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Socio-economic and demographic factors associated with adaptive behaviour among children diagnosed with autism spectrum disorder in Egypt

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Abstract

Background: Adaptive behaviour among children diagnosed with autism spectrum disorder determines wide range of self-independent and autonomous activities. Adaptive behaviour is a clearly defined measurable variable that can be used as an outcome, hence impacts intervention and training programs. The current study aims to determine the socio-economic and demographic factors that are associated with adaptive behaviour among children diagnosed with autism spectrum disorder in Egypt. In this observational cross sectional study, caregivers' reports on their children with a confirmed diagnosis of autism spectrum were obtained. Vineland Adaptive Behaviour Scale was used to assess adaptive behaviour among children aged 3–6 years and admitting at the outpatient clinic. Socioeconomic Status Scale was used to assess family socioeconomic status.

Results: Participants in the current study scored low in domains of adaptive behaviour. Older children scored low in adaptive behaviour compared to younger children. There was significant positive correlation between daily living activities subdomain of adaptive behaviour and education, occupation, family possessions, and home sanitation and health care domains of socioeconomic status scale. There were significant positive correlations between socialization subdomain of adaptive behaviour and education, occupation, family, and family possessions and home sanitation domains of the socioeconomic status scale. The motor functioning subdomain of adaptive behaviour correlates significantly with the following SES domains: education ($r = .268$), occupation ($r = .274$), family possessions ($r = .232$), economic ($r = .195$) and health care ($r = .291$). Results of the current study revealed that high socioeconomic status correlates with higher adaptive functioning in daily living skills, socialisation and motor skills domains of adaptive behaviour.

Conclusion: The correlations detected in the current study between adaptive behaviour and some social determinants of health can influence stakeholders' decisions in planning and implementation of autism specific interventions.

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Background

The estimated prevalence of autism spectrum disorder (ASD) is approximately 1 in 68 children and is considered one of the most common chronic childhood disorders [1]. Functioning in ASD is compromised across different domains including adaptive behaviour. Adaptive behaviour refers to individuals' ability to achieve set of age related skills that enables them achieve independence [2]. Deficits in the area of adaptive behaviour are primary barrier to a wide range of activities that range from basic personal autonomy to self-sustainability [3]. Despite the ambiguity of factors that contribute to positive outcome in ASD, adaptive behaviour tends to be more clearly measurable positive outcome. Therefore, adaptive behaviour is linked to training and intervention programs to enhance independent living [4, 5].

Evidence shows that deficits in adaptive behaviour are more severe than cognitive deficits in ASD. Therefore, adaptive skill development ascertains levels of independence, supervision and treatment planning of children with ASD [6, 7]. Several studies reported that although parents may notice autistic symptoms of their children early, they defer professional help until children reach 3–6 years old. Early detection and management for children with ASD aged 3–6 years could improve their adaptive behaviour as reported in many studies [8].

The dearth of epidemiological data available on ASD in Egypt despite reports of increasing prevalence worldwide is a challenge for health and education provision [9]. Even with the increased importance of early diagnosis and intervention of ASD [10], socioeconomic variables can influence timing of the diagnosis of ASD [11]. Additionally, some cross-cultural variations were reported in observational studies in some defining behaviours of ASD [10]. Epidemiological studies help in defining the characteristics of children with ASD [12] and gain better understanding of the disorder [13] particularly with the underdeveloped health and social services [9] to inform policy and decision-making [14].

Aim

The current study aims to determine the socio-economic and demographic factors that are associated with adaptive behaviour among children diagnosed with autism spectrum disorder in Egypt.

Methods

Study design

Observational cross-sectional research design was used in the current study.

Participants

Children were recruited immediately after a confirmed diagnosis of ASD by the consultant psychiatrist at children's outpatient clinic of psychiatry department, Mansoura University Hospital, where diagnosis of ASD followed the Diagnostic and statistical Manual of Mental Disorder, 5th edition (DSM-5) and was documented in children outpatient medical charts. Diagnosis was not re-confirmed by the study research team. Children were recruited if their age ranged between 3 and 6 years, and their intelligence quotient (IQ) that is routinely assessed for all children by a psychologist at the clinic using the 5th edition of the Arabic Stanford-Binet tests [15] was greater than 80 to control the confounding effect of IQ on adaptive behaviour. Children were excluded if they underwent any behavioural or pharmacological management for ASD (to control the outcome bias). If the attending psychiatrist at the clinic elicited any neurodevelopmental, behavioural or mental disorder during DSM-5 diagnostic screening, the child was excluded from recruitment in the study.

Sample size calculation

Records of the outpatient clinic revealed that approximately 400 child diagnosed with ASD visited the clinic in 2016. We used Steve Thompson equation [16] for calculating sample size:

$$n = \frac{N \times p\,(1-p)}{\left[\left[N - 1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

where N refers to the population size, z is the degree of freedom for 95% significance, d is the error percentage (0.05), and p is the probability of occurrence of the event or not (0.5). The calculated sample size was 89 participants.

A total of 140 participants were approached with 90 caregivers of children with ASD agreeing to take part. Data was collected from January 2017 to January 2018.

Measures

Socio-economic status (SES) scale was originally developed by Fahmy and El Sherbini (1983) in Arabic to assess family socio-economic status. The scale was further extended and updated by El-Gilany and El-Wehady [17] to include seven domains in the updated versions: education and cultural, family, economic, family possessions, home sanitation and health care. Depending on the quartile of the calculated score, the scoring of the scale is classified to high, middle, low and very low socio-economic status, and the Cronbach α of El-Gilany and El-Wehady is 0.66.

Vineland Adaptive Behaviour Scale (VABS) was used to assess adaptive behaviour. The scale consists of five domains: communication, daily living skills, socialization, motor skills and one optional domain (maladaptive behaviour) that was not applied in the current study [18]. In the current study, we used the survey form of the

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scale that was validated and translated to Arabic by Aleteby (2004). The internal consistency of the Arabic scale as reflected in Cronbach α ranges between 0.86 and 0.97

Although severity of autism symptoms is not a target outcome in the current study, we decided to report severity of autism symptoms by using the Arabic version of Giliam Autism Rating Scale [19] to control the confounding effect of symptoms severity on adaptive behaviour.

Procedure
Parents who agreed to take part in the study and their children met the study inclusion criteria which had a choice to complete the questionnaires or have the researcher read it out to them.

Analysis
Data was analysed using the Statistical Manual for Social Sciences (SPSS) version 24. One sample Kolmogorov-Smirnov test was used to check data normality. Categorical data was described in number and percentages, while continuous variables were presented as mean ± SD (standard deviation) for parametric data.

Student's *t* test was run two compare the means of two groups, while analysis of variance (ANOVA) test was used to analyse differences among group means. Pearson's correlation was used to examine the correlation between continuous parametric data. Confidence interval (CI) was set at 95% and the statistical power at 80%.

Results
The majority of children attending (74.4%) were males, and the mean age of the sample was 4.33 ± 0.89 years. High levels of symptoms severity was detected in 31.1% of the sample, and 68.9% has moderate levels of severity.

The majority of the current sample (53.4%) lives in very low and low socioeconomic levels, and nearly quarter of the sample live in moderate SES.

Participants had low levels of adaptive behaviour in communication, daily living skills and socialization. The majority of participants (95.6%) scored low in motor skills domain of adaptive behaviour.

There were no statistically significant differences between males and females in all domains of adaptive behaviour (Table 1).

Adaptive behaviour among the studied sample differs significantly according to age in all domains. Results show that children aged 3 years have higher level of adaptive functioning in domains of communication, daily living skills and motor skills compared to older children, except for children aged 5 years which have higher level of socialization (Table 2).

No statistically significant correlation was identified between communication subdomain of adaptive behaviour and all domains of socioeconomic status, except health care domain. There was significant positive correlation between daily living activities subdomain of adaptive behaviour and the following SES domains: education ($r = .394$), occupation ($r = .318$), family possessions ($r = .290$), home sanitation ($r = .238$) and health care ($r = .403$).

There were significant positive correlations between socialization subdomain of adaptive behaviour and the following domains of SES: education ($r = .355$), occupation ($r = .287.$), family ($r = .247$), family possessions ($r = .282$) and home sanitation ($r = .250$) were identified.

The motor functioning subdomain of adaptive behaviour correlates significantly with the following SES domains: education ($r = .268$), occupation ($r = .274$), family

Table 1 Sex difference regarding adaptive behaviour

Domains of the VABS	Sex	Mean (SD)	Test of sig.	
			T	p
Communication	Males	28.87 (10.84)	.001	.999
	Females	28.87 (12.43)		
Daily living skills	Males	45.90 (8.48)	.213	.832
	Females	46.35 (8.88)		
Socialization	Males	48.88 (10.95)	1.094	.281
	Females	51.78 (10.99)		
Motor skills	Males	44.99 (10.23)	1.236	.225
	Females	48.26 (11.21)		

Table 2 Age difference in relation to domains of adaptive functioning

Domains of the VABS	Age	Mean	SD	Test of sig.	
				F	p
Communication	3 years	44.29	5.76	28.727	< .001
	4 years	22.26	9.96		
	5 years	27.55	7.24		
	6 years	29.25	5.26		
Daily living skills	3 years	58.71	7.09	34.030	< .001
	4 years	42.79	6.98		
	5 years	44.23	4.13		
	6 years	39.63	2.39		
Socialization	3 years	53.94	11.55	23.079	< .001
	4 years	41.44	9.22		
	5 years	57.58	5.03		
	6 years	44.38	5.78		
Motor skills	3 years	62.47	6.00	41.925	< .001
	4 years	41.24	7.30		
	5 years	42.87	6.68		
	6 years	41.38	6.86		

Table 3 Correlation between adaptive functioning and domains of socioeconomic status of studied children

		Communication	Daily living skills	socialization	Motor skills
Education	r	.096	.394	.355	.268
Occupation	r	.173	.318	.287	.274
Family	r	− .148	.158	.247	.077
Family Possessions	r	− .046	.290	.282	.232
Economic	r	− .045	.193	.176	.195
Home Sanitation	r	− .049	.238	.250	.129
Health care	r	.262	.403	.163	.291

possessions ($r = .232$), economic ($r = .195$) and health care ($r = .291$) (Table 3).

High socioeconomic status correlates with higher adaptive functioning in daily living skills, socialisation and motor skills domains of adaptive behaviour (Table 4).

Discussion

The current study sought to determine the socioeconomic and demographic factors that are associated with adaptive behaviour among children diagnosed with autism spectrum disorder in Egypt before undergoing behavioural of pharmacological treatments.

Despite the absence of cognitive impairment in the current sample, findings reveal decline in adaptive behaviour domains in older children compared to younger children which is similar to other findings [20, 21]. Considering that all children in the current study are newly diagnosed

Table 4 Differences of adaptive functioning related to socioeconomic levels of children

Domains of the VABS		Mean	SD	Test of sig.	
				F	P
Communication	Very low	29.22	8.96	.404	.750
	Low	27.80	10.34		
	Moderate	27.73	9.58		
	High	31.05	15.80		
Daily living skills	Very low	42.57	10.23	6.098	.001
	Low	44.32	6.63		
	Moderate	45.82	6.57		
	High	52.30	7.54		
Socialization	Very low	43.35	10.89	4.756	.004
	Low	49.00	11.13		
	Moderate	53.36	9.41		
	High	53.50	9.57		
Motor skills	Very low	42.70	11.75	2.756	.047
	Low	43.60	8.19		
	Moderate	47.18	10.23		
	High	50.70	10.64		

with ASD, this result presents implications for early diagnosis and intervention research for children with ASD particularly among families living in low and very low socioeconomic status that is the case of the current sample.

The statistical correlation detected in the current study between adaptive behaviour and SES is consistent with Pickard and Ingersoll [22]. Children who live in high SES are more likely to receive earlier diagnosis than those from lower SES and may benefit from some privileges like access to social and sport clubs which may influence domains of adaptive behaviour.

The current study reported positive correlation between domains of adaptive behaviour and some domains of SES. The correlation may be linked to social determinants of health. Variability in parents' education, income, occupation and home sanitary conditions may influence access and utilization of health services, views and engagement in treatment [23]. The restricted governmental resources offered to children with ASD in Egypt add high burden on families of children with ASD. Nearly 83.3 to 91.3% of people with ASD in Egypt reside with their families even during their adult life [24].

The implication of the current study is translating its findings alongside larger epidemiological studies into policy action to broaden clinical perspectives. Considering the social context of children with or at risk for ASD in Egypt will inform stakeholders about the changes that need to be made in every situational context [25].

Conclusions

The current study reported correlations between domains of adaptive behaviour and domains of the socioeconomic status of families of children diagnosed with autism spectrum disorder. Interventions targeting adaptive behaviour could be tackling such social determinants of health.

Limitations of the study

The small sample size in the current study that is likely to influence generalisation, the single setting of data recruitment and the reporting bias (caregivers' reports only) as data was based solely on caregivers' reports which are limitations of the current study.

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