children has been lacking in our country and data focusing on paediatrics have still been limited worldwide as well[1-3,5].

There are a variety of methods to assess antimicrobial consumption in hospitals[1,2,5,6] . The anatomical therapeutic chemical/defined daily doses (ATC/DDD) index methodology as assigned by the World Health Organisation (WHO) has been the preferred international standard for drug utilization studies[7,8]. The method eases the comparison of utilization between diverse settings and drugs, rather than reflecting the recommended or actual prescribed daily dosage for individual patients[6]. Although DDDs are normally assigned based on use in adults, WHO, recommends the use of the general DDD as a measuring tool for overall comparisons in selective paediatric care settings[7]. The objective of this study is to assess the trends of antibiotic consumption in hospitalized children aimed at making contributions to efforts for raising awareness of appropriate antimicrobial use and establishing promising antimicrobial stewardship initiatives.

Materials and Methods

Data Collection

The study was conducted to assess antibiotic consumption retrospectively between 1st January 2014 and 31st December 2019 in a tertiary research hospital paediatric ward of 50 beds. Antibiotic use data were obtained from hospital electronic database system where the inputs of doses of medications were recorded by the pharmacy office. Using the hospital pharmacy and administrative databases, we reviewed the records of inpatient children. All hospitalized patients who received antimicrobials, for any reason, were included in this study. We ensure respect for World Medical Association Declaration of Helsinki-Ethical Principles for Medical Research involving Human Subjects[9].

Data Processing

"WHO International Working Group for Drug Statistics Methodology" has concluded that although, DDDs are normally assigned based on use in adults, in selected situations the general DDD should be used as a measuring tool for overall comparisons[7].

Data regarding to antimicrobial use were evaluated accordingly to ATC/DDD method, described in "WHO Guidelines for ATC classification and DDD assignment 2021[7]. Codes of ATC and DDD figures were gathered from "ATC/DDD alterations, cumulative lists" published on WHO collaborating Centre for Drug Statistics

Methodology website (www.whocc.no). Data of antibiotics were revealed as ATC/DDD Index with a unit as DDD/1000 Patient-Days (PD) as described[7,10].

Statistical Analysis

The time trends of antibiotic consumption were statistically analysed by linear regression using IBM® SPSS® Statistics 24 software package.

Results

A total of 11519 paediatric inpatients were recorded, 6103 (53.0%) were boys and 5416 (47.0%) were girls. The ages of patients have not showed a standard normal distribution. Median age of the patients was 2 years (Q1-Q3: 1-8 years respectively).

Overall antibiotic consumption has been shown in Table 1. The most commonly used antibiotic was ceftriaxone; followed by ampicillin sulbactam throughout the 6-year period (Table 1, Figure 1). Trends in ceftriaxone and ampicillin sulbactam utilization rates to total annual antibiotic consumptions has been illustrated in Figure 2 as well. Ceftriaxone consumption had significantly increased from 244.74/1000 PD in 2014 to 469.17/1000 PD in 2017; followed by a slight decrease to 304.19/1000 PD by 2019 (p=0.633). Ceftriaxone utilization has increased by 19.5% between 2014 and 2019. Cefotaxime was the second mostly preferred antibiotic among cephalosporins

Table 1. Antibiotic consumptions between 2014 and 2019

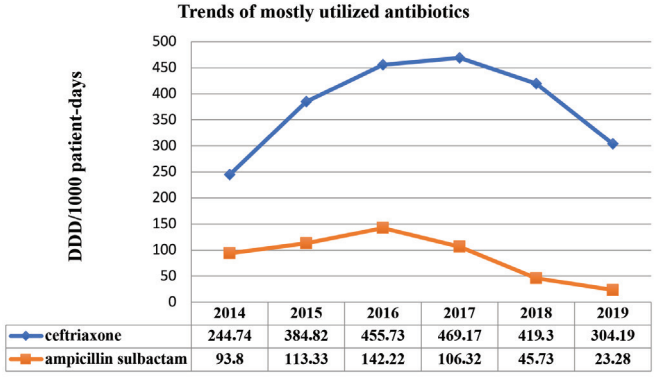
ATC code	Antibiotic	Antibiotic consumption index (DDD/1,000 patient-days)						Trend analysis			
		2014	2015	2016	2017	2018	2019	b	95% Lower limit	95% Upper limit	p
	Penicillins										
J01CR01	Ampicillin-sulbactam	93.80	113.33	142.22	106.32	45.73	23.28	−16.895	−40.193	6.404	0.114
J01CR05	Piperacillin/ tazobactam	0.00	1.75	0.00	0.00	3.12	0.81	0.234	−0.654	1.122	0.505
	Cephalosporins										
J01DB04	Cefazolin	2.35	0.43	6.66	0.83	0.46	2.54	−0.137	−1.885	1.610	0.838
J01DC02	Cefuroxime	2.10	0.00	1.90	23.55	7.28	2.18	1.256	−5.081	7.593	0.611
J01DD01	Cefotaxime	44.93	55.09	51.38	43.26	45.76	44.37	−1.111	−4.231	2.008	0.379
J01DD04	Ceftriaxone	244.74	384.82	455.73	469.17	419.30	304.19	11.832	−51.866	75.530	0.633
J01DE01	Cefepime	0.16	1.43	1.18	1.03	0.47	0.00	−0.111	−0.517	0.296	0.491
	Macrolides										
J01FA09	Clarithromycin	0.57	12.28	3.09	0.37	1.64	13.27	0.826	−3.439	5.090	0.619
	Carbapenems										
J01DH03	Ertapenem	0.85	1.43	2.37	4.26	2.02	2.54	0.345	−0.375	1.064	0.254
J01DH02	Meropenem	46.22	32.78	19.34	23.76	12.88	11.62	−6.521	−10.217	−2.826	**0.008**
J01DH51	Imipenem	0.00	0.00	0.82	1.00	2.02	0.98	0.320	−0.023	0.664	0.061
	Aminoglycosides										
J01GB06	Amikacin	18.33	23.50	29.16	22.55	0.00	3.98	−4.255	−10.564	2.055	0.134
J01GB03	Gentamicin	5.47	11.41	10.47	1.21	16.52	29.67	3.630	−1.748	9.007	0.134
	Polymyxins										
J01XB01	Colistin	3.96	2.11	1.23	5.95	0.00	0.00	−0.612	−2.142	0.917	0.329
	Glycopeptides										
J01XA01	Vancomycin	16.33	47.25	36.38	30.92	17.87	18.95	−2.299	−10.935	6.338	0.501
J01XA02	Teicoplanin	72.39	35.59	40.71	42.23	36.51	45.33	−3.744	−12.465	4.977	0.299
	Others										
J01XX08	Linezolid	1.19	2.92	1.08	2.06	0.00	0.00	−0.393	−1.050	0.264	0.172
J01XD01	Metronidazole	3.18	39.52	46.24	27.81	18.76	0.00	−276.086	−1620.779	1068.607	0.599
J01FF01	Clindamycin	0.00	1.27	6.39	6,85	1.31	1.93	29.143	−182.768	241.054	0.722
	Total	556,57	766,91	856.35	813.13	631.65	505.64	−264.392	−1,845.727	1,316.944	0.667

ATC: Anatomical therapeutic chemical

during the period. Ampicillin sulbactam consumption was relatively high between 2014 and 2016, then it markedly decreased by 2019; however, the trend of utilization analysed between 2014 and 2019 was not statistically significant (p=0.114) (Table 1).

Of the carbapenems was meropenem the most commonly consumed. However, meropenem consumption showed a significant downward trend from 2014 up to 2019 (ATC/DDD index in 2014=46.22/1000 PD; in 2019=11.62/1000 PD) (p=0.008) (Table 1, Figure 3). Although amikacin had been the most commonly preferred aminoglycoside in use between 2014 and 2017, widening the gap against amikacin utilization has gentamicin consumption increased significantly after 2017 onwards. Nevertheless, the trend of annual ATC/DDD indexes for amikacin or gentamicin did not change significantly during the period between 2014 and 2019 (p=0.134) (Table 1, Figure 4).

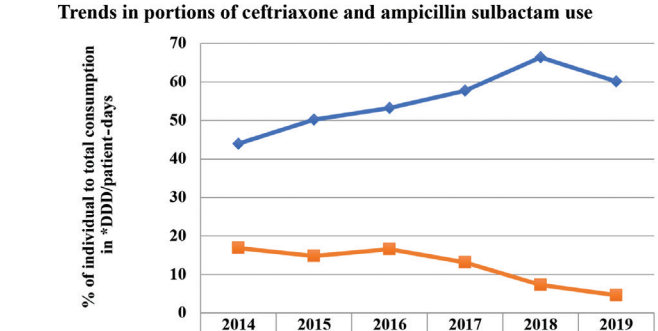
Total antibiotic consumption had increased to its peaks in 2016 and 2017 (856.35/1000 PD and 813.13/1000 PD, respectively), amid a slight drop from 2014 to 2019 (p=0.667) (Table 1) (Figure 5). However, the difference in the trend of total antibiotic utilization between 2014 and 2019 was not statistically significant (p=0.667).



	2014	2015	2016	2017	2018	2019
ceftriaxone	244.74	384.82	455.73	469.17	419.3	304.19
ampicillin sulbactam	93.8	113.33	142.22	106.32	45.73	23.28

Figure 1. Trends of mostly utilized antibiotics during 2014-2019

DDD: Defined daily doses



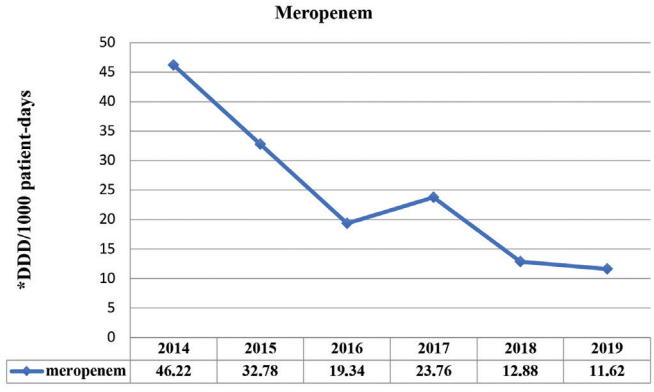
	2014	2015	2016	2017	2018	2019
ceftriaxone	43.97	50.18	53.22	57.7	66.38	60.15
ampicillin sulbactam	16.85	14.78	16.61	13.08	7.24	4.6

Figure 2. Trends in ceftriaxone and ampicillin sulbactam utilization rates to total annual consumptions

DDD: Defined daily doses

Discussion

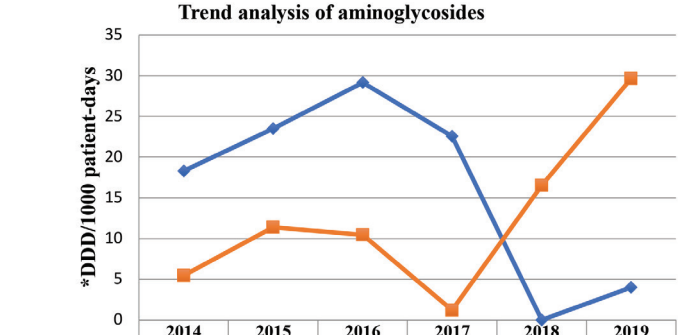
Organisation for Economic Co-operation and Development has announced that antibiotic consumption and, in particular, inappropriate use are among the major causes supporting the development of antibiotic resistance. In 2014 average antibiotic consumption in OECD was about 20.5 DDD per 1000 inhabitants, amid Turkey evidently represented the highest consumption rate among OECD countries with over 40 DDD per 1000 inhabitants[2,10]. Antimicrobial resistance (AMR) has showed an upward trend during the last decade in a majority of countries. The probability of identifying a resistant infection across OECD countries in 2015 was reported as 17% and Turkey was the second country following Greece with the highest levels of resistance with over 35% in 2015[11]. At current resistance rates, increasing healthcare expense is predicted to reach a total of 2.9 trillion USD by 2050. OECD has claimed that if this trend



	2014	2015	2016	2017	2018	2019
meropenem	46.22	32.78	19.34	23.76	12.88	11.62

Figure 3. Trend of meropenem between 2014 and 2019

DDD: Defined daily doses



	2014	2015	2016	2017	2018	2019
amikacin	18.33	23.5	29.16	22.55	0	3.98
gentamicin	5.47	11.41	10.47	1.21	16.52	29.67

Figure 4. Trends of utilizations of aminoglycosides between 2014 and 2019

DDD: Defined daily doses

continues we could revert to a world where simple infections are no longer treatable[10,11].

Monitoring system in place for antimicrobial consumption is among the fundamental implemented policies to foster the rationale use of antimicrobials. Number of packages or prescriptions has been recommended alternative measures; nevertheless they do not provide exact quantitative measure of use; but only useful metrics for assessing antimicrobial prescribing practices between countries[12]. The days of therapy measurement quantifying antimicrobial use regardless of dose and cross-sectional point prevalence surveys and ATC/DDD method might be ranked among surveillance modalities in paediatrics[1-5,13]. However, researches regarding trends of antibiotic utilization, in particular, in children have still been limited[4,5]. In addition, need for a convenient and precise method of measurement for such studies has still been a challenge indeed.

In this study, ATC/DDD index methodology has been preferred in measuring antimicrobial consumption mainly due to its general applicability. The DDD as assigned by WHO International Working Group for Drug Statistics Methodology has been the most commonly used unit of measurement to quantify and compare antimicrobial consumptions between diverse settings particularly in adults[1,6]. Although DDD methodology might be associated with problems related to drug utilization studies in children; since there has not been any determined optimal measuring tool yet, the general DDD has still been commonly in use, in particular, for comparisons of overall data and trends during selected periods in children[7].

This study has reported that ceftriaxone was the most commonly consumed inpatient antimicrobial throughout the period. Although there have been substantial variations among antibiotic use in both children and adults across the globe from Europe to Asia, however, coherently to our results, ceftriaxone was reported to be the most commonly consumed parenteral antimicrobial in most settings[2,3,12,14-17]. Our high ceftriaxone consumption rate might be grounded in high proportion of children with respiratory tract infection as in Europe and Turkey likewise[4,12,18]. However, Ceyhan et al.[4] has stated a comparatively lower rate of ceftriaxone utilization in hospitalized Turkish children according to our results (over 16.6% vs 40.0%), although cephalosporins were found to be the most commonly used antibiotic in a "point prevalence study". However, we need to highlight the fact that it is challenging to make precise comparisons over antimicrobial consumptions between research reports, because of diverse metrics or methods used for assessing drug utilizations, differences in study populations and limited data as well.

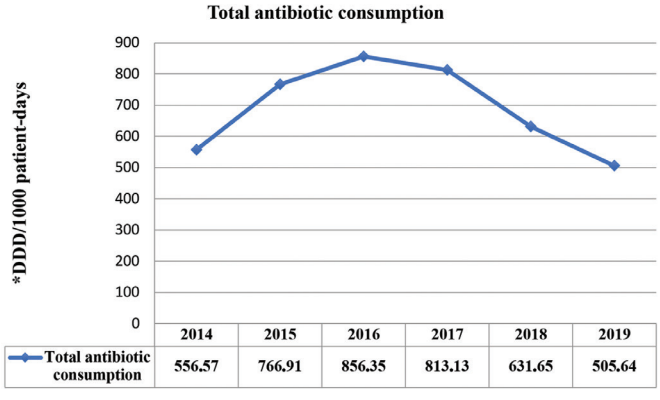


Figure 5. Total antibiotic consumption between 2014 and 2019

DDD: Defined daily doses

In this study, the trend of ceftriaxone use increased markedly by 2016; then following a short plateau, declined significantly from 2017 onwards (Figure 1). This trend was consistent with the higher consumption of third generation cephalosporins between 2005 and 2015 and the decline in utilization from 2015 onwards in a substantial majority of countries[19]. Karabay et al.[20] has recently reported that third-generation cephalosporin consumption had increased while cephalosporin utilization had declined between 2011 and 2014 in Turkey. However, the proportion of ceftriaxone utilization in total antimicrobial consumption had increased throughout the period by 2018; then decreased slightly (Figure 2). A recent study reported that the proportion of ceftriaxone in total inpatient paediatric antibiotic consumption in Latvia was three times higher than the UK rate (25% vs 8%)[16].

Ampicillin sulbactam was the second most frequently consumed antibiotic in this study (Table 1, Figure 1). Penicillins with beta-lactamase inhibitors were reported to be among the most commonly used antibiotics in hospitalized Turkish children likewise our results[4]. In countries with higher antibiotic consumption like South Korea and Italy, higher rates of broad-spectrum agents have been utilized[2,12]. Strikingly, it has been reported that Turkey is the only country in which combination of beta-lactamase inhibitors consumption exceeds that of narrow- and broad-spectrum penicillins which is considered to be incompatible with the principles of rational antibiotic use[20]. In Norway which has been among the lowest antibiotic prescribing countries, first-line penicillins like ampicillin constituted of over 60% of total antibiotic consumption, whereas contributing to their higher resistance rates, second-line penicillins like ampicillin sulbactam have been more frequently used in south Korea and Turkey particularly before 2016[2,3,12]. In our study, both the ampicillin sulbactam utilization and its proportion to total antibiotic consumption declined from 2014 to 2019 (Figure 1, Figure 2). The decreasing trend of ampicillin sulbactam consumption might be associated with the growing resistance pattern to penicillins in the study population.

In this study, among the carbapenems, meropenem has outstood as the most commonly utilized antibiotic throughout the period. Strict policies and management algorithms might help to reduce meropenem consumption[21]. The decline in meropenem consumption from 2014 to 2019 might be associated with such recent hospital antimicrobial restriction policies. Irrational use of antimicrobials as empirical therapy and over-the-counter sales of antibiotics have induced a substantial increase in antimicrobial consumption, particularly of carbapenems in urban areas worldwide as in the case in Pakistan where over 57% of meropenem use was not according to the standards[22,23]. Ceyhan et al.[4] had reported that carbapenems had been used in 11.4% of hospitalized children which might be considered to be comparable with the meropenem use in 2019 in our study population.

In the research population, amikacin was the most commonly consumed aminoglicoside by 2017, however gentamicin utilization has increased by far after 2017 onwards compared to amikacin (Figure 4). This gap might have been due to clinician preferences. Consistently with the results of this study, other aminoglycosides (ATC code: J01GB), in particular gentamicin have been reported to be among the most commonly used antimicrobial in numerous clinics across Europe[3,16]. The European Surveillance of Antibiotic Consumption (ESAC) project reported that antimicrobial combinations had been used in 65% of cases in systemic infection treatment, the most frequent combination of penicillin had been to be with aminoglycosides, mainly gentamicin (21%)[3]. A recent research conducted to evaluate the antibiotic consumptions in inpatient Italian children revealed other aminoglycosides (ATC code: J01GB) consumption as being around 22.32 DDD/1000 PD with no significant difference in the 8-year trend analysis[15,24]. There was no significant difference in the trends of aminoglycosides in this study, indeed.

Comparable with various previous reports, total antibiotic consumption in this study population decreased slightly by 2019, following a dramatic upward trend to its peak in 2016 (Figure 5)[3,10,12]. Even though, the reported decline in total antibiotic consumption trend might brighten the hopes for lesser resistant strains and reduced spending for antibiotics; huge differences have been claimed in paediatric antimicrobial use, even among numerous industrialized countries from Europe, Asia and North America[10,12]. Compared with Norway, had the highest relative antimicrobial consumption rate was 7.57 per child-year in Korean children, and 3.61 in Italy and 2.35 in the US as stated in a Cross- National analysis[12]. The highest antibiotic consumption rates are reported in Asian and Southern European countries like Turkey, Greece and Italy, and the lowest rates came from Scandinavia and Northern European countries[2,10,15,16,25]. These data emphasize the necessity to improve policies to decrease irrational use of antibiotics. Assessing the local trends of antibiotic consumption might be the first principal step to establish rational antimicrobial policies combatting inappropriate antibiotic use and AMR. Electronic prescription and AMR surveillance systems, national rational drug use policies, awareness raising campaigns that urge people to pledge to appropriate use of antibiotics might be ranked as other actions of which Turkey has recently implemented[26].

In our study, the peak total antibiotic consumption rates were detected in 2016 and 2017 (Figure 5). Higher number of hospitalized children and recently graduated young paediatricians newly employed in our clinic in 2016 and 2017 who were highly inclined to start antibiotics might have made significant contributions to these higher utilization rates. It might be also worthy to admit that there was neither a paediatric nor an adult infectious disease specialist consultancy in our clinic. It might be expected the specialist would have crucial impacts on antibiotic use in a center; however, it has been reported that the presence of a paediatric infectious disease specialist rather than patient consultation had not affected the rate of inappropriate antimicrobial use[4]. All in all, besides the number of hospitalized children, continuing education of clinicians, infectious diseases specialist consultancy and practical antibiotic policies might be ranked among the factors determining total antibiotic consumption in a clinic, likewise advocated by Ceyhan et al.[4].

The major limitation of this study is that the ATC/DDD method is not an optimum measuring tool enabling to make precise comparisons, but rather to evaluate overall assessments in children[7]. Secondly, ideally, actual antimicrobial consumptions should better be calculated individually among patients to give more precise estimates, this study has not reflected the actual prescribed antibiotic dosage for individual patients.

Conclusion

In conclusion, ceftriaxone and ampicillin sulbactam were ranked first and second among the most commonly used antimicrobials in the study population. While both consumption and preference for use of ceftriaxone had increased, however the frequency of occasions, ampicillin sulbactam preference had been decreased throughout the six-year period. The meropenem use has declined throughout the period. Preferences of young paediatricians, higher number of hospitalized children and lack of a infectious diseases specialist consultancy might have had decisive impacts over the higher rates of total antibiotic consumption in our clinic in 2016 and 2017. Finally, we claim that determining regional antimicrobial consumptions periodically is critical to establish current antibiotic stewardship initiatives enabling rationale use of antibiotics combatting bacterial resistance.

Ethics

Ethics Committee Approval: University of Health Sciences Turkey, Haydarpaşa Numune Training and Research Hospital Institutional Board with a case code of "62977267-000-12403/26/09/2019" approved this study.

Informed Consent: Retrospective study.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: B.Ş., Ç.N., Concept: B.Ş., S.Ş., R.B., Ç.N., Design: B.Ş., S.Ş., R.B., Ç.N., Data Collection or Processing: B.Ş., S.Ş., Analysis or Interpretation: B.Ş., S.Ş., R.B., Literature Search: B.Ş., S.Ş., Writing: B.Ş., S.Ş.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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