

Demographic & Clinical Correlates of Admission into a Specialized Psychiatric Inpatient Service for Children and Adolescents in Egypt: An Observational Retrospective Study

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Abstract

Background: To our knowledge, this is the first study that aims to investigate the demographic and clinical correlates of admission into a specialized inpatient psychiatric unit for children and adolescents in Egypt and the Arab world.

Methods: The files of all new cases who presented for care in the outpatient service for children and adolescents in Tanta University between July 2017 and December 2019 were reviewed. Of the 1195 files reviewed, 100 patients were admitted to the inpatient unit for 133 admission episodes with an average duration of 18.5 days per episode.

Results: The most common diagnosis among admitted youth was disruptive behavior disorder but having a diagnosis of bipolar disorder, eating disorder, or trauma related disorders predicted admission more powerfully than did the diagnosis of disruptive behavior disorder. Physical and sexual abuse were both associated with higher rates of admission, readmission and longer duration of admission.

Conclusions: Except for having more percentage of youth with disruptive behavior disorders, and less percentage of those with eating disorders, the characteristics of youth in need for admission into psychiatric inpatient unit is comparable to those reported in other parts of the world.

Background

At any given point of time, it is estimated that one in every 4–5 people under the age of 18 suffers from a psychiatric disorder (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Jaffee, Harrington, Cohen, & Moffitt, 2005). Although most children and adolescents with behavioral problems can be managed at their natural environment, a significant minority of this population need to be admitted to inpatient facilities (Blader, 2004, 2011; Case, Olfson, Marcus, & Siegel, 2007; Glick, Sharfstein, & Schwartz, 2011). Residential facilities for children and adolescents, mainly applying discipline to delinquent youth and general care for mentally retarded orphans, have existed in the US since the nineteenth century (Jemerin & Philips, 1988). More therapeutically oriented facilities have not been established till 1930s and 1940s (Association, 1957; Harper, 1987; Jemerin & Philips, 1988; Lewis, 1985). In other parts of the world, Child and adolescent inpatient services have developed from the theoretical concept of “therapeutic milieu” that aims to shape the behavior of youth at early stage of personality development (Kennard, 1983).

In the second half of the twentieth century, the availability of child psychiatric inpatient services increased rapidly in the US and Europe, with several changes in trends of admission, quality of care and targeted population (Worrall-Davies, 2015). An increasing number of admissions, shorter length of stay, with multiple changes in diagnostic patterns of youth in need for admission was reported in several studies. For example, a comprehensive study of overall psychiatric admissions in the US between 1996 and 2007 showed much more increase (180%) in children, and adolescents (141%), as compared to adults (108%) (Blader, 2011). In 2014, approximately 606,000 adolescents received inpatient or residential specialty mental health services in the US (Rachel N. Lipari, 2016). The number of psychiatric inpatient beds dedicated to adolescents in England and Wales increased from 900 beds in 1999 to 1128 beds by 2006, with increase in adolescent only unit and general units (i.e. units which admit both children and adolescents) but 30% decrease in units dedicated only to children under 14 years of age (O’Herlihy et al., 2018). Inpatient admission rates for children and adolescents also increased by 38.1% in Germany between 2000 and 2007 with a sharp increase of cases for depressive disorders (219.6%) and hyperkinetic disorders (111.3%) (Holtmann et al., 2010). A recent study from Spain also reported an increase of youth under 18 years old admitted to psychiatric units from 27.7 per 100000 inhabitant in 2005 to 49.8 per 100000 inhabitant in 2015 (Llanes-Alvarez et al., 2019). In a study carried out in a French public hospital, 2.0% of the children and adolescents cared for in the emergency department were admitted to the psychiatric emergency department (Boyer et al., 2013).

A retrospective meta-analysis of 34 studies (Pfeiffer & Strzelecki, 1990), in addition to a prospective one-year follow up study (Green et al., 2007) all highlighted meaningful clinical improvement with child and adolescent psychiatric inpatient treatment across all diagnostic categories. Two long-term follow up studies (Fuchs et al., 2016; Healy & Fitzgerald, 2000) reported that most of children and adolescents admitted to inpatient psychiatric units still met the criteria of psychiatric disorders during their adulthood but only 26% of these patient were readmitted to psychiatric inpatient units as adults. Despite the widespread use of

inpatient services for children and adolescents with mental health problems in developed countries, the costs and benefits of such practice and the call for alternative approaches to deal with their problems in less restrictive settings have been the focus of a long, ongoing debate among experts (Boge, Schepker, & Fegert, 2019; Branik, 2001; Edwards et al., 2015; Glick et al., 2011; Mattejat, Hirt, Wilken, Schmidt, & Remschmidt, 2001). In a randomized controlled study in two German centers for child and adolescent mental health, authors concluded that residential treatment can be replaced by home treatment with no significant differences in therapeutic outcome in at least 15% of those patients treated in inpatient setting (Mattejat et al., 2001). In 2008, a systematic review (Shepperd et al., 2009) identified eight worldwide commonly used alternative models to inpatient care for youth with complex mental health needs, such as multisystemic therapy, day hospitals, intensive specialist outpatient service. However, a more recent review reported high levels of parental burden and complex emotional reactions associated with engagement with such alternative interventions (Vusio, Thompson, Birchwood, & Clarke, 2019).

A review of potential risks that affects children and adolescents using inpatient child and adolescent mental health services in the UK concluded that dislocation from normal life, together with stigmatization, are the main potential risks caused by hospitalization of youth with severe psychiatric problems. However, the same review reported little evidence supports the existence of better options to care for this population other than inpatient setting (Edwards et al., 2015). In another study, a sample of adolescents interviewed within 7 days of discharge from their first psychiatric hospitalization, the participants reported "a little" stigma towards their admission (Moses, 2011). Having an assisted transition from an inpatient psychiatric service to school and open community was found to facilitate the re-integration of discharged youth into their natural environment and decreased rates of re-admission (Weiss et al., 2015)

Few studies explored the characteristics of children and adolescents admitted to psychiatric inpatient units outside the US and Europe (Bharath, Srinath, Seshadri, & Girimji, 1997; Jacob, Seshadri, Girimaji, Srinath, & Sagar, 2013). An early study from India (Bharath et al., 1997), the most common diagnoses among admitted children were hysterical neurosis (30.8%), psychoses (25.2%), conduct disorder (10.5%) and hyperkinetic syndrome (9.8%) with average duration of stay was 4–12 weeks. Egypt population was recently estimated to exceed 100 million people, with approximately 43% of this number aged less than 19 years ((CAPMAS), 2018). However, there is absence of studies reporting the case of admission of children and adolescents into specialized psychiatric inpatient services in Egypt and the Arab region. The first specialized university-affiliated psychiatric inpatient unit for both children and adolescents was started in Tanta psychiatry and neurology center in 2013 to serve a wide catchment area of about 13 million people. The unit included 10 beds for both children and adolescents while 7 more beds were later added in 2017 to serve adolescents only. In a previous report (Seleem, Amer, Romeh, & Hamoda, 2019), our team described the demographic and clinical characteristics of children seeking psychiatric advice in our outpatient service. The current study aims to identify the demographic and clinical correlates of admission into our psychiatric inpatient unit for children and adolescents.

Methods

This descriptive study was carried out through reviewing the files of children and adolescents who were admitted to the inpatient psychiatric unit and comparing them to those who received outpatient service only in Tanta Psychiatry and Neurology Center during a period of 30 months between July 2017 and December 2019. The files included the data collected by trained social workers about the demographic and socio-economic status of the families coming for psychiatric advice in addition to medical and developmental history obtained by child psychiatry fellows. As corporal punishment is relatively common in Arab culture (Dwairy & Menshar, 2006; El.Makzoum, 2015), physical abuse was technically defined as any physical punishment that left a mark on the skin of the child for a period of more than 24 hours. Touching the child in a sexual manner or showing him any kind of media with explicitly sexual or pornographic content was considered as sexual abuse as defined by Egyptian law (Parliament), 2008 (amendment) - Original Act 1996).

An Arabic translated and validated psychiatric interview, namely the MINI International Neuropsychiatric Interview for Children and Adolescents, (Ghanem, 1998; Ibrahim M, 2002; Sheehan D, 1997) was used to confirm psychiatric diagnoses. Both parents and children were interviewed except for the case of preschoolers where only parent were interviewed. Trained bachelor's degree interviewers did the interviews and the results were all reviewed and confirmed by a trained child and adolescent psychiatrist (the

first author). The questions of the MINI-kid were sometimes modified to reflect the diagnostic criteria of the DSM-5 (Association, 2013). When needed, the intellectual abilities of children and adolescents were evaluated using the Arabic translation of the Stanford-Binet Intelligence quotient (I.Q) fourth edition (Melika, 1998; Thorndike, 1986), The decision to admit a case was made by the consultant attending child psychiatrist (the first author) at time of evaluation according to predetermined admission criteria. These criteria were adapted with little modifications from the criteria determined by the American Academy of Child and Adolescent psychiatry (AACAP) (Psychiatry, 1989). The adapted criteria include showing a behavior that poses an actual or imminent danger to him or herself or to others, requiring a period of intensive observation by skilled professionals to make a diagnosis, being in need for unusually high doses of medication that requires close monitoring, and failure to improve in other, less restrictive settings. The decision to discharge a case was based on consensus of a treatment team that includes residents, nurses, psychologists, and social workers working with the case and agreeing that the admission criteria no longer apply to the patient.

Data was analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) (Corp., Released 2011). Simple descriptive analysis was utilized to describe the demographic and clinical characteristics of the sample. Logistic regression was used to explore the role of different variables in predicting admission while univariate Linear regression was used to explore the role of the same variables in predicting number of admissions and the total duration of admission (only the significant results was shown in the table). Significance of the obtained results was judged at the 5% level.

Results

The medical records of 1278 patients presenting to the unit during the designated period of the study were reviewed. Eighty files were excluded due to missing data while 3 more files were found to be for adult cases (age > 18 years old). Of our final sample (n = 1195), only 100 cases were admitted to the inpatient unit (8.4% of the total sample) for 133 admission episodes. Most of our sample (73%) were admitted once, 23% were admitted twice, 3% for 3 times and only one case (1%) was admitted 5 times. The duration of the last admission ranged from 3 to 60 days with an average of 18.5 ± 10.9 days. Regarding the DSM-5 diagnostic categories, the diagnoses received by 59% of the sample were included in one DSM-5 diagnostic category, 31% of the sample received diagnoses from two categories, 8% from 3 categories, and 2% from 4 categories. (data not shown).

The children admitted to the inpatient unit were significantly older than those who received outpatient services ($p \leq 0.001$). The age of the inpatient group ranged from 3 to 18 years with a mean age of $11.6 (\pm 3.7)$ while that of the outpatient group ranged from 18 months to 18 years, with a mean age of $7.4 (\pm 3.8)$ years (table 1). Significantly more adolescents (54%) and less preschoolers (5%) were admitted to the inpatient unit as compared to the percentage of the same age categories in the outpatient group (16.1% and 36.3% respectively). Only 25% of the inpatient and 32.1% of the outpatient groups were females with no significant difference between the two groups. Admitted youth were more likely to come from urban residence (60% vs. 40.6%) and less likely to be living with both parents (80% vs. 89%) as compared to youth who needed only outpatient services. The admitted youth were also more likely to have fathers who did not finish high school (37% vs. 25.3%), but a similar difference was not significant in mothers. No significant differences were found between both groups regarding family income and child enrollment in school (p -values > 0.05) (table 1).

History of birth complications, delayed milestones, medical illness, and to less extent a family history of psychiatric illness were all significantly less common in admitted youth as compared to outpatient group. Physical punishment was reported in about one fifth of cases with no significant differences between inpatient and outpatient groups. However, both physical and sexual abuse were reported in the inpatient group more frequently than in the outpatient group, with more significant difference between both groups regarding sexual abuse (8% vs. 1.4%). On the other hand, IQ, birth order or the presence of comorbidity (more than one diagnosis) did not show any significant differences between both groups (p -values > 0.05) (table 2). The most frequently diagnostic categories received by admitted children included disruptive disorders (42%), followed by borderline intellectual abilities (BIF) (30%), ADHD (22%), and depressive disorders (18%). Admitted youth were more likely to receive a diagnosis of disruptive disorders, bipolar disorders, psychotic disorders, eating disorders or trauma related disorders but less likely to receive a diagnosis of autism spectrum disorder, communication disorders, elimination disorders or neurological disorders (table 3).

Older age was one of the significant predictors for both admission and longer duration of admission (OR = 1.3, B = 0.7). The school age category had more than 6-fold likelihood to be admitted as compared to the preschool age category while being an adolescent raised, in turn, the likelihood to be admitted almost four times as compared to be a school aged child (OR = 6.2). Coming from urban background, having a deceased parent or an illiterate father also predicted admission in our unit (OR = 2.2, 3.6, 1.9 respectively). Being out of school was associated with spending more time in the inpatient service (B = 7.4) while having a history of birth complications, delayed milestones, or medical illness decreased the likelihood of being admitted (OR = 0.2, 0.4, and 0.2, respectively). Being a subject of sexual abuse specifically increased the likelihood of being admitted (OR = 6.3), but all types of abuse were associated with more readmissions, and longer duration of admission (B = 0.2, 2.3 respectively)

The most powerful predictor of admission among diagnostic categories was bipolar disorders (OR = 14.4), followed by eating disorders (OR = 11.2), trauma related disorders (OR = 6.7), disruptive disorders (OR = 5.6), and finally psychotic disorders (OR = 3.8). Both psychotic (B = 0.7) and disruptive disorders (B = 0.3) predicted more frequent admissions while both sexual and neurological disorders predicted longer duration of admission (OR = 26.7 for both). On the other hand, communication disorders (OR = 0.08), neurological disorders (OR = 0.1), autism spectrum disorder (OR = 0.2), and elimination disorders (OR = 0.4) all predicted that the child would receive outpatient service only (table 4; Figs. 1–4)

Discussion

To our knowledge, this is first study to describe the demographic and clinical correlates of admission into a specialized inpatient unit for child and adolescent psychiatry in Egypt and other Arabic-speaking countries. Given that our unit is the only specialized inpatient unit in our catchment area which have a population of about 13 million people, 43% of which are under the age of 19 years ((CAPMAS), 2016), the estimated number of admission episodes per year will be 0.8 per 100000 inhabitants under 19 years old. This number is well below numbers of admissions reported for admission of all patients under 18 years old in other countries such as Spain (49.8 per 100000) (Llanes-Alvarez et al., 2019) and Germany (705 per 100000) (Holtmann et al., 2010). Studies from UK (James, Clacey, Seagroatt, & Goldacre, 2010) report the admission of 20 children under 10 years old and 220 adolescents per 100000 youth inhabitants, compared to 283.04 and 969.03 for the same age categories in the US (Blader, 2011). This difference could be explained by the relatively recent start of the practice in Egypt and scarce beds available for this population. It might also be explained by the possibility of admission of youth, especially older adolescents, in adult psychiatric wards.

We report a relatively short length of stay per admission with a mean of 18.5 days. This duration is similar to that reported in Spain (Llanes-Alvarez et al., 2019), shorter than that reported in Germany (22.2 days) (Holtmann et al., 2010) and in New Zealand (27.3 days) (Swadi & Bobier, 2005), but longer than that reported in the US (7.4 days) (Bardach et al., 2014; Case et al., 2007). The median length of stay of a child in a psychiatric inpatient unit in the US has reportedly declined from 12.2 days to 4.5 days between 1990 and 2000 (Case et al., 2007). Given that the major portion of the improvement was suggested to occur during the first 3 weeks of admission (Swadi & Bobier, 2005), the “ultrashort” period of hospitalization which became a trend in the US in the last decade (Case et al., 2007) was criticized as it might interfere with the long-term recovery process and increase rates of short term readmission in the so called “revolving door phenomenon” (Glick et al., 2011; Simila, Hakko, Riipinen, & Riala, 2018). Better outcomes were independently predicted by longer length of stay in the inpatient setting (Green et al., 2007). Our reported percentage of readmission (27%) within the period of follow up (30 months) was lower the that reported in a previous study in the US in which 43% of youth were readmitted during a similar period of follow up (30 months) (S. James et al., 2010). In another study, the reported rates of readmission of discharged youth within one year was estimated to be as high as 34%, with 81% of readmissions occurring in the 90 days next to discharge (Blader, 2004). A recent meta-analysis of 33 studies (Edgcomb, Sorter, Lorberg, & Zima, 2020) reported a readmission rate of 13.2% during an average follow up period of 13.1 months, a comparable rate of our reported finding.

The mean age of our inpatient sample is similar to that reported by Grupp-Phelan and colleagues (Grupp-Phelan et al., 2009) but less than that reported by Boyer and Llanes-Álvarez and their colleagues (Boyer et al., 2013; Llanes-Alvarez et al., 2019). The rare occasion of admitting young children less than 5 years of age could not be considered an unprecedented practice in the current study as for every 100000 children under the age of 5 years, 10 children were reportedly admitted to inpatient psychiatric units in

the US (Case et al., 2007). The greater need for admission among adolescents coming from urban areas in our sample replicates previous studies reporting similar results in different cultures (Case et al., 2007; Grupp-Phelan et al., 2009; Llanes-Alvarez et al., 2019) and might, together with higher parent education, reflect more family awareness and easier access to service but might also reflect more behavioral problems with urbanization. However, the percentage of male patients (75%) in our sample was higher than expected from the actual percentage of male children in our population (51.2%) and from previous studies in other parts of the world (Boyer et al., 2013; Case et al., 2007; Llanes-Alvarez et al., 2019). This high percentage might reflect the cultural tendency to give attention to behavioral problems more in males rather than in females. Although the percentage of children living with both parents is less in our admitted than in outpatient group, this percentage among admitted youth is still less than reported in other cultures (Mendonca, Pantano, Casella, & Scivoletto, 2017), a finding that might reflect the conservative nature of Egyptian but might also reflect the need to reach out to more troubled families and residential homes in our community. Unsurprisingly, we report a clear association between physical and sexual abuse of children and admission, readmission, and longer duration of admission among our inpatient sample of youth, a finding previously reported in several studies (Bobier & Warwick, 2005; Mendonca et al., 2017).

The distribution of our sample of admitted youth among diagnostic categories were more or less similar to previously reported results (Case et al., 2007; Edelson, Braitman, Rabinovich, Sheves, & Melendez, 2003; Holtmann et al., 2010; Santiago, Tunik, Foltin, & Mojica, 2006) with slightly higher percentage of youth with disruptive behavior disorders and slightly lower internalizing disorders, e.g. depression. This finding might reflect the higher urgency of externalizing which usually attracts more attention than do internalizing behaviors in our society. Several previous studies highlighted the role of admission in the management of psychiatric disorders that predicted the admission to our unit, especially bipolar disorders (Holtmann et al., 2010), trauma related disorders (Romansky, Lyons, Lehner, & West, 2003), and eating disorders (Llanes-Alvarez et al., 2019). The small percentage of youth with eating disorders, most of which were severe enough to justify admission, might reflect the cultural shift towards western parameters of thinness (Makino, Tsuboi, & Dennerstein, 2004). Having a diagnosis of autism spectrum disorder had a significant effect in decreasing the likelihood of admission into our unit, most probably due to lack of enough nursing staff needed to deal with severe aggressive and self-injurious behavior exhibited by some cases with severe autism. The less probability of admission of children with history of, delayed milestones, medical illness, or comorbid neurological disorders might be attributed to the referral of such cases into pediatric and neurological units for outpatient or inpatient care. The lower percentage of patients with family history of psychiatric disorders in our admitted sample might be explained by the denial of such history among the children of admitted children due to less education and more illiteracy.

Before concluding, it is important to highlight some of the limitations of the current study. First, the small size of our sample makes it difficult to generalize our results over the entire population. For example, only one case with sexual disorder and comorbid epilepsy stayed in our unit for a long duration led to the result that both sexual and neurological disorders were associated with longer duration of admission. Second, no data were collected from public or private psychiatric hospitals that do not have special units for children and adolescents but might admit youth on adult beds. Third, factors other than the actual condition of the patient, such as availability of human resources, sometimes affected the decision to admit a case. Fourth, socio-economic status of the families was explored through informal questioning and not using a standardized tool to measure it. Finally, the source of referral of youth was not separately documented for each patient and hence no comparison between outpatient and inpatient groups was done.

Conclusions

Admitting children and adolescents in psychiatric inpatient units is a relatively new and still debatable practice in our Arab Egyptian society. We report that Egyptian youth with complex behavioral problems, such as in other parts of the world, desperately need and do get benefit from inpatient psychiatric service. Except for relatively higher rates of disruptive behavior disorders and less rates of eating disorders, the demographic and clinical characteristics of children in need for such service are not clearly different from those reported in other parts of the world. Further research is desperately needed to explore the actual needs of this population, the best practice to manage their problems, and the effectiveness of possible alternative services, such as day hospital or wrap-around services to replace admission. There is also a need to replicate our findings in other parts of the

Arab world to identify the cultural aspects that might help or interfere with providing such service to children and adolescents in need.

Abbreviations

AACAP
the American Academy of Child and Adolescent psychiatry
ADHD
Attention Deficit-Hyperactivity Disorder
ASD
Autism Spectrum Disorder
BIF
Borderline Intellectual Functioning
DBD
Disruptive Behavior Disorders
DSM-5
Diagnostic and Statistical Manual of Mental Disorders – version 5
IBM
International Business Machines Corporation
ID
Intellectual Disability
IQ
Intelligence quotient
MINI-Kid
MINI International Neuropsychiatric Interview for Children and Adolescents for parents and with children and adolescents
OCD
Obsessive Compulsive Disorder
OR
Odds Ratio
NY
New York
UK
United Kingdom
US
United States
USD
United Stated Dollar

Declarations

Ethics approval and consent to participate:

The study was approved by the Ethical Research Committee of the Faculty of Medicine, Tanta University under the code 33670/2/20

Consent for publication:

All participating authors consent for publication

Availability of data and material:

The dataset created and analyzed during the current study will be uploaded with the files and will be available from the corresponding author on request.

Competing interests:

All authors report no biomedical financial interests or potential conflicts of interest.

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Authors' information and contributions:

Mohammad A. Seleem, MD.: *Department of Psychiatry and Neurology, Faculty of Medicine, Tanta University, Tanta, Egypt.*

Contribution: Confirming the diagnoses of all recruited subjects, Statistical analysis of the results, writing the manuscript, and responding to the reviewers' comments

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Contribution: Supervising the process of interviewing families, reviewing the files of the subjects, shared in writing the manuscript.

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Tables

Table (1):
Demographic characteristics of children admitted to the inpatient unit compared to those received only outpatient service (n=1195)

Variable		Inpatient service (n = 100)	Outpatient service only (n = 1095)	Total (n = 1195)	Statistic	p value
Age		11.6 ± 3.7	7.4 ± 3.8	7.8 ± 3.9	t = 10.5	≤ 0.001
Age Category	Preschoolers ^a	5 (5.0%)	397 (36.3%)	402 (33.6%)	χ ² = 95.9	≤ 0.001
	School Age ^b	41 (41.0%)	522 (47.7%)	563 (47.1%)		
	Adolescents ^c	54 (54.0%)	176 (16.1%)	230 (19.2%)		
Gender (Female)		25 (25.0%)	351 (32.1%)	376 (31.5%)	χ ² = 2.1	0.1
Residence	Rural	40 (40.0%)	650 (59.4%)	690 (57.8%)	χ ² = 14.1	≤ 0.001
	Urban	60 (60.0%)	444 (40.6%)	504 (42.2%)		
Family Status (Living with both parents)		80 (80.0%)	975 (89.0%)	1055 (88.3%)	χ ² = 7.2	0.007
Father Education	< High school ^a	37 (37.0%)	276 (25.3%)	313 (26.3%)	χ ² = 6.5	0.04
	High school ^b	35 (35.0%)	452 (41.4%)	487 (40.9%)		
	College degree ^b	28 (28.0%)	364 (33.3%)	392 (32.9%)		
Mother Education	< High school	33 (33.0%)	295 (27.0%)	328 (27.5%)	χ ² = 2.6	0.3
	High school	43 (43.0%)	460 (42.1%)	503 (42.2%)		
	College degree	24 (24.0%)	337 (30.9%)	361 (30.3%)		
Family Income	< 5000 EGP/M	66 (66.0%)	720 (65.8%)	840 (65.9%)	χ ² = 0.002	0.9
	≥ 5000 EGP/M	34 (34.0%)	375 (34.2%)	409 (34.2%)		
Child Education	Out of school	7 (7.4%)	48 (6.9%)	55 (6.9%)	FET	0.6
	Regular school	87 (91.6%)	628 (90.0%)	715 (90.2%)		
	Special school	1 (1.1%)	22 (3.2%)	23 (2.9%)		

FET: Fisher's Exact Test; Different superscripts denote significant between-group differences calculated using pair-wise chi-square tests (p-values ≤ 0.05)

Table (2):

Clinical characteristics of children admitted to the inpatient unit compared to those received only outpatient service (n =1195)

Variable	Inpatient service (n = 100)	Outpatient service only (n = 1095)	Total (n = 1195)	Statistic	p value
IQ	79.8 ± 11.4	78.2 ± 12.2	78.4 ± 12.1	t = 0.8	0.3
Family History of Psychiatric Illness	10 (10.0%)	194 (17.8%)	204 (17.1%)	$\chi^2 = 3.9$	0.05
History of Birth Complications	3 (3.0%)	228 (20.9%)	231 (19.4%)	$\chi^2 = 18.8$	≤ 0.001
History of Delayed Milestones	26 (26.0%)	520 (47.7%)	546 (45.9%)	$\chi^2 = 17.4$	≤ 0.001
History of Medical Illness	6 (6.0%)	271 (24.8%)	277 (23.2%)	$\chi^2 = 18.1$	≤ 0.001
Birth Order (5th or more)	3 (2.7%)	19 (1.6%)	22 (1.7%)	FET	0.4
History of Abuse	None ^{a, b}	62 (62.0%)	728 (66.9%)	FET	≤ 0.001
	Physical Punishment ^a	17 (17.0%)	257 (23.6%)		
	Physical Abuse ^b	13 (13.0%)	88 (8.1%)		
	Sexual Abuse ^c	9 (8.0%)	15 (1.4%)		
Comorbid diagnosis	41 (41.0%)	428 (39.1%)	469 (39.2%)	$\chi^2 = 0.1$	0.7
FET: Fisher Exact Test					
Different superscripts denote significant between-group differences calculated using pair-wise chi-square tests (p-values ≤ 0.05)					

Table (3):

Diagnostic categories of children admitted to the inpatient unit compared to those received only outpatient service (n =1195)

Diagnostic category	Inpatient service (n = 100)	Outpatient service only (n = 1095)	Total (n = 1195)	Statistic	p value
Depressive Disorders	18 (18.0%)	155 (14.2%)	173 (14.5%)	$\chi^2 = 1.1$	0.3
Bipolar Disorders	5 (5.0%)	4 (0.4%)	9 (0.8%)	FET	≤ 0.001
Anxiety Disorders	2 (2.0%)	38 (3.5%)	40 (3.3%)	FET	0.8
Psychotic Disorders	5 (5.0%)	15 (1.4%)	20 (1.7%)	FET	0.02
ADHD	22 (22.0%)	298 (27.2%)	320 (26.8%)	$\chi^2 = 1.3$	0.3
DBD	42 (42.0%)	126 (11.5%)	168 (14.1%)	$\chi^2 = 70.5$	≤ 0.001
ASD	2 (2.0%)	115 (10.5%)	117 (9.8%)	$\chi^2 = 7.5$	0.006
Communication Disorders	1 (1.0%)	119 (10.9%)	120 (10.0%)	$\chi^2 = 9.9$	0.002
OCD spectrum	4 (4.0%)	15 (1.4%)	19 (1.6%)	FET	0.07
Somatic Related Disorders	1 (1.0%)	12 (1.1%)	13 (1.1%)	FET	1.0
Trauma Related Disorders	3 (3.0%)	5 (0.5%)	8 (0.7%)	FET	0.02
Tics	2 (2.0%)	25 (2.3%)	27 (2.3%)	FET	1.0
Elimination Disorders	5 (5.0%)	137 (12.5%)	142 (11.9%)	$\chi^2 = 4.9$	0.03
Eating Disorders	2 (2.0%)	2 (0.2%)	4 (0.3%)	FET	0.04
Sexual Disorders	1 (1.0%)	3 (0.3%)	4 (0.3%)	FET	0.3
BIF	30 (30.0%)	284 (25.9%)	314 (26.3%)	$\chi^2 = 0.8$	0.4
Intellectual Disability	9 (9.0%)	152 (13.9%)	161 (13.5%)	$\chi^2 = 1.9$	0.2
Neurological Disorders	1 (1.0%)	107 (9.8%)	108 (9.0%)	$\chi^2 = 8.6$	0.001
FET: Fisher Exact Test					

Table (4):
Univariate logistic and linear regression analyses for the demographic and clinical variables predicting admission, number of admissions, and duration of last admission

Variables	Admission (n = 1195)	No. of admissions (n = 100)	Duration of last admission (n = 100)
	OR (95% C.I)	B (95% C.I)	B (95% C.I)
Age	1.3 (1.2–1.4) **		0.7 (1.1–1.3) *
Age Category			4.7 (1.1–8.2) *
Preschoolers (1–5) ®	–		
School age (6–11)	6.2 (2.4–15.9) **		
Adolescents (12–18)	24.4 (9.6–61.9) **		
Urban Residence	2.2 (1.4–3.3) **		
Marital status			
Living with both parents®	–		
One parent deceased	3.6 (1.6–8.2) *		
Father Education			
High Education®	–		
Illiterate	1.9 (1.1–3.8) *		
Being out of school			7.4 (0.6–14.2) *
History of medical illness (Child)	0.2 (0.1–0.5) **		
Birth Complication	0.2 (0.04–0.4) **		
Delayed Milestones	0.4 (0.2–0.6) **		
Child Abuse (None®)		0.2 (0.07–0.3) *	2.3 (0.2–4.5) *
Harsh Physical punishment			
Physical abuse			
Sexual abuse	6.3 (2.6–15.3) **		
Bipolar disorders	14.4 (3.8–54.4) **		
Psychotic disorders	3.8 (1.3–10.7) *	0.7 (0.1–1.3) *	
Disruptive disorders	5.6 (3.6–8.6) **	0.3 (0.001–0.5) *	
Autism spectrum disorder	0.2 (0.04–0.7) *		
Communication disorders	0.08 (0.01–0.6) *		
Trauma related disorders	6.7 (1.6–28.6) *		
Elimination disorders	0.4 (0.2–0.9) *		
Eating disorders	11.2 (1.6–80.0) *		

OR: Odd`s ratio; C.I: Confidence interval; ® reference;

*: Statistically significant at $p \leq 0.05$; **: Statistically significant at $p \leq 0.001$

Variables	Admission (n = 1195)	No. of admissions (n = 100)	Duration of last admission (n = 100)
	OR (95% C.I)	B (95% C.I)	B (95% C.I)
Sexual disorders			26.7 (5.5–47.9) *
Neurologic disorders	0.1 (0.01–0.7) *		26.7 (5.5–47.9) *
OR: Odd`s ratio; C.I: Confidence interval; ® reference;			
*: Statistically significant at $p \leq 0.05$; **: Statistically significant at $p \leq 0.001$			

Figures

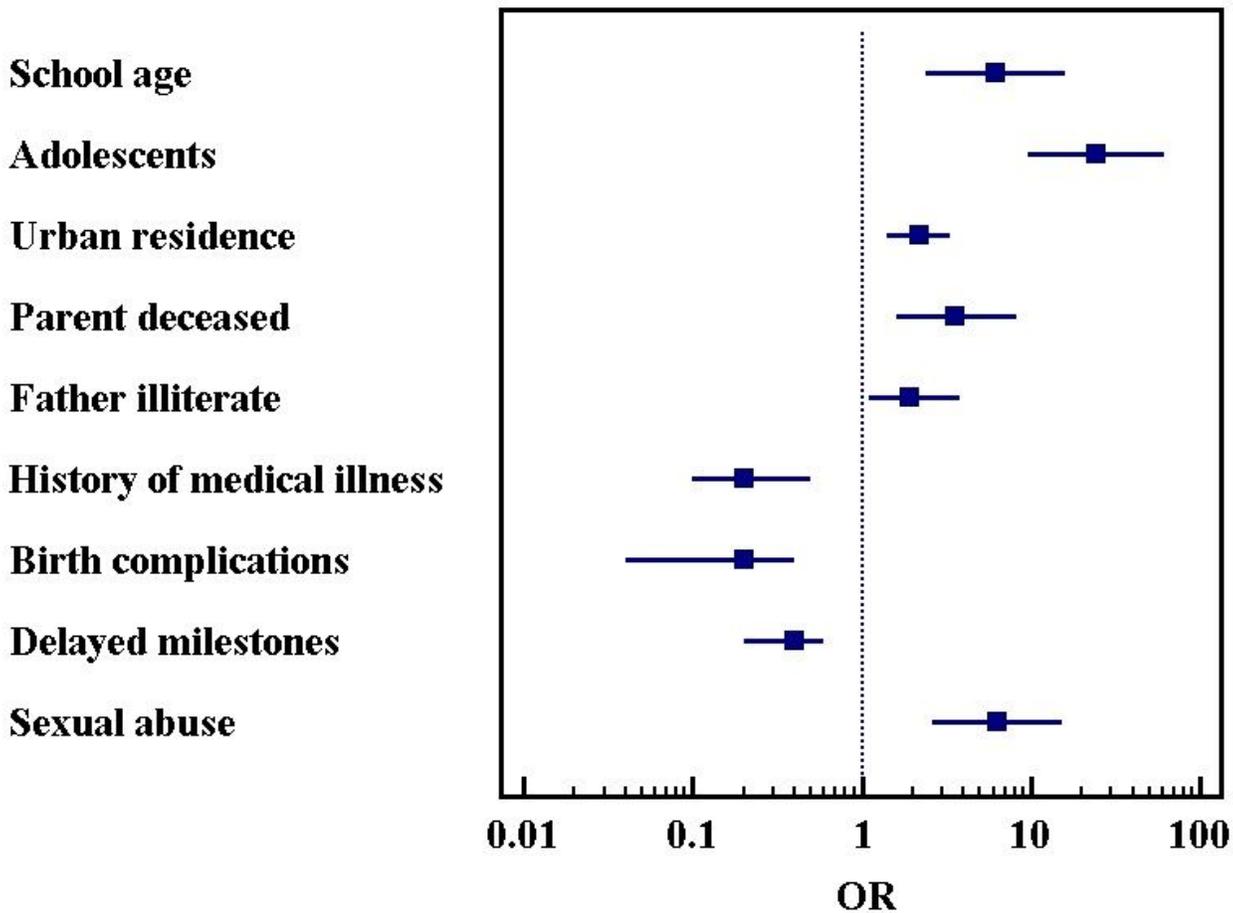


Figure 1

Demographic and clinical variables significantly predicting the admission into inpatient unit

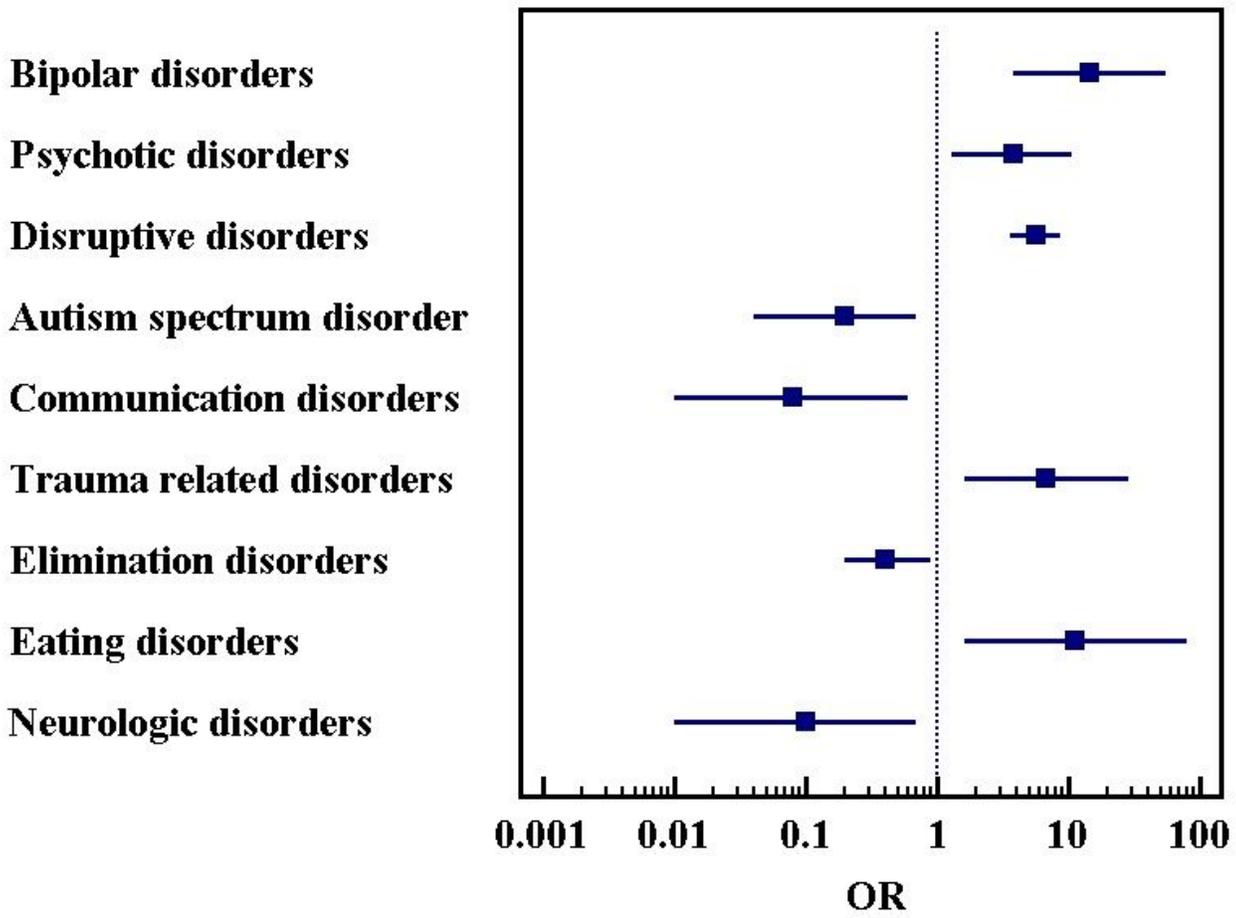


Figure 2

Diagnostic categories significantly predicting the admission into inpatient unit

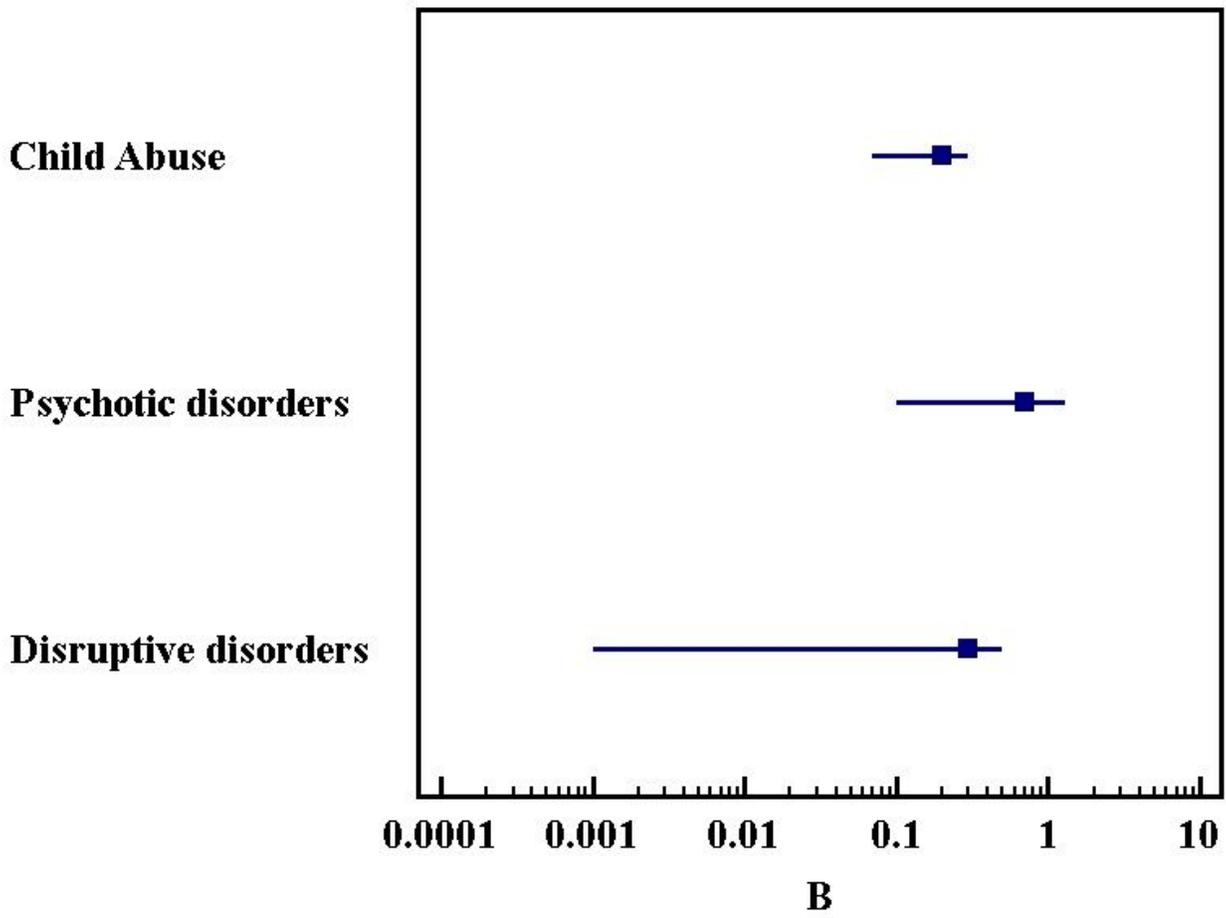


Figure 3

Factors significantly predicting the number of admission episodes in inpatient unit

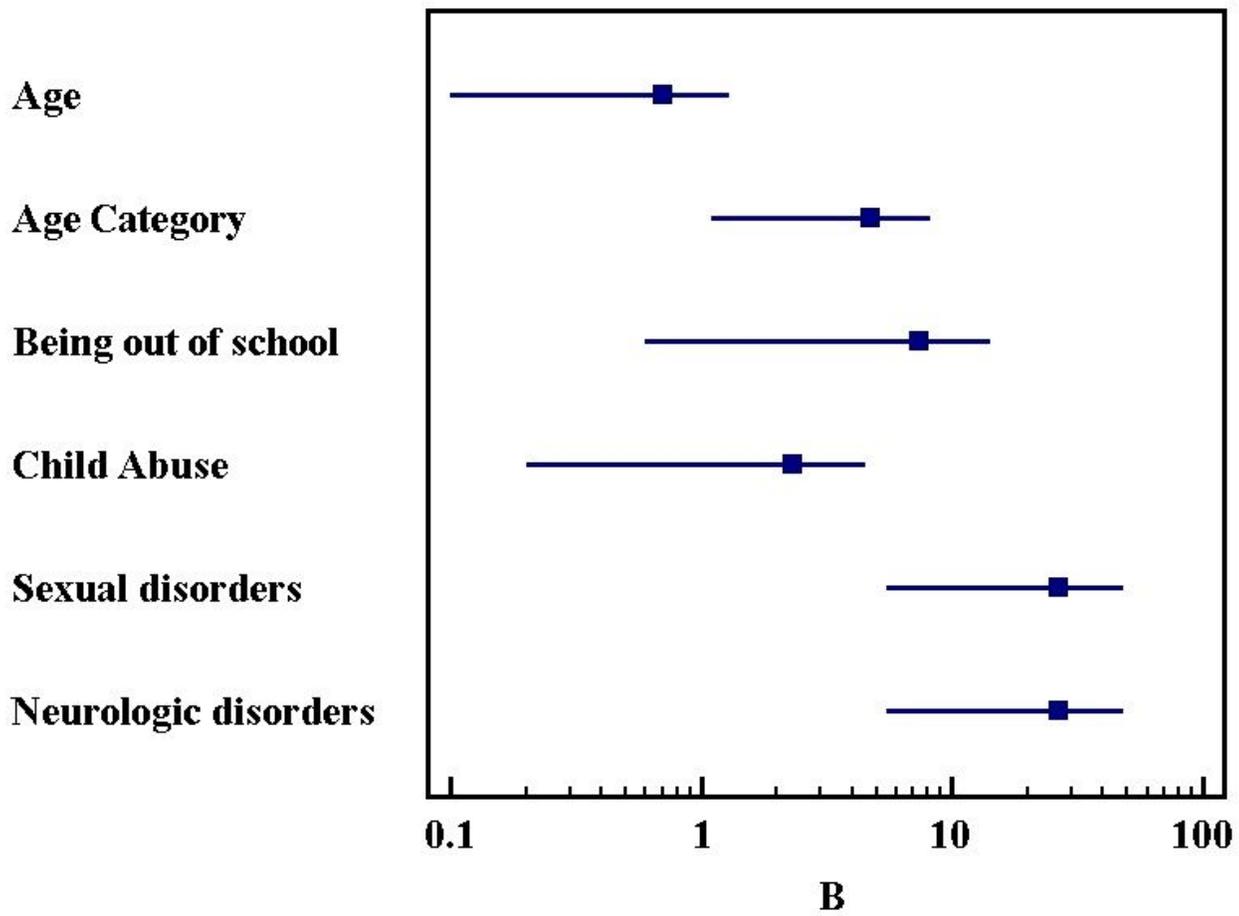


Figure 4

Factors significantly predicting the duration of admission in inpatient unit