Inequality in School Readiness and Autism among 6-Year-Old Children across Iranian Provinces: National Health Assessment Survey Results

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Abstract

Objective: To assess the national inequality of school readiness and autism among 6-year-old Iranian children before school entry using a national health assessment survey.

Methods: In a cross-sectional nationwide survey, all Iranian children entering public and private elementary schools were asked to participate in a mandatory national screening program in Iran in 2009 in two levels of screening and diagnostic levels.

Findings: The study population consisted of 955388 children (48.5% girls and 76.1% urban residents). Of the whole children, 3.1% of the 6-year-old children had impaired vision. In addition, 1.2, 1.8, 1.4, 7.6, 0.08, 10, 10.9, 56.7, 0.7, 0.8 and 0.6 percent had color blindness, hearing impaired, speech disorder, school readiness, autism, height to age retardation, body mass index extremes, decayed teeth, disease with special needs, spinal disorders, and hypertension, respectively. The distribution of these disorders was unequally distributed across provinces.

Conclusion: Our results confirmed that there is an inequality in distribution of school readiness and autism in 6-year-old children across Iranian provinces. The observed burden of these distributions among young children needs a comprehensive national policy with evidence-based province programs to identify the reason for different inequality among provinces.

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Key Words: National Health Assessment Survey; School Readiness; Autism; Children; Inequality; Iran

Introduction

Representative and valid information at the population level is essential for health planning and priority setting for interventions to control diseases, and for population-based evaluation of health programs[1]. National representative studies may help to have a view on these health concerns at national and regional levels. These national health surveys might prepare reliable information for policy making[1-9].

Autism prevalence is not the same in different countries, for example the prevalence of autism-spectrum disorders (ASDs) in the UK is 1

percent[10] but 8.0 per 1000 (among 4-year-old) and 7.0 per 1000 among 8-year-olds in South Carolina[11]. Children with ASDs have at least as many comorbidities as individuals with typical development may show, but sometimes with different presentations[12]. Those children who show disproportionate difficulty with the pragmatic as compared to the structural aspects of language are described as having pragmatic language impairment (PLI) or social communication disorder (SCD); among them, some who have PLI also show mild social impairments associated with high-functioning autism or ASD[13]. The impairments in social cognition and social skill that characterize autism spectrum disorder extend in milder forms to the broad autism phenotype in the general population and suggest a framework for understanding how social broad autism phenotype traits may manifest in diminished social ability[14]. In addition, children with average development, both with and without autism, had lower adaptive skills than expected for their developmental level[15]. On the other hand, mothers of children with autism report higher levels of depression than mothers of children with other developmental disabilities[16]. Research has shown that a 20-week parent education program including skills training for parents of young children with autistic disorder provides significant improvements in child adaptive behavior and symptoms of autism for low-functioning children[17]. Therefore, it is important to find these children as soon as possible, especially at pre-school ages.

Although, there are some Iranian health surveys available, most of which have been limited to one city and thus their results could not be generalizable to the whole country[18-20]; however, there are also some national studies which have considered all Iranian provinces[21-23]. Some of these studied only adult people[24-27] or only on special diseases such as childhood dental problems[28] or overweight and obesity[21,22,29]. Moreover, developing countries including Iran are facing with epidemiologic transition in disease and nutritional patterns [30], which in turn would raise the necessity for conducting a representative and comprehensive national health survey. Since Iran is a big country, taking into account the great diversity in socioeconomic and demographic factors in different provinces, it is expected to observe a substantial inequality in disease and disorder distribution across Iranian provinces. The aim of this study was to assess the potential national inequality of school readiness and autism in 6-year-old Iranian children before school entry across Iranian provinces using national health assessment survey.

Subjects and Methods

The data were collected as a nationwide screening program. This program is regularly performed by the Ministry of Health and Medical Education and the Ministry of Education and Training among all children entering elementary schools. The number of health employees who helped to conduct this survey was 5582 health workers through Iran in health centers. All Iranian children entering elementary school were studied. As elementary education in Iran is mandatory; thus the study population comprised all children entering public and private elementary schools. During summer 2009 (for three months), in 823 centers and 712 cities and regions, 955388 Iranian children entering elementary schools have been assessed physically and mentally by 5582 skilled health care staff.

The assessment had two levels: introductory (screening) and diagnostic levels. In the first level, probable diseases and disorders have been screened (in 13 different aspects) and potential patients were sent to verify their possible problems in the second level. The diagnosed patients then were referred to specialists for further treatment and some advices were given to their parents. Ethical committee of Iranian Health Ministry has approved this survey with regard to ethical considerations. The national Data and Safety Monitoring Board closely supervised the quality control and quality assurance of each survey. At first, the data-checking process was conducted at the provinces every week and then at national level monthly. The analysis has been done after editing.

Table 1: Main characteristics of national health assessment survey on Iranian
6-year-old children before entering school in 2009

Characteristics		Number (%)
Health employees		5582(-)
Children	Girl	463076 (48.5)
	Boy	484891 (50.8)
Residence	Urban	727309 (76.1)
	Rural	210997 (22.1)
Health insurance	Yes	714955 (74.8)
	No	233755 (24.5)
Home Language*	One	673812 (70.5)
	Two	273708 (28.6)
Having previous education		722977 (75.7)
Vaccination	Complete	817995 (85.6)
	Incomplete	110234 (11.5)
Extra/specific examination	Not necessary	757950 (79.3)
	Necessary	26702 (2.8)
	Unknown	170736 (17.9)
Referred to specialists		146790 (15.4)
Referred to special schools		4661 (0.5)

*Two languages (Farsi and Turkish/Kurdish)

Overall health assessment, primary assessment (impaired vision, color blindness, hearing impaired and autism), school readiness assessment include current problems with potential reasons (low score, no corporation, higher age, insufficient language understanding, sensorimotor disorders and others), expert evaluation result (normal, unapt, confidential refer to school, be trainable, test/temporary, re-evaluation, refer to special school), combinations of disabilities (refer to normal/special school or re-evaluation) include visual-hearing, visual-school readiness, hearing-school readiness, and visual-hearing-school readiness disorders, autism's expert evaluation normal, confidential refer to normal/special school and autistic), mental illnesses (diagnosed or suspected) include severe mental disorder, mild mental disorder, epilepsy, mental retardation and other mental illnesses, and psychology results include separation anxiety disorder, mood disorder, hyperactivity and attention deficit disorder, epilepsy, conduct disorder and obsession disorder were the considered health problems which were taken into account by general practitioner.

The children have been referred to specialists to give the readiness score available. The specialists have taken into account overall assessment scores by sex, preschool education,

father's and mother's education (illiterate, reading and writing, primary school, high school, diploma, associate degree, BSc, MSc, and above), father's occupation (unemployed, dead, employed and retired), mother's occupation (dead, housekeeper, retired and employed), number of family members (from 2 to 9 and more), parity number (from 1 to 8 and more) and residency.

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software package version 18.0 (SPSS Inc., Chicago, IL, USA).

Findings

Main characteristics of national health assessment survey on Iranian 6-year old children before entering school in 2009 are shown in Table 1. Of 955388 Iranian children aged 6 years, 50.8% were boys, 76.1% lived in urban area, 24.5% didn't have health insurance, 28.6% spoke two languages (Farsi and Turkish/Kurdish) at home, 11.5% did not complete their vaccination, 2.8% of children needed extra/specific examinations, 15.4% were referred to specialists and 0.5% had to go to special schools.

Table 2 demonstrates the main characteristics

Table 2: Main characteristics of school readiness and autism among Iranian 6-year-old children before entering school in national health assessment survey in 2009

Disease/ Disorder			Number (%)
Overall primarily assessment		Healthy	809593 (84.7)
		With disease/disorder	39859 (4.2)
		Unknown	105936 (11.1)
Primary assessment		Impaired vision	29874 (3.1)
		Color blindness	11243 (1.2)
		Impaired hearing	16821 (1.8)
		Speech problems	13586 (1.4)
		Autism	788 (0.08)
School readiness assessment	**Having problems**		72605 (7.6)
	Potential reasons	Low score	46556 (4.9)
		No corporation	6339 (0.7)
		Higher age	10308 (1.1)
		Insufficient language understanding	1360 (0.1)
		Sensorimotor disorder	835 (0.1)
		Others	3463 (0.4)
	Expert evaluation result	Normal	22061 (2.31)
		Unapt	23104 (2.42)
		Confidential refer to school	13356 (1.40)
		Is trainable	3048 (0.32)
		Test/temporary	1007 (0.11)
		Re-evaluation	588 (0.06)
		Referred to special school	156 (0.02)
Disability combination	**Visual-hearing disorder**	Referred to normal school	975 (7.7)
		Referred to special school	73 (0.6)
	Visual-school readiness disorder	Referred to normal school	4642 (36.6)
		Referred to special school	1146 (9.0)
		Re-evaluation	337 (2.7)
	Hearing-school readiness disorder	Referred to normal school	2333 (18.3)
		Referred to special school	450 (3.5)
		Re-evaluation	92 (0.7)
	Visual-hearing-school readiness disorder	Referred to normal school	1062 (8.4)
		Referred to special school	1087 (8.6)
		Re-evaluation	397 (3.1)
Autism's expert evaluation		Normal	177 (0.02)
		Confidential refer to normal school	236 (0.01)
		Temporarily sent to special school	70 (0.02)
		Autistic	226 (0.07)
Mental illnesses (Diagnosed)		Severe mental disorder	2189 (0.2)
		Mild mental disorder	797 (0.1)
		Epilepsy	203 (<0.1)
		Intellectual disability	655 (0.1)
		Other mental illnesses	4258 (0.4)
Mental illnesses (Suspected)		Severe mental disorder	1110 (0.1)
		Mild mental disorder	433 (< 0.1)
		Epilepsy	219 (<0.1)
		Intellectual disability	99 (< 0.1)
		Other mental illnesses	3328 (0.3)
Psychology result		Separation anxiety disorder	3836 (0.4)
		Mood disorder	762 (0.1)
		Hyperactivity and attention deficit disorder	1123 (0.1)
		Epilepsy	162 (< 0.1)
		Conduct disorder	502 (0.1)
		Obsession disorder	469 (< 0.1)

of school readiness and autism of these children. Of these children, 39859 (4.2%) had a disease or disorder. In addition, 3.1, 1.2, 1.8, 1.4 and 0.08 percent showed impaired vision, color blindness, impaired hearing, speech problems and autism, respectively. Of them, 72605 (7.6%) children had problems with their school readiness assessment, mainly due to low score (46556 or 4.9%). Based

on expert's opinion, 23104 (2.42%) were unapt. There were different combinations of disabilities some of which have been sent to normal or special schools. Autism was diagnosed in 226 (0.07%) children. For diagnosed mental illnesses, 2189 (0.2%) of children had severe mental illnesses. This figure was 1110 (0.1%) for suspected mental illnesses. Psychology result showed that separation anxiety disorder is the main disorder among others with 3836 (0.4%).

Table 3 demonstrates the relationship between school readiness and other characteristics among Iranian population of 6-year olds entering primary school. The mean score of school readiness was

Table 3: The relationship between school readiness and other characteristics among Iranian 6-year-old children before entering school in national health assessment survey in 2009

Characteristic vs school readiness		Mean	*P*-value
Sex	Girl	35.38	<0.0001
	Boy	35.10	
Preschool education	Yes	35.70	<0.0001
	No	33.64	
Father's education	Illiterate	32.53	<0.0001
	Reading and writing	32.86	
	Primary school	33.74	
	High school	34.97	
	Diploma	36.31	
	Associate degree	36.85	
	BSc	37.63	
	MSc and above	38.51	
Mother's education	Illiterate	32.72	<0.0001
	Reading and writing	33.16	
	Primary school	33.86	
	High school	35.16	
	Diploma	36.59	
	Associate degree	37.37	
	BSc	37.97	
	MSc. and above	39.13	
Father's occupation	Unemployed	33.30	<0.0001
	Dead	34.67	
	Employed	35.33	
	Retired	35.68	
Mother's occupation	Dead	34.29	<0.0001
	Housekeeper	35.01	
	Retired	37.06	
	Employed	37.53	
Number of family members	9 and more	32.80	<0.0001 (others) 0.8 (2, 4)
	8	33.23	
	7	33.53	
	6	34.00	
	5	34.70	
	2	35.43	
	4	35.51	
	3	36.18	
Parity number	8 and more	32.71	<0.0001
	7	32.94	
	6	33.21	
	5	33.66	
	4	34.06	
	3	34.70	
	2	35.40	
	1	35.67	
Residency	Urban	35.90	<0.0001
	Rural	32.95	

higher among girls, children with preschool education, children with fathers and mothers ofhigher education, less crowded families, less parity number and urban children (*P*<0.0001).

Discussion

To the best of our knowledge, the present study is one of the first Iranian reports providing information on inequality of school readiness and autism from the entire population of children at school entry. We confirmed substantial differences in the regional distribution of diseases and disorders across Iranian provinces[29,31-34].

Since various socioeconomic groups are living in different provinces and therefore the observed differences among provinces on children disorders and diseases cannot be fully explained by the socioeconomic pattern of each province, and this study has not documented the socioeconomic determinants of growth in Iranian 6-year-old children at school entry. As an obvious assumption, it seems to be logical to say that the provinces with more prevalence of diseases/disorders were economically deprived; however, this prevalence was low in other provinces with a similar socioeconomic situation.

The irregularity in distribution of diseases/disorders across Iranian provinces does not follow the socioeconomic distribution. It means that there is a considerable inequality in the distribution pattern of diseases/disorders. The first explanation for this inequality would be different nutritional and economical patterns among Iranian provinces; however, because in recent decades, Iran has had a remarkable improvement in maternal and child nutritional status[3], the role of other determinants such as the different pattern of micronutrient distribution across Iran might be more important; in other words, it might be due to recent global economic crisis which could affect the accessibility to enough and necessary amount of foods for Iranian families.

Another explanation for the observed inequality might be the ethnic differences. The populations of various Iranian provinces have their own ethnic distribution. However, these differences are more socioeconomic-related than ethnic differences, because even in provinces with a mixture of ethnic groups, the distribution of observed diseases/disorders is similar to the pattern of provinces with special ethnic groups.

The most important strength of our study is its nationwide coverage of all school-entry children. Another strength is reporting of disease/disorder patterns of children across Iranian provinces. There is also the benefit of using inference statistics; i.e. despite the descriptiveness of previous national health assessments on these children, this study also considered inferential statistics. However, the study had also some limitations. The main limitation of this study is its cross-sectional nature. In addition, due to very large sample size of the study population, it was not possible to document details of socioeconomic and lifestyle determinants of Iranian children entering school.

Conclusion

The high inequality in the distribution of school readiness and autism among 6-year old children across Iranian provinces is confirmed in this study. These results will raise the necessity of a comprehensive surveillance system and a centralized data registry for Iranian children. Given the variation of growth disorders across different Iranian provinces, information on local circumstances as well as dietary and physical activity patterns of children is essential for policy making at national level.

Conflict of Interest: None

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