

Prevalence study of clinical disorders in 6-year-old children across Iranian provinces: Findings of Iranian national health assessment survey

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Objective: To assess the national prevalence of clinical disorders in 6-year-old Iranian children before school entry using a national health assessment survey. **Materials and 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. **Results:** The study population consisted of 955388 children (48.5% girls and 76.1% urban). Of the whole children, 3.1% of the 6-year-old children had impaired vision. In addition, 1.2, 1.8, 1.4, 10, 10.9, 56.7, 0.7, 0.8 and 0.6% had color blindness, hearing impaired, speech disorder, height to age retardation, body mass index extremes, decayed teeth, having disease with special needs, spinal disorders, and hypertension, respectively. The distribution of these disorders was unequally distributed across provinces. **Conclusions:** Our results confirmed that the prevalence of clinical disorders among 6-year-old children across Iranian provinces was not similar. 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 distribution among provinces.

Key words: Children, clinical symptoms, Iran, national health assessment survey, prevalence

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 us to have a view on these health concerns at national and regional levels. There have been conducted many national health surveys worldwide to prepare reliable information for policy making.^[1-9]

Although, there are some Iranian health surveys available, which most of these previous studies have been limited to one city and thus their results could not be generalizable to the whole country;^[10-12] however, there are also some national studies which have been

considered all Iranian provinces.^[13-15] Some of these studies were only on adult people^[16-19] or only on special disease such as childhood dental problems^[20] or overweight and obesity.^[13,14,21] Moreover, developing countries including Iran are facing with epidemiologic transition in disease and nutritional patterns^[22] 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 is to assess the potential difference of national prevalence distribution of clinical disorders distribution among 6-year-old Iranian children before school entry across Iranian provinces using national health assessment survey.

MATERIALS AND METHODS

The data were collected as a nationwide screening program in a cross-sectional study. 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.

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All Iranian children entering elementary school were studied. As in Iran, elementary education 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 concerns have been considered by the aforementioned ministries. 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.

Training sessions were organized for health-care providers who measured children's weight and height according to standard protocols by using calibrated instruments. Body mass index (BMI) was computed as weight in kilograms divided by the square of height in meters. In all surveys, the growth charts of the Centers for Disease Control and Prevention were used,^[23] which are in close agreement with Iranian charts.^[14]

Overall health assessment, impaired vision (negative, positive, no corporation and unknown), color blindness (negative, positive, unknown), hearing impaired (negative, positive, no corporation and unknown), speech problems (negative, positive and unknown), appearance situation (anemic, cyanosed and edema), skin and hair (scabies and scalp ringworm), glands (hyperthyroidism and enlarged lymph nodes), eye problems, ear problems, deviated nasal, abnormal mucosa, adenoid, abnormality in height to age ratio and BMI, decayed teeth, having disease with special need for surveillance, hypertension (systolic: <70 and 120+, and diastolic: <20 and 100+), spinal situation (spinal disorders, kyphosis, lordosis, scoliosis, walking abnormalities and flat feet), abdomen (abdominal mass, enlarged spleen, hepatomegaly and hernia), chest (cardiovascular, thorax and lung diseases), genitourinary (genital ambiguity, undescended testicles, hernia, hydrosol and renal diseases), neurologic problems and puberty (precocious and delayed) were the considered health problems which were taken into account by general practitioner.

The children with potential disorders have been referred to specialists. The specialists have taken into account overall assessment (healthy or ill), vision examination (no problem,

no glasses needed for now, glasses needed, amblyopia, medication-surgery supervision, vision-aid instrument (sent to normal school), vision-aid instrument (sent to special school) and blind), hearing examination (no problem, duct collapse, medical treatment, ear wash, one-sided ear problem, problem in one or two frequency, problem in low frequency, hearing-aid instrument (sent to normal school), hearing-aid instrument (sent to special school) and deaf), having both vision and hearing problems (sent to normal or special schools), dermal problems (head lice and scalp ringworm), dental problems (decayed, missed and filled teeth and gingivitis), special diseases (diabetes mellitus, cardiovascular diseases, epilepsy, asthma, hemophilia and Thalassemia), positive family history (diabetes mellitus, hypertension, smoking, atherosclerosis, tuberculosis, asthma, hemophilia, Thalassemia, seizure disorder, mental disorders and others), positive personal history (diabetes mellitus, hypertension, atherosclerosis, tuberculosis, asthma, hemophilia, Thalassemia, seizure disorder, mental disorders and others), need for special surveillance (no, yes and unknown), medication use history (no, yes and unknown) and sensitivity history (no, yes and unknown).

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software package version 18.0 (SPSS Inc., Chicago, IL, USA). The absolute and relative frequencies of variables were obtained and demonstrated in Tables 1-3.

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

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)
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)
Refer to specialists	146790 (15.4)
Refer to special schools	4661 (0.5)

^{*}Some sum of percentages is not 100% due to unknown data

Table 2: Main clinical disorders of national health assessment survey at primary assessment among Iranian 6-year- old children before entering school

Disease/disorder	Number (%) [*]
Overall primarily assessment	
Healthy	809593 (84.7)
With disease/disorder	39859 (4.2)
Unknown	105936 (11.1)
Impaired vision	
Negative	912931 (95.6)
Positive	29874 (3.1)
No corporation	4544 (0.5)
Unknown	8039 (0.8)
Color blindness	
Negative	028231 (97.2)
Positive	11243 (1.2)
Unknown	15914 (1.7)
Hearing impaired	
Negative	926505 (97.0)
Positive	16821 (1.8)
No corporation	3523 (0.4)
Unknown	8539 (0.9)
Speech problems	
Negative	219957 (95.9)
Positive	13586 (1.4)
Unknown	25845 (2.7)
Clinical assessment results	
Appearance situation	
Anemic	3618 (3.3)
Cyanosed	176 (<0.1)
Edema	229 (<0.1)
Skin and hair	
Scabies	470 (<0.1)
Scalp ringworm	354 (<0.1)
Glands	
Hyperthyroidism	2670 (0.3)
Enlarged lymph nodes	2824 (0.3)
Eye problems	5447 (0.6)
Ear problems	5398 (0.6)
Deviated nasal	1130 (0.1)
Abnormal mucosa	1339 (0.1)
Adenoid	9271 (1.0)
Height to age ratio (abnormality)	95587 (10)
Body mass index (BMI) abnormality	104161 (10.9)
Decayed teeth	541971 (56.7)
Having disease with special surveillance	6798 (0.7)
Problems in hair, skin, glands, and E. N. T	60926 (6.4)
Hypertension	5613 (0.6)
Systolic pressure	
<70	3993 (0.4)
120+	504 (0.1)
Diastolic pressure	
<20	493 (0.1)
100+	623 (0.1)
Spinal situation	
Spinal disorders	8045 (0.8)
Kyphosis	230 (<0.1)

Table 2: cond...

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Disease/disorder	Number (%) [*]
Lordosis	630 (0.1)
Scoliosis	433 (<0.1)
Walking abnormalities	1332 (0.1)
Flat feet	5420 (0.6)
Abdomen	
Abdominal mass	187 (< 0.1)
Enlarged spleen	214 (< 0.1)
Hepatomegaly	143 (< 0.1)
Hernia	1060 (0.1)
Chest	
Cardiovascular	4269 (0.4)
Thorax	800 (0.1)
Lung	1496 (0.2)
Genitourinary	
Genital ambiguity	278 (< 0.1)
Undescended testicles	2261 (0.2)
Hernia	762 (0.1)
Hydrosol	470 (< 0.1)
Renal	1418 (0.1)
Neurology	1829 (0.2)
Puberty	
Precocious	952 (0.1)
Delayed	193 (< 0.1)

*Some sum of percentages is not 100% due to unknown data

RESULTS

Main characteristics of national health assessment survey on Iranian 6-year old children before entering school in 2009 are shown in Table 1. The number of health employees who helped to conduct this survey was 5582 health works through Iran. Of 955388 Iranian children aged 6-year old, 463076 (48.5%) children were girls, 727309 (76.1%) lived in urban area, 233755 (24.5%) did not have health insurance, 237808 (28.6%) spoke two languages at home, 110234 (11.5%) did not complete their vaccination, 146790 (15.4%) children were referred to specialists and 0.5% had to go to special schools.

Table 2 demonstrates the main clinical symptoms of these children reported by general practitioners. Of these children, 809593 (84.7%) were healthy. In addition, 3.1, 1.2, 1.8 and 1.4% had impaired vision, color blindness, hearing impaired and speech problems, respectively. Abnormalities in height to age ratio and body mass index (BMI) have been observed in 10.0 and 10.9% of Iranian children entering primary school, respectively. Furthermore, decayed teeth, having disease with special surveillance need, problems in hair – skin – glands - and ear – nose - and throat (ENT), spinal disorders and hypertension were observed in 56.7, 0.7, 6.4, 0.8, and 0.6% of Iranian children in 2009. Moreover, appearance of 3.3% of children was anemic, while only less than 0.1% of these children were cyanosed or edema, respectively. Less than 0.1% of children has showed scabies and scalp

Table 3: Main findings of specialists on clinical disorders of national health assessment survey among Iranian 6-year- old children before entering school

Disease/disorder	Number (%)`
Overall specialist assessment	
Healthy	51367 (5.4)
Ill	4533 (0.5)
Vision examination	
No problem	4435 (19.2)
No glasses needed for now	4350 (18.8)
Glasses needed	9300 (40.1)
Amblyopia	4202 (18.1)
Medication-surgery supervision	600 (2.6)
Vision-aid instrument (normal school)	172 (0.7)
Vision-aid instrument (special school)	79 (0.3)
Blind	35 (0.2)
Hearing examination	
No problem	3684 (26.9)
Duct collapse	1853 (13.5)
Medical treatment	2369 (17.3)
Ear wash	2196 (16.0)
One-sided ear problem	857 (6.3)
Problem in one or two frequency	1663 (12.1)
Problem in low frequency	636 (4.6)
Hearing aids (normal school)	254 (1.9)
Hearing aids (special school)	127 (0.9)
Deaf	69 (0.5)
Having both visual and hearing problems	
Sent to normal school	975 (7.7)
Sent to special school	73 (0.6)
Dermal problems	
Head lice	4201 (0.4)
Scalp ringworm	384 (<0.1)
Dental problems	
Decayed teeth	541971 (56.7)
Gingivitis	8604 (0.9)
Missed teeth	79100 (8.3)
Filled teeth	64229 (6.7)
Special diseases	
Diabetes mellitus	232 (<0.1)
Cardiovascular diseases	1304 (0.1)
Epilepsy	1111 (0.1)
Asthma	2424 (0.3)
Hemophilia	215 (<0.1)
Thalassemia	1512 (0.2)
Need for special surveillance	
No	796272 (83.3)
Yes	11756 (1.2)
Unknown	14736 (15.4)
Positive family history for	
Diabetes mellitus	8416 (0.9)
Hypertension	9354 (1.0)
Smoking	92216 (9.7)
Atherosclerosis	4508 (0.5)
Tuberculosis	240 (<0.1)
Asthma	4712 (0.5)

Table 3: cond...

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Disease/disorder	Number (%)`
Hemophilia	190 (<0.1)
Thalassemia	3796 (0.4)
Seizure disorder	2593 (0.3)
Mental disorder	5318 (0.6)
Others	19710 (2.1)
Positive personal history for	
Diabetes mellitus	320 (< 0.1)
Hypertension	199 (< 0.1)
Atherosclerosis	202 (< 0.1)
Tuberculosis	125 (< 0.1)
Asthma	3452 (0.4)
Hemophilia	210 (< 0.1)
Thalassemia	2260 (0.2)
Seizure disorder	4537 (0.5)
Mental disorder	2355 (0.2)
Others	10913 (1.1)
Medication use history	
No	789333 (82.6)
Yes	15545 (1.6)
Unknown	150510 (15.8)
Sensitivity history	
No	776634 (81.3)
Yes	28241 (3.0)
Unknown	150513 (15.8)

*Some sum of percentages is not 100% due to unknown data

ringworms. Hypothyroidism and enlarged lymph nodes were diagnosed in 0.3% of children. Eye, ear, deviated nasal, abnormal mucosa and adenoid were reported in 0.6, 0.6, 0.1, 0.1 and 1.0% of Iranian 6-year children. Hypertension was in 5613 (0.6%) of children, with 0.4, 0.1, 0.1 and 0.1% with systolic blood pressure less than 70 and above 120 mmHg, and diastolic blood pressure less than 20 and more than 100 mmHg, respectively. Spinal disorders were diagnosed in 8045 (0.8%) of children. Abdomen, chest, genitourinary and puberty disorders were reported in less than 1000 children.

Main clinical disorders found by specialists are presented in Table 3. Most of the children who have been sent to specialists were healthy. Many of the children needed glasses to have a better vision. There were also many hearing problems among these children. Some children had combination of visual and hearing problems. There was also head lice and scalp ringworm among Iranian 6-year-old children. Some special diseases such as diabetes mellitus, cardiovascular diseases have also been reported. For some of these diseases, there was a familial and/or personal history.

DISCUSSION

To the best of our knowledge, the present study is one of the first Iranian reports providing information on national prevalence of clinical disorders from the entire population of children at school entry. We confirmed substantial

differences in the regional distribution of diseases and disorders across Iranian provinces.^[21,24-27]

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, 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 the 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 big 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 it could affect on the accessibility of Iranian families to the enough and necessary amount of foods.

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 clinical symptoms' 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 some limitations, its cross-sectional nature being the most important one. 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 different prevalence distribution of clinical disorders among 6-year-old children across Iranian provinces has been 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.

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