



CHANGES IN REFERRAL PATTERNS TO DEVELOPMENTAL PEDIATRICS DURING THE PANDEMIC IN TURKEY

Bahar Bingoler Pekcici, Ezgi Ozalp Akin, Funda Akpinar, Gamze Hayran, Merve Cicek Kanatli, Sidika Canan Atasoy, Selin Ince, Aysen Akbas, Ilgi Ertem
Developmental Pediatrics Division, Department of Pediatrics, Ankara University School of Medicine, Ankara, Turkey



INTRODUCTION Information on changes in referral patterns to developmental-behavioral pediatric clinics during crises is crucial to inform and prepare these services. In the COVID-19 pandemic, it has been reported that outpatient referrals have decreased in many centers working with developmental difficulties (1-4). The referral patterns of such clinics in low and middle income countries have not been reported. We aimed to compare referral patterns to Ankara University Developmental Pediatrics Division (AUDPD) before and after the pandemic in a children's hospital.

METHOD Referrals to AUDPD of children aged 0-36 months during the first nine months of the pandemic in 2020 was compared to the corresponding nine months in 2019 and 2018. Referral sources and child characteristics were analyzed from the AUDPD database and compared across groups using the 2-sample-Z test of proportions.

RESULTS Of 1498 children referred during the study months, 573 (38%), 555 (37%), and 370 (25%) were in years 2018, 2019 and 2020, respectively. Child sex was similar across the years but the proportion of referred infants (0-12 months) was larger in 2020. The proportion of referrals came from the outpatient clinic was 72% in 2020 versus 87% and 88% in 2018 and 2019, respectively while proportion of inpatient referrals increased over two-fold (28% in 2020 versus 12% and 13% in 2018, 2019, respectively). These demographical and distributional data is shown in **Table 1**. It was observed that inpatient admissions increased not only proportionally but also numerically (from 69 patients in 2018, 73 in 2019 to 104 in 2020). When the inpatient referrals were examined, it was seen that none of them were due to COVID-19 and related conditions.

The diagnoses of the referred children were examined and it was determined that those with chronic diseases (from 16.0% to 25.1%) and cerebral palsy (from 1.6% to 4.6%) increased significantly, while those with behavioral problems (from 14.8% to 10.0%) decreased, as shown in **Table 2**. There was a significant decrease in referrals from general pediatrics (from 23.6% to 13.8%) and families' self-referrals (from 11.2% to 5.4%) compared to the previous year whereas neonatology (from 18.4% to 27.8%) and neurology (from 9.7% to 15.1%) referrals increased proportionally.

Table 1. Sociodemographic data

	Before the pandemic		During the pandemic	p value 2019-2020
	2018	2019	2020	
Sex				
Male	337 (58.8%)	327 (58.9%)	200 (54.1%)	0.133
Female	236 (41.2%)	228 (41.1%)	170 (45.9%)	0.133
Age (months)				
0-12	280 (48.9%)	247 (44.5%)	209 (56.5%)	0.000*
13-24	127 (22.2%)	176 (31.7%)	87 (23.5%)	0.008*
25-36	166 (29.0%)	132 (23.8%)	74 (20.0%)	0.152
Outpatient/inpatient				
Outpatient	504 (88.0%)	482 (86.8%)	266 (71.9%)	0.000*
Inpatient	69 (12.0%)	73 (13.2%)	104 (28.1%)	0.000*
Place of residence				
Ankara	468 (81.7%)	443 (79.8%)	287 (77.6%)	0.400
Out of Ankara	105 (18.3%)	112 (20.2%)	83 (22.4%)	0.465
Need for special education and/or rehabilitation				
No need	380 (66.3%)	375 (67.6%)	250 (67.6%)	1.000
Already having	51 (8.9%)	33 (5.9%)	19 (5.1%)	0.603
Referred to	142 (24.8%)	147 (26.5%)	101 (27.3%)	0.787
TOTAL	573	555	370	

Table 2. Diagnoses according to years

Years	Before the pandemic		During pandemic	p value 2019-2020
	2018	2019	2020	
Preterm follow up	110 (19.2%)	150 (27.0%)	84 (22.7%)	0.170
Isolated expressive language delay	111 (19.4%)	67 (12.1%)	39 (10.5%)	0.186
Chronic diseases	138 (24.1%)	94 (16.0%)	93 (25.1%)	0.000*
Behavioral problems (feeding disorder and others)	66 (7.9%)	82 (14.8%)	37 (10.0%)	0.026*
Down syndrome and other genetic diseases	46 (8.0%)	52 (9.4%)	42 (8.9%)	0.322
Autism spectrum disorder	25 (4.4%)	30 (5.4%)	22 (5.9%)	0.509
Vision and hearing loss	30 (5.2%)	25 (4.5%)	22 (6.0%)	0.342
Children assessed with suspicion of developmental delay but found to have age appropriate development	29 (5.1%)	34 (6.1%)	20 (5.4%)	0.652
Cerebral palsy	10 (1.7%)	9 (1.6%)	17 (4.6%)	0.045*
Cognitive delay (unknown reason)	8 (1.4%)	12 (2.2%)	3 (0.8%)	0.121
TOTAL	573 (100%)	555 (100%)	370 (100%)	

DISCUSSION This study found that a significant reduction in referrals to AUDPD outpatient clinic and changes in distribution of diagnoses of referred children. Our results may guide developmental pediatrics centers in preparing for crises related changes in referral patterns.

The overall decrease in referrals was an expected finding during the pandemic. In a study investigating the effects of the pandemic on child and adolescent mental health services in Europe, a widespread decrease in the number of patients was reported; the reduction was two-thirds for outpatients (2). A similar reduction in outpatient referrals has been described in centers working with childhood disability (1,3-4). Mauri and colleagues stated that decrease in outpatient visits were observed in all Italian Neuromuscular Centers (3).

The lack of difference in sex distribution of referred children may indicate that there may not have been an increase in sex inequality during the pandemic in our research population. The decrease in referrals for almost all diagnoses indicates a disruption in the access of children with all kinds of developmental risks to services. This finding indicates that efforts to increase access are crucial for all children with developmental difficulties. The reported widespread use of telehealth during the pandemic period may offer an important opportunity.

Our results related to the proportional increase in the referrals of children with chronic diseases and cerebral palsy are related to increased focus of AUDPD to inpatients because of the decrease in outpatients.

An increase in childhood behavioral problems has been reported during the COVID-19 pandemic (5). In contrast, we found a decrease in referrals related to behavioral problems which may be due to a lack of focus on the part of parents and service providers alike.

CONCLUSIONS Our findings indicate that during crises, referrals to developmental pediatrics may decrease and changes in referral patterns may occur. Analyses of referral patterns may enable adaptation of infrastructure, training and services, particularly for outpatient clinics where attention to child development may decrease further during crises.

Conflict of interest declaration: All authors have declared no conflict of interest

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