


RESEARCH ARTICLE

Missed initial appointments at Israeli child development centres: Rate, reasons, and associated characteristics

Galit Hirsh-Yechezkel¹ | Saralee Glasser¹  | Lidia V. Gabis² |
Avi Eden³ | David Savitzki⁴ | Adel Farhi¹ | Osnat Luxenburg⁵ |
Gila Levitan¹ | Liat Lerner-Geva^{1,6}

¹Women & Children's Health Research Unit, Gertner Institute for Epidemiology & Health Policy Research, Sheba Medical Center, Affiliated with Tel Aviv University, Ramat Gan, Israel

²Weinberg Child Development Center, Sheba Medical Center, The Edmond & Lily Safra Children's Hospital, Ramat Gan, Israel

³Barzilai Medical Center, Child Development Institute, Ashkelon, Israel

⁴Pediatric Neurology and Child Development Unit, Galilee Medical Center, Nahariya, Israel

⁵Medical Technology, Health Information and Research Directorate, Ministry of Health, Jerusalem, Israel

⁶School of Public Health, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

Correspondence

Saralee Glasser, Women & Children's Health Research Unit, Sheba Medical Center, Gertner Institute for Epidemiology & Health Policy Research, Tel Hashomer, Ramat Gan, 52621, Israel.

Email: Saraleeg@gertner.health.gov.il

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Abstract

Introduction: Missed appointments (MAs) at child development centres (ChDCs) cause multiple problems: they preclude timely diagnosis and treatment of both the invited child and children whose appointment was delayed due to overbooking, as well as disrupting efficient organisational management. The aim of this study was to assess the rate and describe the reasons for missed appointments at Israeli ChDCs, and to evaluate the association of socio-demographic, clinical, and administrative variables with MA rates.

Methods: This nested case-control study included all children scheduled for initial appointments ($N = 1143$) at three centres during 1 year. Parents of children who missed their appointment and a sample of those who attended were interviewed by telephone.

Results: The rate of missed appointments was 26.6%, and the most frequent reasons were unexpected events (26.0%) and lack of insurance coverage (23.4%). Variables associated with lower MA rates were: having had ≥ 3 types of rehabilitative interventions (odds ratios (OR) = 0.26; 95% confidence interval [CI] 0.16–0.44), detailed referral letter (OR = 0.48; 95%CI 0.30–0.75), telephone reminder (OR = 0.37; 95%CI

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0.24–0.57) and health maintenance organisations or private insurance coverage (OR = 0.12; 95%CI 0.06–0.17 and OR = 0.56; 95% CI 0.38–0.89, respectively).

Conclusion: Encouraging physician's referral letters and personal-contact reminders can reduce missed appointments. Understanding the family's and the child's personal characteristics, and the organisational/administrative aspects of missed appointments may guide efforts to ensure timely care for every child.

KEYWORDS

child development centre, disabilities, healthcare management, missed appointments, no-shows

Highlights

- The missed appointment (MA) rate at Child Development Centres (ChDCs) was 26.6%
- The most frequent reasons was unexpected personal events, for example, child's illness
- Children who had received previous rehabilitative therapy had lower MA rates
- Organisational factors, for example, insurance, reminders, were associated with MA rates

1 | INTRODUCTION

The prevalence of developmental impairment among children worldwide is estimated at 8.4%.^{1,2} This includes major conditions such as autism spectrum, cerebral palsy, intellectual impairment, and other conditions such as developmental coordination disorder, Attention deficit hyperactivity disorder (ADHD) and learning disabilities. Developmental delay refers to a significant lag in achieving age-appropriate milestones in two or more developmental areas, warning of potential delay. Delays in each area of development may become evident at a young age, and may involve language or motor domains, or delays in several developmental modalities. According to the Israel Ministry of Health (MOH),³ 10% of Israeli children have some developmental delay reflecting suspected impairment. In order to initiate interventions and other services when an impairment is suspected, an initial assessment is required by a multidisciplinary team. This team generally includes a developmental specialist (M.D.) for all assessments, and a psychologist, speech, occupational or physical therapists, depending on the delayed modalities. If more than one area is delayed or a major diagnosis is suspected, the child is referred to a child development centre (ChDC) where a coordinated team conducts the assessment.

Early diagnosis of developmental impairment allows timely intervention in order to improve prognosis and treatment outcome,^{2,4,5} and thus may positively impact the child's life and that of his family and community. In addition, the advantages of early diagnosis and intervention have direct and indirect economic consequences.^{4,6} Despite recommended policy⁷ early developmental delays are not always identified and treated on time.⁸ Delay in diagnosis may be due to administrative difficulties (e.g. personnel shortages, lack of insurance coverage) and/or family characteristics (e.g. socioeconomic status, lack of awareness, denial).⁹ The issue of missed appointments (MAs, i.e., 'no-show'), is a

factor that may exacerbate delay of diagnosis, because it might affect the waiting period for the child him/herself, as well as for other children waiting for an appointment. Missed appointments also result in wasted time and reduce efficient management of professionals, thereby causing financial loss. At ChDCs, the impact of missing initial appointments is particularly great because they usually require more time and involve multi-disciplinary professionals.

A wide range of MA rates in various types of medical services have been reported around the world, ranging from 10% to 70%.⁹⁻¹³ This broad range may be due to the characteristics of the study populations, and/or the different types of health services.

Various factors have been found related to missed appointments, including: patient characteristics (e.g., age, sex, ethnicity, socioeconomic status); family logistics (e.g., working parents, care of other children); clinic accessibility (e.g., distance, transportation, opening hours); and administrative factors (e.g., cost, waiting period, communication errors).¹⁴⁻¹⁷ Furthermore, patients who do not perceive the service as urgent or particularly helpful tend to miss their appointment.^{17,18} On the other hand, being referred for assessment by a physician has been found to have a significant positive impact on keeping an appointment.¹⁴

In Israel, ChDCs are under the auspices of one of the four health maintenance organisations (HMO) by which all citizens are insured as per the National Health Insurance Law. In addition, there are ChDCs in many of the MOH government hospitals, for which the HMO must give approval and commitment to pay. The centres provide diagnosis, and in some cases treatment, for complex developmental problems of children from birth to 6 years of age. These centres are staffed by multi-disciplinary professionals, including neurologists, psychologists, physical, occupational and speech therapists, and social workers. They provide culturally- and language-appropriate services to the diverse Israeli population groups. Applicants are referred by a paediatrician or family physician. In addition, a letter from the child's teacher (nursery or kindergarten) may be requested, as well as a questionnaire for the parent to complete, describing various aspects of the child's development. On the basis of this information the centre determines the initial appointment and the professionals who will be involved.

The aims of the present study were to assess the rate and describe the reasons for missed appointments at ChDCs in Israel, and evaluate the association of socio-demographic, clinical, and administrative variables with the MA rates. This goal is especially important considering the clear advantage of early diagnosis and treatment, and in light of the impact on resource utilisation. The findings may serve as a basis for interventions aimed at reducing the rate of missed appointments at ChDCs.

2 | METHODS

2.1 | Design and participants

This nested case-control study included all children scheduled for an initial appointment over the course of one year (May 2015–May 2016) at one of three MOH ChDCs: Sheba Medical Centre–Tel Hashomer, Galilee Medical Centre–Nahariya, and Barzilai Medical Centre–Ashkelon. These hospitals were chosen to represent different geographic and demographic areas in Israel, serving diverse populations from urban and rural populations.

The study population was identified through the centres' administrative records.

2.2 | Procedure

Information on all children for whom a first appointment was made during the study period was drawn from the computerised or manual log at each participating centre. These logs were reviewed on a bi-weekly basis by the research assistant or centre's secretary. A data file was opened for each child that included the details and date of the appointment, and whether a telephone reminder of the appointment had been made by the centre's secretary.

Two groups were defined from among these children: (1) all children who did not arrive for the appointment without prior notice or notified only shortly before the date (No-Show Group); and (2) those who arrived for the appointment (Attended Group). For the current study, a random sample of the Attended Group was selected by a computerised programme, matched by centre. A letter was sent to the parents of all children in the No-Show Group and the sample of the Attended Group, with a brief description of the research and a request for their participation. The letter also explained how they could decline to participate if they so wished. If parents of a child in the Attended Group refused to be interviewed, another such case was randomly selected from the same Centre. They were then contacted by telephone during the following month in order to conduct the interview, or to set a time to be interviewed at their convenience. The purpose of the research was again stated at the onset of the interview, and their consent confirmed. The telephone interviews were conducted in Hebrew, Arabic, or Russian, according to the interviewees' preference. Although either parent could be interviewed, in all cases the mother was the respondent.

2.3 | Interview protocol

The structured interview questionnaire included:

- Sociodemographic and administrative variables, including parents' age, family status, number of children, educational level, income level, health insurance status, who made the referral to the ChDC.
- Child's health, including congenital malformation, vision, hearing, chronic disease, medications, hospitalisations, rehabilitative treatments received before the referral to ChDC (occupational, speech, and physiotherapy).
- Child's developmental history, including fine motor, gross motor, language and social developmental milestones (possible responses—'normal'; 'as expected' or 'abnormal/limited or delayed').
- Child's current behavioural and temperamental characteristics.
- Child's preschool/school framework and achievement compared to peers.
- In addition, parents in the No-Show Group were asked about their main reason for non-attendance. This was an open question, with responses subsequently recoded into distinct categories.

Responses were manually recorded and then entered into the research database.

2.4 | Data analysis

The rate of missed initial appointments was drawn from the Centre's records and calculated as the percentage of the total study population. Reasons for the MA, as well as family and child characteristics, were drawn from the telephone interviews. Categorical variables are presented as frequencies and percentages. Multivariate logistic regression was conducted to assess the association between each sociodemographic, clinical, and administrative variable with the risk of missed appointments, adjusted for Centre (due to a sociodemographic disparities between the populations served by the participating Centres). All models present odds ratios (OR) with 95% confidence interval (95% confidence interval [CI]). The statistical processing was conducted by statistical analysis system version 9.4.

2.5 | Ethics

The study was approved by institutional review boards at each participating centre: Sheba Medical Centre (# 1718-14-SMC), Galil Medical Centre, Naharia (# 0162-14 NHR), and Barzilai Medical Centre (#0120-14-BRZ).

3 | RESULTS

This section includes two parts. The first part, relating only to the no-show group is descriptive, presenting the scope and reasons for the missed appointments. The second, analytic part, compares those in the no-show and attended groups on various demographic and child-related characteristics.

3.1 | Part 1: The No-Show group

During the study period, 1143 children for whom an initial appointment was scheduled at one of the participating ChDCs were identified and comprised the study population (Figure 1). Of these, 304 missed their first appointment.

3.1.1 | Missed appointment rate

The rate of missed appointments was 26.6% (13.5%, 22.7% and 34.0%, by centre), including 204 (17.8%) who did not give prior notice; 24 (2.1%) who notified of the intention not to keep the appointment only shortly before the assigned date; and 76 (6.6%) who notified that they would not attend only when the centre's secretary called to remind them of their appointment (data not shown). Of the 304 children who missed their appointment, 24 were twins for whom two appointments had been scheduled, and only one was randomly selected and counted as a case in the following analyses, resulting in 280 families in the No-Show Group.

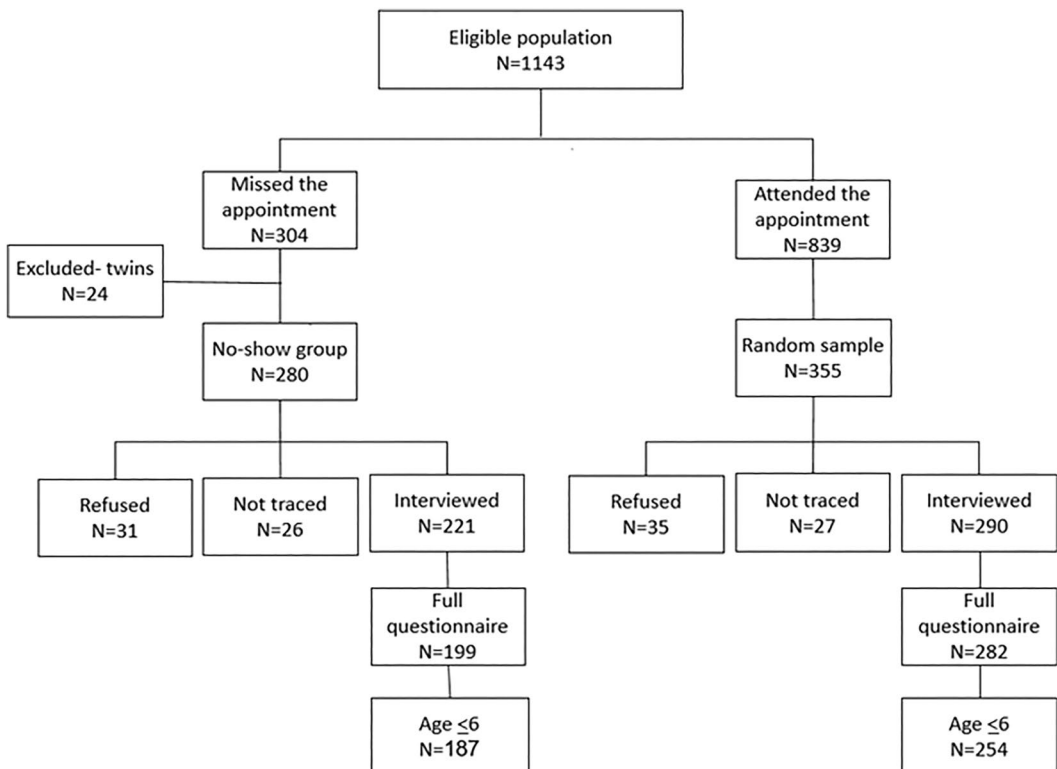


FIGURE 1 Recruitment of study participants

3.1.2 | Reasons for missed appointment

Of the 280 mothers in the No-Show Group, 235 (83.9%) answered a brief questionnaire regarding the reason for non-attendance (Figure 2). The most frequently reported reasons for missing the appointment were an unexpected event, such as a child's illness (26.0%), or not having received a commitment from their HMO for reimbursement of the expense of the visit (23.4%), thereby requiring out-of-pocket payment. An inconvenient time or location of the ChDC was the reason for 14.8% of the missed appointments, while 13.6% of the mothers reported that they had not received notice of the appointment date, which was sent by mail. 10% were referred elsewhere, 8% considered the referral unnecessary, and only 4.3% said they simply forgot about the appointment. There were no differences with respect to administrative or personal reasons for no-show by either child or parent characteristics.

3.2 | Part 2: Comparison of no-show and attended groups

No-show group: Of the 280 children in the no-show group, 199 parents (71.1%) responded to the full interview. Since the centres generally receive children under school age, the analyses in this section include only data reported by parents of the 187 children (66.8%) in the No-Show Group who were 6 years of age or under.

Attended group: During the study period 839 children arrived for their appointment, and a random sample of 355 was selected to participate (in the case of twins only one, randomly selected, was included in the sample). Of these, 282 answered the entire questionnaire (78.4%), and the 254 who were parents of children aged 6 years or under are included in this analysis.

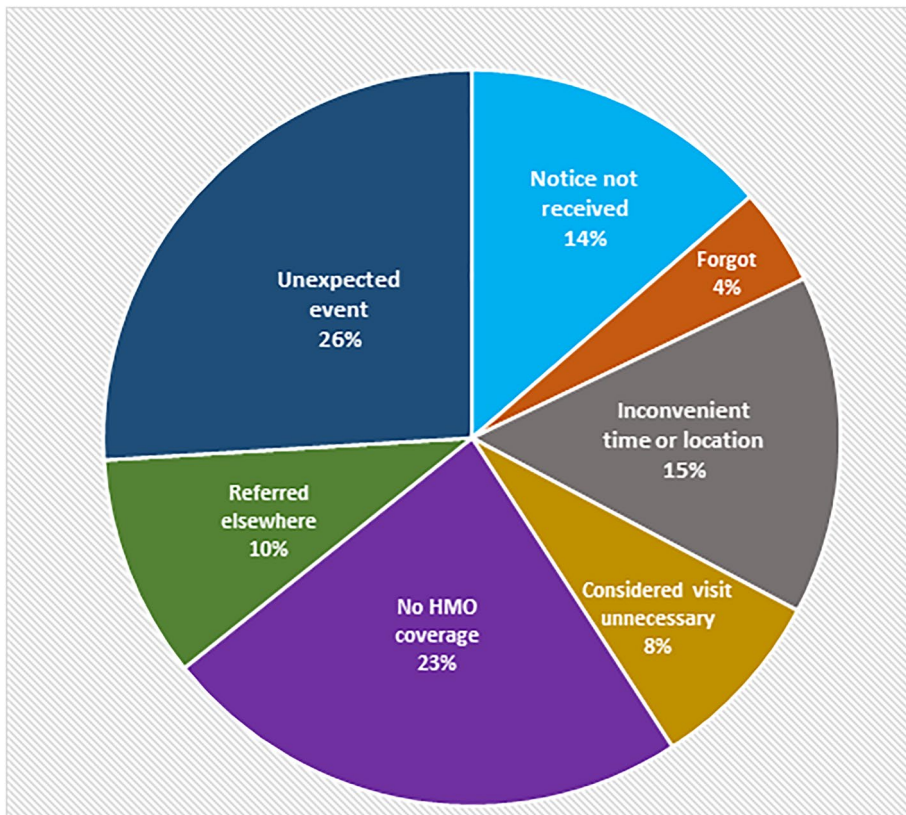


FIGURE 2 Reported reason for missing the initial appointment (N = 235) [Colour figure can be viewed at wileyonlinelibrary.com]

3.2.1 | Socio-demographic characteristics by study group

A significant difference was not found in the age or sex of children in the no-show group, compared to those in the Attended group (Table 1). The rate of two-parent families was lower in the no-show group than was that among those who attended, with borderline significance ($p = 0.1$). In addition, the rate of children whose mother or father was over 30 years-of-age was lower in the No-Show Group (p for trend = 0.01 and $p = 0.07$ for mother's and father's age, respectively). Ethnic group, mother's level of education, and family's income level were not associated with the appointment status. No association was found between family size and appointment status. However, there was an association (with borderline significance) between the child's position among his/her siblings and missing the appointment; a child whose position was third or higher had a greater probability of missing the appointment than did a child who was the eldest or second (OR = 1.58; 95% CI 0.98–2.54).

Missing the appointment was not associated with the child's having a sibling with developmental or genetic problems, or whose siblings had visited the ChDC in the past (data not shown).

3.2.2 | Clinical characteristics by study group

Children who had received any rehabilitative interventions in the past (e.g., occupational, speech, or physiotherapy) were less likely to miss their appointment (Table 2). Furthermore, the number of different types of therapy that they had experienced was negatively associated with the probability of no-show (p for trend <0.0001); for three or more types of treatment the OR was 0.26 (95% 0.16–0.44). Regarding specific developmental modalities--gross motor, fine motor, language, behaviour, or interpersonal communication (e.g., eye contact)--mothers were asked whether their child's development had occurred at the expected age or was delayed. The mothers' assessments indicated no significant difference between the groups. The total number of these modalities in which there was abnormal development was not associated with the appointment status. Neither was there a significant difference between the groups when mothers were asked about their own assessment of the child's development in general; over half of the mothers in both the No-Show and Attended Groups reported that their child had a generally normal development (57.8% and 52.1%, respectively), while about one-third (33.9% and 38.1%, respectively) reported that the child's development was somewhat slower than expected.

No differences were found between the groups with regard to any of the five temperamental traits about which the mothers were asked (calm/restless, cautious/risky, cuddly/not enjoying touch, consolability, and sociability), but there was a borderline significant difference ($p = 0.09$) when considering the cumulative number of these traits that the mother considered problematic; those who reported that their children had a greater number of problematic traits were more likely to attend the appointment.

A previous diagnosis of autism was reported by mothers of 10.3% and 11.5% of the children in the no-show and attended groups, respectively. Similarly, an earlier diagnosis of ADHD was reported by 10.4% and 14.4% of those in the no-show and attended groups, respectively. No significant difference was found between the groups in the rate of diagnosed chronic disease, including hearing or vision problems, epilepsy, or physical impairment. In response to the question 'How would you assess your child's health in general?' in both groups only 5.3% of the mothers stated that the child's condition was poor or very poor.

3.2.3 | Management aspects

As presented on Table 3, when the referral to the ChDC was accompanied by a detailed physician's letter, the likelihood of missing the appointment was significantly reduced (OR = 0.48; 95%CI 0.30–0.75). In an attempt to reduce the rate of missed appointments, a telephone reminder was made by the Centres' administration during the week prior to

TABLE 1 Demographic characteristics by initial appointment status

Characteristic	No-show group		Attended group		OR ^b	95%CI
	n	% ^a	n	% ^a		
Total	187	100.0	254	100.0		
Child's age (weeks)						
<12	90	48.1	110	43.3	1.00	
12–36	37	19.8	65	25.6	0.80	0.49–1.33
36–72	60	32.1	79	31.1	1.02	0.65–1.59
Child's sex						
Male	114	61.0	162	63.8	1.00	
Female	73	39.0	92	36.2	1.08	0.73–1.61
Ethnic group (by father)						
Jewish	158	92.9	217	86.8	1.00	
Arab	8	4.7	19	7.6	0.60	0.23–1.57
Other	4	2.4	14	5.6	0.43	0.13–1.38
Mother's age						
≤30	69	38.3	78	30.8	1.00	
>30	111	61.7	175	69.2	0.66	0.44–1.00
Father's age						
≤30	42	24.9	43	17.3	1.00	
>30	127	75.2	205	82.7	0.59	0.36–0.96
Parents' marital status ^c						
Not married	18	10.2	16	6.3	1.00	
Married	158	89.8	237	93.7	0.51	0.25–1.05
Mother's education						
Elementary	5	2.8	12	4.8	1.00	
High school	53	29.9	83	33.1	1.38	0.45–4.19
Technical	29	16.4	34	13.6	1.61	0.49–5.27
Academic	90	50.9	122	48.6	1.36	0.45–3.13
Family income						
Below average	75	41.0	99	39.0	1.00	
Average	37	20.2	52	20.5	0.83	0.49–1.42
Above average	52	28.4	66	26.0	0.83	0.51–1.37
Refused to answer	19	10.4	37	14.6	0.58	0.30–1.10
Number of siblings						
0	34	19.3	52	21.1	1.00	
1	53	30.1	87	35.4	0.87	0.50–1.52
≥2	89	50.6	107	43.5	1.31	0.78–2.20
Birth order						
First or only child	62	35.2	94	38.2	1.00	

TABLE 1 (Continued)

Characteristic	No-show group		Attended group		OR ^b	95%CI
	n	% ^a	n	% ^a		
Total	187	100.0	254	100.0		
Second child	47	26.7	82	33.3	0.81	0.50–1.33
Third or later	67	38.1	70	28.5	1.58	0.98–2.54

^aNumbers and percentages do not include missing values.

^bEach variable was adjusted separately for ChDC.

^c'Not married' includes single, divorced, or widowed.

Abbreviations: CI, confidence interval; OR, odds ratios.

TABLE 2 Developmental variables as per parent report by initial appointment status

	No-show group		Attended group		OR ^b	95%CI
	n	% ^a	n	% ^a		
Total	187	100.0	254	100.0		
Types of rehabilitative therapies (number) ^c						
None	79	44.9	62	25.1	1.00	
1	27	15.3	35	14.2	0.59	0.32–1.08
2	36	20.4	42	17.0	0.68	0.39–1.20
≥3	34	19.3	108	43.7	0.26	0.16–0.44
Modalities with abnormal development (number) ^d						
None	87	48.1	99	40.7	1.00	
1	41	22.6	46	18.9	1.10	0.66–1.87
2	23	12.7	40	16.5	0.71	0.39–1.29
>3	30	16.6	58	23.9	0.66	0.39–1.13
General developmental performance						
Slow	58	32.0	85	35.4	1.00	
Regular	107	59.1	130	54.2	1.12	0.73–1.72
Advanced	16	8.8	25	10.4	0.90	0.44–1.84
Number of problematic temperamental traits						
0	103	57.2	133	55.4	1.00	
1	49	27.2	57	23.7	1.13	0.71–1.79
2	15	8.3	29	12.1	0.74	0.37–1.47
>3	13	7.2	21	8.8	0.86	0.41–1.82

^aNumbers and percentages do not include missing values.

^bEach variable was adjusted separately for ChDC.

^cType of therapies include: occupational therapy, speech therapy, physiotherapy, and psychological.

^dModalities include: gross motor, fine motor, language, behaviour, interpersonal, and communication.

Abbreviations: CI, confidence interval; OR, odds ratios.

TABLE 3 Administrative variables by initial appointment status^a

Variable	No-show group		Attended group		OR ^c	95%CI
	n	% ^b	n	% ^b		
Total	187	100.0	254	100.0		
Physician's letter of referral						
No	56	31.5	40	16.7	1.00	
Yes	122	68.5	200	83.3	0.48	0.30-0.77
Telephone reminder						
No	74	39.6	53	21.1	1.00	
Yes	97	51.9	161	64.1	0.38	0.24-0.60
Don't remember	16	8.6	37	14.7	0.28	0.14-0.56
HMO insurance coverage						
Not requested	69	37.3	26	10.3	1.00	
Requested, not received	50	27.0	12	4.8	1.43	0.65-3.14
Received	66	35.7	214	84.9	0.12	0.07-0.20
Waiting period to appointment (approx.)						
<1	82	50.9	98	42.2	1.00	
2-3	52	32.3	85	36.6	0.81	0.51-1.30
≥4	27	16.8	49	21.1	0.82	0.46-1.46
Cancelled appointments previously ^d						
No	107	57.2	135	52.1	1.00	
Yes	80	42.8	124	47.9	0.8	0.54-1.16
Private health insurance ^e						
No	126	71.2	147	61.5	1.00	
Yes	51	28.8	92	38.5	0.58	0.38-0.89
Appointment schedule by season ^f						
Winter	47	25.1	64	25.2	1.00	
Spring	39	20.9	69	27.2	0.74	0.42-1.28
Summer	53	28.3	68	26.8	1.00	0.59-1.70
Autumn	48	25.7	53	20.9	1.18	0.68-2.10

^aData reported by parent interviewed.

^bNumbers and percentages do not include missing values.

^cEach variable was adjusted separately for ChDC.

^dThe question was: 'Did you cancel any appointment for yourself or for a family member in the past year?'

^eThis does not refer to HMO Supplemental Insurance (which the majority of families have), but to additional private insurance policies.

^fData summarised from medical records at the ChDC.

Abbreviations: CI, confidence interval; HMO, Health maintenance organisations; OR, odds ratios.

the appointment; this protocol was found to be associated with the rate of missed appointments (OR = 0.37; 95%CI 0.24-0.57). In this study, the probability of a no-show was also significantly lower among families who had received coverage from the HMO, compared to those without this commitment (OR = 0.12; 95%CI 0.06-0.17). There was a significant difference in the distribution of children by HMO and appointment status ($p = 0.04$), however those who

had private insurance policies (in addition to HMO supplementary insurance) were less likely to miss their appointment (OR = 0.56 95% CI 0.38–0.89).

Over 40% of the mothers of children in both the no-show and attended groups reported that in the past year they had either missed or cancelled another medical appointment (42.8% and 47.9%, respectively). There was no significant association between missed appointments and the waiting period (the time that elapsed from the date on which the appointment was made until the date of the appointment), or with the season of year.

4 | DISCUSSION

The present study aimed to clarify the reasons and characteristics of missed initial appointments at ChDCs. During the study period (2015–2016) 26.6% of first appointments were missed. This is similar to the reported rate of 26% noncompliance with para-medical therapy among Jewish children in Israel in 2004,¹⁹ and to the rate of 28% reported in a survey of new referrals to a child and adolescent mental health clinic in Scotland.²⁰ This is also similar to findings from the USA and England of rates of about one-quarter of the appointments being missed at various types of paediatric clinics (e.g., neurology, allergy, dermatology).^{6,21} On the other hand, there have also been reports of higher and lower no-show rates.^{9,22} The difficulty in comparing the findings of various studies are due to differences in the type of medical treatment required and characteristics of study populations, or specific definitions of missed-appointments. A study of dropout rates at paediatric mental health services²³ also noted that it is hard to compare findings and predictors due to varying definitions of the event.

No significant associations were found in this study between the child's age and the rate of missed appointments. Conflicting findings have been reported with respect to the association with age; some reporting higher rates among older children,^{10,24} and others demonstrating a negative association between age and the probability of missed appointments.^{25,26} Regarding the child's sex, similar to the present findings, several studies have found no significant differences in rates of missed appointments.^{9,10,21,22,27} Sociodemographic characteristics may be associated with parents' knowledge and awareness of the importance of diagnosis and early treatment of developmental problems, thereby affecting their motivation to keep the appointment. They may also be associated with logistic factors, such as the expense of missing a day's work or travel expenses. Indeed, Raz et al.²⁸ found that the median out-of-pocket expense reported by Israeli parents of children with autism spectrum disorder was over \$4000 yearly, which is more than the average monthly wage. While in the present study no significant association was found between income and the rate of missed appointments, the findings of other studies have reported a negative association between socioeconomic status and rates of missed appointments.^{9,10,18} For example, an Israeli study assessed the rate of missed appointments after a requirement for copayments was instituted (1998–1999) for children with developmental disabilities,¹⁹ and demonstrated a higher rate of missed appointments among Bedouin children (who are among the lowest income groups), compared with children in the Jewish sector (31.1% vs. 26%, respectively).

Family size and the child's position among his siblings may influence the rate of missed appointments. In the present study, if the child's birth order was third or more, this was associated with higher rate of MA, albeit of borderline significance. Parents of large families may have more limited time with which to accommodate the appointment schedule. Further, if their children are young, they may be more likely to miss an appointment due to unexpected events, such as a child's illness. In line with this hypothesis, studies have demonstrated a positive association between family size and the rate of missed appointments.^{9,26} In a different vein, parents of several children might tend to be less anxious about the child's condition, particularly if another one of the siblings had some developmental lag that later resolved; this may reflect their experience and confidence in deciding whether or not to bring the child to the ChDC.

Organisational and administrative factors were found to be among the main reasons for not keeping the appointment. About a quarter of the missed appointments were due to not obtaining HMO coverage. The reasons for this may be administrative, for example, the HMO preferred to provide the service at one of its own ChDCs. Technical issues might also be involved, such as delay in receiving the written invitation for the appointment (which is necessary for

getting the HMO approval). It is recommended that future research investigate this aspect in order to improve coordination between service providers.

Since in this study, only initial appointments were considered, this may have had a particularly strong impact. That is because assessment at the ChDC usually involves several professionals, thus the cost can be high and families usually need the HMO coverage, at least for that visit. Those who requested coverage but did not receive it had the highest MA rates. It is possible that at the time of scheduling, the parents assumed that the cost of the visit would be covered by their HMO, however if the request was rejected, they did not keep the appointment, and did not notify about cancellation. Others have also reported insurance coverage as a significant reason for missed appointments.^{10,26,29} On the other hand, the results indicated that having private health insurance was associated with attending the appointment.

No association was found in this study between the rate of missed appointments and the waiting period (i.e., time from scheduling to the actual appointment). This, despite the fact that other studies have reported such an association.^{9,21} The difference between those studies and the present one, was that in this study the category of shortest waiting period was 'at least 1 month,' with no option for shorter periods (e.g. week); therefore these differences may not be apparent.

A detailed letter of referral from the child's physician was found to reduce the likelihood of missing an appointment. This might have emphasised the seriousness of the child's condition, or the physician's involvement might itself be a marker for the severity of the child's developmental delay. Other studies have also found referral-related issues (e.g. source, quality) to be associated with rates of missed appointments.^{9,27}

A telephone reminder within days before the appointment was also effective in reducing the rate of missed appointments. This might be because the mother may have simply forgotten, but it is also possible that the personal contact served additional purposes, for example, raising awareness, offering additional information that facilitated attendance, or discussing barriers mentioned by the mother, thus affording the opportunity for the centre's secretary to suggest options to overcome the barriers. It is noteworthy that in recent years much clinic-parent communication is implemented by texting (email, Short Message Service),^{13,30} allowing for the 'reminder' aspect, but not the personal aspect for discussion of barriers, guidance, etc.³¹ The present study was conducted on children who were invited to an appointment in 2015–2016, and during that period the reminders were made by telephone; however with technological advances in recent years, the medical system has switched to email and text messages, or internet applications, expanding the opportunity to send multiple reminders, on the one hand, but eliminates the potential advantage of personal contact. In addition, during the study period, appointment notifications necessary for obtaining HMO coverage were sent by the centres through the postal service, and many respondents reported that these were not received in time.

It might be assumed that children with more severe or more complex developmental problems would be less likely to miss appointments at the ChDC, however this was only partially confirmed in the present study. While no specific intervention (e.g., physical therapy, speech therapy) predicted attendance, a positive association was found between the number of different types of therapy that the child had previously received and the rate of MA. Receipt of different types of intervention might indicate the complexity of the child's problem and this may influence the degree of the parent's awareness and/or the HMO's willingness to cover the expense of referrals, thereby affecting the parent's motivation to keep the appointment. Other contributing factors may be that the child's therapist had suggested or referred to the ChDC, or that due to waiting periods for visiting the centre, parents who were very concerned might have found a way to begin treatments elsewhere until their appointment date.

While the number of types of treatment that the child had received in the past more objectively reflects the complexity or severity of the child's condition, the subjective assessment of the child's developmental problem, as reflected by the mothers' report, did not distinguish between the study groups, nor did the mothers' assessment of their children's achievements in their educational framework (nursery, kindergarten, class) as being better or poorer than those of their peers. In contrast, it has been noted that parents' assessment of the severity of the child's condition was a crucial variable for their arrival at the appointments.⁹

Since this study included only three government ChDCs, there may be concern that these do not reflect the entire population of children in need of service. Nevertheless, these centres serve populations representing a broad geographic distribution (North, Central and South) and socioeconomic status, enhancing the generalisability of the findings. A larger number of ChDCs, or larger sample sizes, could have clarified significance or non-significance where differences between the groups were small. It is possible that some of the administrative impediments to attendance have been revised and reduced in the years since the study period, however there are no clear guidelines on a national level which could ensure maximum reduction of the no-show rate.

Israeli ChDCs do not have a clear organisational or administrative policy with respect to dealing with missed appointments. Generally, no sanctions are imposed on those who miss their appointment. Since ultimately the responsibility lies with the parents, and not with the child, missing appointments cannot be handled in the same way as they are with adults. The difference between adults' missed appointments and those of children not being brought to the appointment, must be considered in any intervention programme.³² Recommendations for intervention programs to reduce the no-show phenomenon include payment for missed appointments,²² shortening the waiting period,²⁷ and proactive contact with the families.^{33,34} Aggarwal, Davies and Sullivan³⁵ considered 'nudge' policies for reduction of missed appointments based on consumers' feelings of social responsibility, recommending behavioural strategies. In contrast to others, they suggested that financial penalties might be less culturally acceptable, at least in the context of Britain's National Health Service.

The United Nations Convention on the Rights of the Child⁷ recognises the right of children with special needs to receive treatment and to have access to education, training, medical services, and rehabilitation services in order to allow them to achieve their full potential. The current study has highlighted various aspects of the phenomenon of missed appointments—specifically initial appointments—at ChDCs, which delay a child's timely diagnosis and treatment when necessary. Understanding these aspects can guide health policy and intervention programs to ensure the timely and appropriate care for every child.

5 | CONCLUSION

Missed appointments (i.e., 'no-show'), at ChDCs can exacerbate delay of diagnosis for the child him/herself, as well as for other children waiting for an appointment. Further, initial appointments at the centres generally require a multidisciplinary team, thus missing these appointments results in considerable wasted time and financial loss, and reduces efficient management of professionals. This study aimed to assess the rate of missed initial appointments at Israeli government ChDCs, to describe the reasons, and to characterise this phenomenon with respect to clinical, socio-demographic, organisational and administrative aspects, by comparing those who missed or attended these appointments. Among the main findings were that more than clinical and socio-demographic characteristics, administrative factors distinguished between the groups and were found to be associated with not keeping the appointment. These included insurance coverage, source of referral, and personal-contact reminders. The centres' management, as well as local and national health policy can use this information to plan programs for reducing the rate of these important initial appointments, and of all ChDC visits in general.

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CONFLICT OF INTEREST

All authors confirm that they have no conflict of interest related to this research.

AUTHOR CONTRIBUTIONS

Galit Hirsh-Yechezkel: Conceptualization; Methodology; Formal analysis; Investigation; Writing – original draft preparation; Writing – review and editing; Manuscript review and approval. **Saralee Glasser:** Conceptualization; Methodology; Formal analysis; Investigation; Writing – original draft preparation; Writing – review and editing; Manuscript review and approval. **Lidia V. Gabis:** Conceptualization; Methodology; Formal analysis; Investigation; Writing – review and editing; Manuscript review and approval. **Adel Farhi:** Conceptualization; Methodology; Formal analysis; Investigation; Writing – review and editing. **Liat Lerner-Geva:** Conceptualization; Methodology; Formal analysis; Investigation; Writing – original draft preparation; Writing – review and editing; Manuscript review and approval. **Avi Eden:** Methodology; Writing – review and editing; Manuscript review and approval. **David Savitzki:** Methodology; Writing – review and editing; Manuscript review and approval. **Gila Levitan:** Methodology; Writing – review and editing; Data Collection; Manuscript review and approval. **Osnat Luxenburg:** Formal analysis; Investigation; Writing – review and editing; Manuscript review and approval.

ETHICS STATEMENT

The study was approved by institutional review boards at each participating centre: Sheba Medical Centre (# 1718-14-SMC), Galil Medical Centre, Naharia (# 0162-14 NHR), and Barzilai Medical Centre (#0120-14-BRZ).

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Saralee Glasser  <https://orcid.org/0000-0003-0084-2710>

REFERENCES

1. Olusanya BO, Davis AC, Wertlieb D, et al. Developmental disabilities among children younger than 5 years in 195 countries and territories, 1990–2016: a systematic analysis for the global burden of disease Study 2016. *Lancet Global Health*. 2018;6(10):e1100–e1121. [https://doi.org/10.1016/s2214-109x\(18\)30309-7](https://doi.org/10.1016/s2214-109x(18)30309-7)
2. Rydz D, Shevell MI, Majnemer A, Oskoui M. Developmental screening. *J Child Neurol*. 2005;20(1):4–21. <https://doi.org/10.1177/08830738050200010201>
3. Israel Ministry of Health. *Children with Developmental Delays*; 2020. (in Hebrew) https://www.health.gov.il/Subjects/KidsAndMatures/child_development/Pages/default.aspx
4. Guralnick MJ. Why early intervention works: a systems perspective. *Infants Young Child*. 2011;24(1):6–28. <https://doi.org/10.1097/IYC.0b013e3182002cfe>
5. Koegel LK, Koegel RL, Ashbaugh K, Bradshaw J. The importance of early identification and intervention for children with or at risk for autism spectrum disorders. *Int J Speech Lang Pathol*. 2014;16(1):50–56. <https://doi.org/10.3109/17549507.2013.861511>
6. Guzek LM, Gentry SD, Golomb MR. The estimated cost of “no-shows” in an academic pediatric neurology clinic. *Pediatr Neurol*. 2015;52(2):198–201. <https://doi.org/10.1016/j.pediatrneurol.2014.10.020>
7. United Nations. *Convention on the Rights of the Child*; 1989. <https://www.ohchr.org/en/professionalinterest/pages/crc.aspx>
8. Israel State Comptroller. *67th Yearly Report*; 2017. Accessed July 25, 2021. <https://www.mevaker.gov.il/he/Reports/Pages/587.aspx>
9. Minty B, Anderson C. Non-attendance at initial out-patient appointments at a hospital-based child psychiatric clinic. *Clin Child Psychol Psychiatr*. 2004;9(3):1045–1359. <https://doi.org/10.1177/1359104504043923>
10. Kalb LG, Freedman B, Foster C, et al. Determinants of appointment absenteeism at an outpatient pediatric autism clinic. *J Dev Behav Pediatr*. 2012;33(9):685–697. <https://doi.org/10.1097/DBP.0b013e31826c66ef>
11. McDonough B, Mault S. Non-attendance at a difficult-asthma clinic. *Nurs Times*. 2013;109(16):12–14.
12. Rodd HD, Clark EL, Stern MR, Baker SR. Failed attendances at hospital dental clinics among young patients with cleft lip and palate. *Cleft Palate Craniofac J*. 2007;44(1):9205–94162. [pii].
13. Stubbs ND, Geraci SA, Stephenson PL, Jones DB, Sanders S. Methods to reduce outpatient non-attendance. *Am J Med Sci*. 2012;344(3):211–219. <https://doi.org/10.1097/MAJ.0b013e31824997c6>

14. Paige L, Mansell W. To attend or not attend? A critical review of the factors impacting on initial appointment attendance from an approach-avoidance perspective. *J Ment Health*. 2013;22(1):72-82. <https://doi.org/10.3109/09638237.2012.705924>
15. Shioda T, Matsuura M, Fukuda Y, Takahashi K, Yamaoka K. Social and household factors affecting child health checkup attendance based on a household survey in Japan. *Ind Health*. 2016;54(6):488-497. <https://doi.org/10.2486/indhealth.2016-0057>
16. Woicik K, van der Lem R, Sijtsema JJ, Bogaerts S. Treatment no-show in forensic outpatients with ADHD. *Crim Behav Ment Health*. 2017;27(1):76-88. <https://doi.org/10.1002/cbm.1989>
17. Lasser KE, Mintzer IL, Lambert A, Cabral H, Bor DH. Missed appointment rates in primary care: the importance of site of care. *J Health Care Poor Underserved*. 2005;16(3):475-486. <https://doi.org/10.1353/hpu.2005.0054>
18. Ballantyne M, Benzies K, Rosenbaum P, Lodha A. Mothers' and health care providers' perspectives of the barriers and facilitators to attendance at Canadian neonatal follow-up programs. *Child Care Health Dev*. 2015;41(5):722-733. <https://doi.org/10.1111/cch.12202>
19. Lubetzky H, Svarts S, Galia A, Tesler H, Vardi G, Merrick J. Impact of copayment requirements on therapy utilization for children with developmental disabilities in Israeli Jewish and Arab Bedouin populations. *J Pol Pract Intellect Disabil*. 2004;1(3-4):164-168. <https://doi.org/10.1111/j.1741-1130.2004.04030.x>
20. Hoare P, Norton B, Chisolm D, Parry-Jones W. An audit of 7000 successive child and adolescent psychiatry referrals in Scotland. *Clin Child Psychol Psychiatr*. 1996;1(2):229-249. <https://doi.org/10.1177/1359104596012005>
21. Cronin PR, DeCoste L, Kimball AB. A multivariate analysis of dermatology missed appointment predictors. *JAMA Dermatol*. 2013;149(12):1435-1437. <https://doi.org/10.1001/jamadermatol.2013.5771>
22. Chariatte V, Michaud PA, Berchtold A, Akre C, Suris JC. Missed appointments in an adolescent outpatient clinic: descriptive analyses of consultations over 8 years. *Swiss Med Wkly*. 2007;137(47-48):677-681.
23. Dossett KW, Reid GJ. Predicting dropout from children's mental health services: using a need-based definition of dropout. *Child Psychiatr Hum Dev*. 2020;51(1):13-26. <https://doi.org/10.1007/s10578-019-00906-4>
24. Samuels RC, Ward VL, Melvin P, et al. Missed appointments: factors contributing to high No-show rates in an urban pediatrics primary care clinic. *Clin Pediatr (Phila)*. 2015;54(10):976-982. <https://doi.org/10.1177/0009922815570613>
25. Miller AJ, Chae E, Peterson E, Ko AB. Predictors of repeated "no-showing" to clinic appointments. *Am J Otolaryngol*. 2015;36(3):411-414. <https://doi.org/10.1016/j.amjoto.2015.01.017>
26. Perez FD, Xie J, Sin A, et al. Characteristics and direct costs of academic pediatric subspecialty outpatient no-show events. *J Healthc Qual*. 2014;36(4):32-42. <https://doi.org/10.1111/jhq.12007>
27. Benway CB, Hamrin V, McMahon TJ. Initial appointment nonattendance in child and family mental health clinics. *Am J Orthopsychiatry*. 2003;73(4):419-428. <https://doi.org/10.1037/0002-9432.73.4.419>
28. Raz R, Lerner-Geva L, Leon O, Chodick G, Gabis LV. A survey of out-of-pocket expenditures for children with autism spectrum disorder in Israel. *J Autism Dev Disord*. 2013;43(10):2295-2302. <https://doi.org/10.1007/s10803-013-1782-2>
29. Norris JB, Kumar C, Chand S, Moskowitz H, Shade SA, Willis DR. An empirical investigation into factors affecting patient cancellations and no-shows at outpatient clinics. *Decis Support Syst*. 2014;57:428-443. <https://doi.org/10.1016/j.dss.2012.10.048>
30. Lin CL, Mistry N, Boneh J, Li H, Lazebnik R. Text message reminders increase appointment adherence in a pediatric clinic: a randomized controlled trial. *Int J Pediatr*. 2016;2016:8487378-6. <https://doi.org/10.1155/2016/8487378>
31. Teo AR, Forsberg CW, Marsh HE, Saha S, Dobscha SK. No-show rates when phone appointment reminders are not directly delivered. *Psychiatr Serv*. 2017;68(11):1098-1100. <https://doi.org/10.1176/appi.ps.201700128>
32. Powell C, Appleton JV. Children and young people's missed health care appointments: reconceptualising 'Did Not Attend' to 'Was Not Brought' - a review of the evidence for practice. *J Res Nurs*. 2012;17(2):181-192. <https://doi.org/10.1177/1744987112438158>
33. Michelson D, Day C. Improving attendance at child and adolescent mental health services for families from socially disadvantaged communities: evaluation of a pre-intake engagement intervention in the UK. *Adm Policy Ment Health*. 2014;41(2):252-261. <https://doi.org/10.1007/s10488-012-0462-4>
34. McKay MM, McCadam K, Gonzales JJ. Addressing the barriers to mental health services for inner city children and their caretakers. *Community Ment Health J*. 1996;32(4):353-361. <https://doi.org/10.1007/bf02249453>
35. Aggarwal A, Davies J, Sullivan R. "Nudge" and the epidemic of missed appointments. *J Health Organisat Manag*. 2016;30(4):558-564. <https://doi.org/10.1108/JHOM-04-2015-0061>

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