

Spectrum of paediatric diseases in south Islamic Republic of Iran

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نوعيات أمراض الأطفال في جنوب جمهورية إيران الإسلامية
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خلاصة : تقدم هذه المقالة نتائج استعراض لأمراض الأطفال في العيادات الخارجية والأقسام الداخلية في جنوب جمهورية إيران الإسلامية . لقد وجد أن أعداد المرضى الذكور أكبر من أعداد الإناث في العيادات الخارجية والأقسام الداخلية على السواء (1:1.3 و 1:1.4 على التوالي) . وكان الرضع المرضى الذين زاروا عيادة الأطفال أكثر من المرضى في السن المدرسية وما قبلها وخاصة أثناء فصلي الربيع والصيف . كما كانت الأمراض المعدية أكثر عددا من غير المعدية ولاسيما في فصلي الخريف والشتاء ، وكان معظمها أمراضا فيروسية . وشكلت أمراض الجهاز التنفسي أكثر من نصف جميع أمراض الطفولة في العيادات الخارجية . وبلغت نسبة الرضع الذين أدخلوا المستشفى حوالي 45% من عدد الأطفال المقيولين . وكان نصف الأطفال المقيولين يمانون من فشل النمو ، بينما كان 3.5% من بينهم في حالة وخمة من سوء التغذية . وتبين أن الأمراض المعدية هي أكثر أمراض الأطفال انتشارا في المستشفى ، ومن بعدها في الترتيب الأورام الخبيثة ثم أمراض الدم .

ABSTRACT The results of an inpatient and outpatient review of paediatric diseases in the south of the Islamic Republic of Iran are presented. Male patients outnumbered females for both outpatients and inpatients (1.3:1 and 1.4:1 respectively). More sick infants than preschoolers or school-aged children visited the paediatrician's office, especially in spring and summer. Infectious diseases outnumbered noninfectious diseases, particularly in autumn and winter and consisted mostly of viral illnesses. Respiratory illnesses comprised more than half of all outpatient childhood diseases. About 45% of children admitted to hospital were infants. Half of the children admitted had failure to thrive and 3.5% were severely malnourished. Infectious diseases were the most prevalent paediatric disease in hospital, followed by neoplastic and blood diseases respectively.

Tableau des maladies pédiatriques dans le sud de la République islamique d'Iran

RESUME Les résultats d'une analyse des maladies pédiatriques dans les services de consultations externes et d'hospitalisation dans le sud de la République islamique d'Iran sont présentés dans cet article. Les enfants de sexe masculin étaient plus nombreux que ceux de sexe féminin, tant chez les malades ambulatoires que chez les malades hospitalisés (1,3:1 et 1,4:1 respectivement). Aux consultations de pédiatrie, il y avait plus de nourrissons malades que d'enfants d'âge préscolaire ou scolaire, surtout au printemps et en été. Il y avait plus de maladies infectieuses que de maladies non infectieuses surtout en automne et en hiver, et il s'agissait principalement d'affections virales. Les maladies respiratoires comprenaient plus de la moitié de l'ensemble des maladies de l'enfance chez les malades ambulatoires. Environ 45% des enfants hospitalisés étaient des nourrissons. La moitié de ces enfants hospitalisés présentait un état caractérisé par l'absence de développement et 3,5% étaient gravement malnutris. Les maladies infectieuses constituaient les maladies pédiatriques les plus fréquentes à l'hôpital, suivies par les tumeurs et les maladies du sang respectivement.

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Introduction

The health problems of children are different from those of adults and vary widely among the nations of the world. The assessment of the state of health of any community begins with a description of the incidence or prevalence of illness and continues with studies that show the changes that occur with time and in response to programmes of prevention, case finding, therapy and adequate surveillance [1].

The objective of this study was to examine the spectrum of paediatric diseases in the southern part of the Islamic Republic of Iran and explore the possible factors affecting the morbidity and mortality of Iranian children.

Materials and methods

The study was done in two parts. Part I included a comprehensive chart review of 2651 patients admitted to the paediatric wards of two Shiraz University Health Science hospitals (Nemazee and Ali-Asghar) during a three-year period between 1984 and 1988. Neonatal wards were not included.

Part II included 4848 children seen by the author in the Nemazee Hospital clinic from 1987 to March 1988. The relevant patient information, including data on follow-ups, patient demographic characteristics, presumptive and final diagnosis were recorded in an office book which served as a source of information for the outpatient data.

Results and discussion

Table 1 shows the common characteristics of inpatients versus outpatients. The male to female ratio was similar. Fewer infants, but more preschoolers, were seen in the clinic than in the hospital. The proportions were nearly similar for school-aged children. This accords with the fact that infants are the most vulnerable age group for diseases requiring hospitalization. On the other hand, school-aged and preschool children are more likely to have diseases which can be managed in the clinic. The age distribution of sick children in the Hoekelman study [2] is similar to ours with regard to infant and preschooler visits to the paediatrician's office, but higher for ado-

Table 1 Common characteristics of outpatients and inpatients

Characteristic	Outpatient		Inpatient	
	No.	%	No.	%
Male	1730	56.5	1576	59.4
Female	1328	43.4	1075	40.6
M:F	1.3:1		1.4:1	
Infancy (0-2 years)	1212	39.6	1197	45.2
Preschool (3-5 years)	881	28.8	599	22.6
School age (6-15 years)	953	31.2	852	32.1
>15 years	12	0.4	3	0.1
Total	3058		2651	

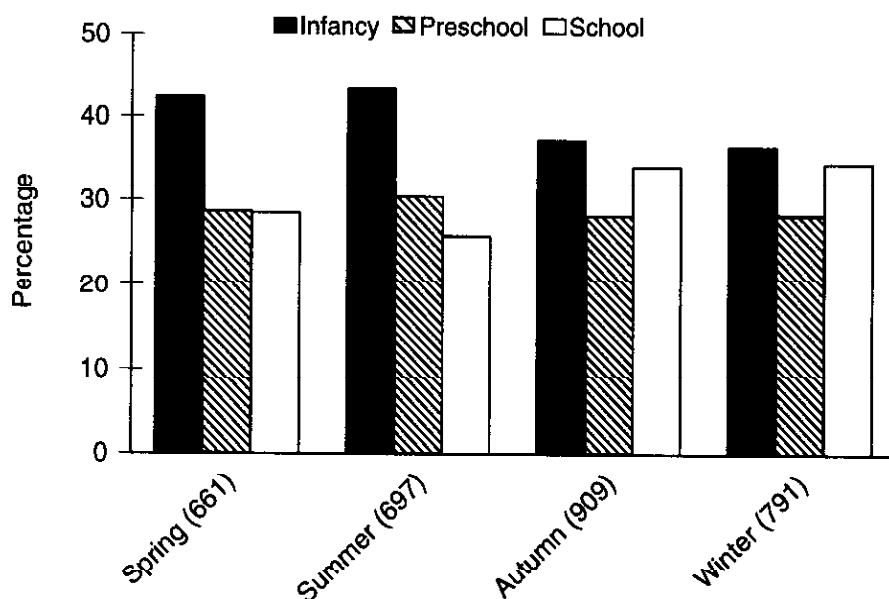


Figure 1 Seasonal distribution and age of outpatients (excluding those aged >15 years)

lescents and particularly for 15–19 year olds. This is because children over 15 years usually prefer to go to an internist rather than a paediatrician in our country.

Outpatient data

Of the 4848 children seen in the clinic, 1790 (37%) were referred for a check-up, vaccination or follow-up and 3058 (63%) were referred for a disease. Data from a 1981 national ambulatory medical care survey in the United States [3] showed that 54% of office visits to paediatricians were for follow-up care and 38% for problems presented by the patients. This differs from our finding that most of the office visits were for problems and diseases. Generally, primary well-care and preventive care are given through different health department clinics in Shiraz.

The seasonal distribution of sick children seen in the clinic is shown in Figure 1. More sick children were seen in the autumn than any other season. The proportion of patient visits in autumn and winter was 55.6% versus 44.4% in spring and summer. More infants were referred for their illnesses in warmer months than colder months, constituting 43% versus 36.9% of all clinic visits, respectively. School-aged children, on the other hand, were seen in the clinic more often in colder months than warmer ones (34% versus 27%) ($P < 0.01$).

During the study period, 3361 illnesses (disease conditions) were diagnosed in the clinic among the 3058 children. Figure 2 shows the seasonal distribution of the principal diagnoses in the clinic patients. Respiratory tract diseases were the most common presenting illnesses, comprising

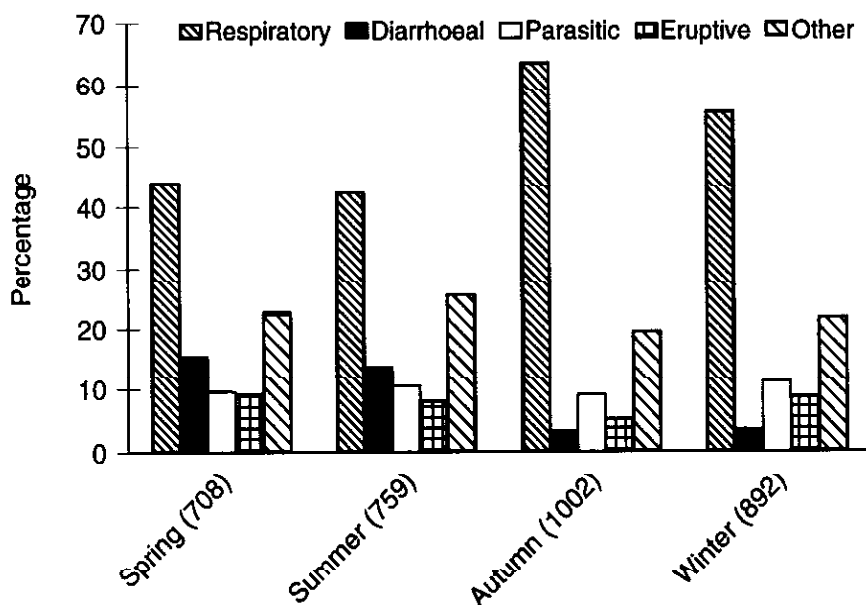


Figure 2 Seasonal distribution of outpatient paediatric disease conditions

53% of all outpatient diseases. The study by Hoekelman et al. in the United States [2] showed that upper and lower respiratory tract diseases are the principal diagnoses in ambulatory visits to the paediatrician's office (50%). In our study about 64% of respiratory diseases occurred in autumn and winter and 36% in spring and summer, with the highest incidence in November and the lowest in July and August.

Gastroenteritis comprised only 3.7% of all visits to the paediatrician's office in the United States [2] but comprised 8.3% of cases in our study. Early April is the time when childhood diarrhoeal diseases re-surge in Shiraz, reaching a peak in June and declining thereafter. The results showed that 77% of the cases occurred in spring and summer and 23% in autumn and winter. Pathogenic *Escherichia coli*, *Salmonella* and *Shigella* were the predominant

pathogens in warmer months (April–September); the majority of diarrhoeal diseases from October to March were presumably of a viral etiology. No significant seasonal distribution was noted with respect to parasitic, fungal and eruptive diseases. Figure 3 shows the monthly distribution of outpatient “infectious” versus “noninfectious” diseases. The results showed that 74.5% of all outpatient paediatric diseases were of infectious origin. The decline in the proportion of infectious diseases started in May and reached a minimum level (61.3%) by August and then started to rise in late September and peaked in December (82.7%). Noninfectious diseases, on the other hand, peaked in August and reached a minimum level by December.

The seasonal distribution of infectious diseases is shown in Figure 4. Viral infections predominated and comprised 45%

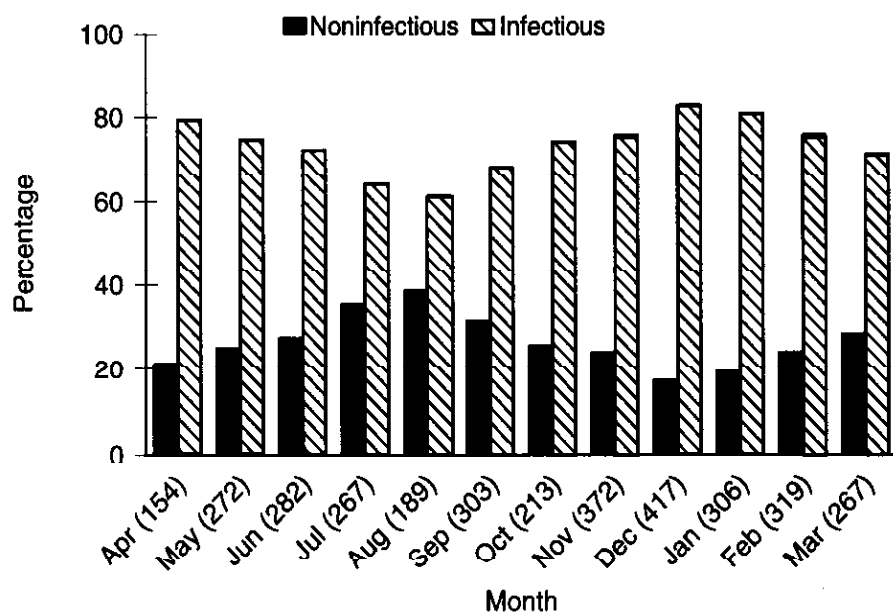


Figure 3 Monthly distribution of outpatient paediatric infectious and noninfectious diseases

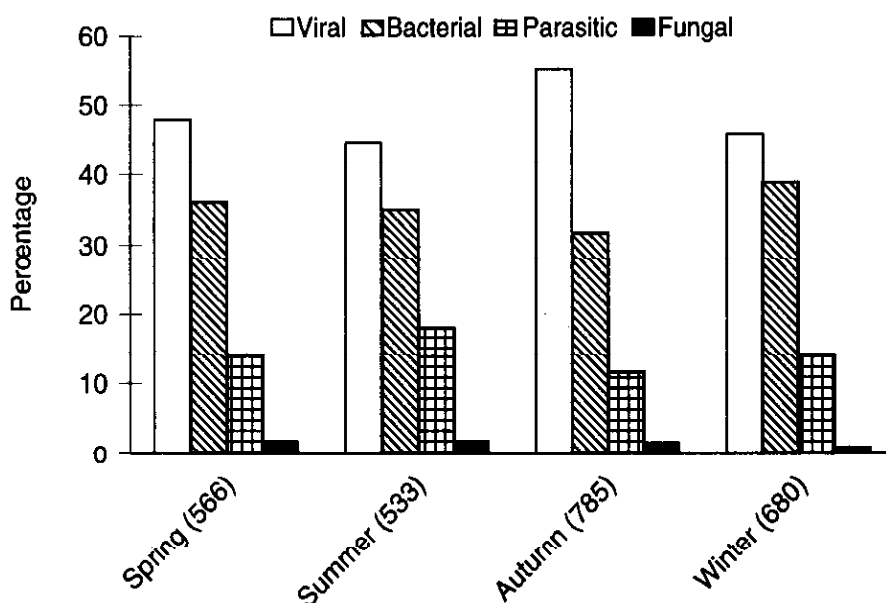


Figure 4 Seasonal distribution of outpatient paediatric infectious diseases

Table 2 Patients weighing on admission less than the fifth percentile of weight for their age

Hospital	1984-85 %	1986-87 %	1987-88 %	Total 1984-88 %
Nemazee	51.2	48.6	46.0	48.6
Ali-Asghar	54.5	48.4	51.0	51.3
Total	52.8	48.5	48.5	49.9

55% of infectious diseases year round. They peaked in autumn and reached a minimum level by February and March. Bacterial diseases fell to their lowest level in late September and early October and then peaked in February and March. Parasitic diseases were seen relatively more often in summer, and fungal infections were at a low level all year round.

Inpatient data

Table 2 shows patient weight on admission to the hospital. According to the National Centre for Health Statistics growth charts [4], about half of the patients weighed less than the 5th percentile of weight for their age, thus falling into the category of failure to thrive (FTT). In another study at this centre by Dr Amirhakimi, of 1520 patients, 68.5% weighed less than the 3rd percentile (personal communication).

Table 3 shows the systemic distribution of 3421 inpatient diseases according to the disease classification of the *Nelson textbook of pediatrics* [1].

Infectious diseases [$n = 1030$ (30.1%)] were the most common reason for admission to hospital. Respiratory, urinary, neoplastic and blood diseases comprised the next most common systemic illnesses in that order. If infectious diseases are extracted from other systemic illnesses and grouped together, the percentage of this

Table 3 Systemic distribution of inpatient diseases

Disease type	No.	%
Nutritional	108	3.2
Prenatal	17	0.5
Inborn errors of metabolism	21	0.6
Immunity, allergy and diseases of inflammation	123	3.6
Infectious diseases	1030	30.1 → 1562 (45.6)
Digestive	161	4.7 → 135 (3.9)
Respiratory	469	13.7 → 44 (1.2)
Cardiovascular	123	3.6 → 122 (3.5)
Blood	236	6.9
Neoplasm and neoplasm-like	243	7.1
Urinary	268	7.8 → 190 (5.5)
Endocrine	29	0.8
Metabolic	44	1.3
Neuromuscular	37	1.1
Skin	12	0.3 → 9 (0.2)
Bone and joints	16	0.4
Nervous	166	4.9
Poisoning	41	1.2
Nonspecific and others	189	5.5
Not diagnosed	88	2.6
Total	3421	100

→ Adjusted figures

group of diseases increases from 30.1% to 45.6%. With the extraction of infectious diseases from respiratory, urinary and gastrointestinal systems, the frequency of systemic diseases will be in the following order: infectious, neoplastic, blood, urinary, nervous and digestive.

Table 4 shows the most prevalent inpatient childhood illnesses. Pneumonia is the single most common disease requiring hospitalization, followed by kala-azar, meningitis, sepsis, anaemia, gastroenteritis, leukaemia, malnutrition, urinary tract infection, convulsive disorders and septic arthritis.

Nutritional disorders [n = 108 (3.2%)]

Malnutrition was the most common nutritional disorder, comprising 93 (86%) of the patients in this group (3.5% of all admissions), followed by rickets, zinc deficiency and vitamin K deficiency. Out of the 93 cases of malnutrition, 78 (84%) were infants and 15 (16%) were over 2 years of age. In other words, of the 1197 infants admitted, 78 (6.5%) had malnutrition, while only 15 (1%) of the children over 2 years of age were malnourished. In Dr Amirhakimi's study (mentioned before), 9.3% of children had severe malnutrition. His study showed different health, cultural, economic and social factors to be involved in predisposing a child to malnutrition. There is a historical synergism between infection and malnutrition [5] so that the infection compromises the child's nutrition, and malnutrition is associated with more severe and prolonged infection. This interaction is evident from this study, as half of our patients weighed less than the fifth percentile and 45.6% had infections.

Prenatal disturbances [n = 17 (0.5%)]

Down syndrome was the most common disorder of this group [14 (82%)].

Table 4 Inpatient paediatric diseases (n = 3421)

Disease	No. of cases	%
Pneumonia	379	16.0
Kala-azar	195	8.2
Meningitis	162	6.8
Sepsis	159	6.7
Anaemia	153	6.5
Gastroenteritis	152	6.4
Leukaemia	144	6.1
Malnutrition	93	3.9
Urinary tract infection	70	3.3
Convulsions	78	3.3
Septic arthritis	70	3.0
Lymphoma	61	2.6
Rheumatic fever	59	2.5
Nephritic syndrome	57	2.4
Congenital heart disease	51	2.2
Acute glomerulonephritis	48	2.0
Idiopathic thrombocytopenic purpura	43	1.8
Cirrhosis	38	1.6
Osteomyelitis	37	1.6
Congestive heart failure	35	1.5
Encephalitis	35	1.5
Cellulitis	33	1.4
Juvenile rheumatic arthritis	30	1.3
Guillain-Barré syndrome	29	1.2
Diabetes mellitus	29	1.2
Hepatitis	29	1.2
Abscesses	27	1.1
Chronic renal failure	23	1.0
Peritonitis	21	0.9
Typhoid fever	20	0.8
Total	2368	100.0
Other and undiagnosed	1053	30.8

*Inborn errors of metabolism**[n = 21 (0.6%)]*

Lipid and glycogen storage diseases (38% and 33% respectively) were the two most commonly diagnosed diseases of this group, followed by galactosaemia, porphyria and mucopolysaccharidosis.

Immunity, allergy and diseases of inflammation [n = 123 (3.6%)]

Acute rheumatic fever and juvenile rheumatoid arthritis were the two most common diseases of this group [59 (48%) and 30 (24%) respectively]. In North America, rheumatic fever, which was a rare disease in the sixties and seventies, reappeared in the mid-1980s [6-10]. Although our study also showed an increase in the number of cases of rheumatic fever from 13 to 21 and 25 cases in the three-year study period, the increase was not statistically significant. More than 95% of the cases of acute rheumatic fever involved the 5-15 year old age group. Seventy per cent (70%) of the cases were admitted in winter and spring and more than 50% from December to March. There was no significant change in the proportion due to arthritis during the study period, but that of carditis increased by 50%. The proportion due to chorea decreased from 23% in the first year to 8% in the third year. The occurrence of carditis in North America showed a significant rise in the 1980s. In one of the large studies, more than 80% of the patients had evidence of carditis [9]. There was a marked reduction in the proportion due to juvenile rheumatic arthritis during the study period, with no significant seasonal direction.

Anaphylactoid purpura, drug reactions, immunoglobulin deficiencies, Stevens-Johnson syndrome and systemic lupus erythematosus comprised the rest of the diseases of inflammation.

*Gastrointestinal diseases**[n = 161 (4.7%)]*

Excluding gastroenteritis, liver diseases were the most prevalent gastrointestinal disorders [92 (57%)], and cirrhosis of the liver was the most common liver disease. One of the most notable liver diseases was Wilson disease, comprising 17.8% of all liver diseases.

Respiratory diseases [n = 469 (13.7%)]

Pneumonia syndromes were the most common respiratory diseases requiring hospitalization [379 (81%)]. The number of cases of pneumonia increased sharply in November and December, continued at a steady level through to April and May and declined to their lowest level from July to September. Monthly and seasonal distribution of pneumonia was similar to the corresponding distribution of respiratory illnesses in the clinic all year round.

Cardiovascular diseases [n = 123 (3.6%)]

Congenital heart diseases were the most common cardiac diseases [51 (41.5%)], followed by congestive heart failure, hypertension, rheumatic heart disease and cardiomyopathy. Ventricular septal defect, tetralogy of Fallot and patent ductus arteriosus were the most commonly diagnosed congenital heart diseases in that order. With better use of echocardiography and cardiac angiography, the percentage of undiagnosed congenital heart diseases dropped from 45% in 1984 to 12.5% in 1988. Congenital heart diseases, β -thalassaemias and cardiomyopathies were the most common (77%) causes of congestive heart failure, followed by juvenile rheumatoid arthritis and hypertension. The cause of congestive heart failure remained unknown in 11.4% of the cases.

Diseases of the blood [n = 236 (6.9%)]

The frequency of blood diseases is shown in Table 5 and the frequency of the anaemias in Table 6.

Thalassaemias, and especially thalassaemia major, were the most common cause of inpatient anaemias (34%), fol-

Table 5 Frequency of diseases of the blood

Disease	No.	%
Anaemia	153	64.8
Idiopathic thrombocytopenic purpura	43	18.2
G6PD deficiency haemolysis	13	5.5
Haemophilia	9	3.8
Disseminated intravascular coagulation	5	2.1
Lymphadenitis	5	2.1
Spherocytosis	2	1.0
Others	6	2.5
Total	236	100

Table 6 Frequency of the types of anaemia

Type of anaemia	No.	%
Thalassaemia major	42	27.4
Iron deficiency	25	16.3
Aplastic	15	9.8
Haemolytic	9	5.9
Congenital	6	3.9
Sickle-cell	6	3.9
Sickle thalassaemia	5	3.3
Myelodysplastic	5	3.3
Megaloblastic	5	3.3
Thalassaemia minor	3	2.0
Thalassaemia intermedia	2	1.3
Sideroblastic	1	0.6
Unspecified	29	19.0
Total	153	100.0

lowed by iron deficiency, aplastic, haemolytic, congenital and sickle-cell anaemia. Currently, 8% of the population of Fars province are carriers for β -thalassaemia, and there are 1500 cases of thalassaemia major registered in Shiraz (personal communication from Dr M. Haghshenas, Haematologist, Department of Internal Medicine, Shiraz University of Medical Sciences).

Neoplastic and neoplastic-like diseases [n = 243 (7.1%)]

Leukaemia and lymphoma were the major neoplastic diseases of Iranian children, accounting for 84% of all neoplasms. The proportions due to neuroblastoma, Wilms tumour and retinoblastoma were 2.0%–5.7%. Central nervous system tumours, sarcomas and bone tumours were relatively rare and comprised about 2% of all childhood malignancies.

Acute lymphoblastic leukaemia (ALL) and acute and chronic myelogenous leukaemia comprised about 60% of Iranian childhood neoplastic diseases. Acute lymphoblastic leukaemia was the major type of leukaemia, comprising 84.7% of cases of leukaemia, followed by acute myelogenous leukaemia (14.6%). There was only one case (0.7%) of chronic myelogenous leukaemia. According to the French-American-British (FAB) classification, about two-thirds of the childhood leukaemias were of the L2 or L3 types, which have a poor prognosis.

Urogenital diseases [n = 268 (7.8%)]

Urinary tract infections were the most common disorder in this group, comprising 29% of all urogenital diseases. This was followed by nephritic syndrome, acute glomerulonephritis, chronic and acute renal failure and vesico-urethral reflux.

Endocrine disorders [n = 29 (0.8%)]

Congenital adrenal hyperplasia, hypothyroidism, hypoparathyroidism and diabetes insipidus together comprised 80% of the endocrine disorders.

Metabolic disorders [n = 44 (1.3%)]

Diabetes mellitus and its complications were the most common and important diseases of this group (95.5%).

Neuromuscular diseases [n = 37 (1.1%)]

The most prominent disease in this group was Guillain-Barré syndrome, comprising 29 cases (78.4%), followed by muscular dystrophy and Werdnig-Hoffmann disease (16.2% each). Three cases presented with paralysis of undetermined etiology.

Nervous system disorders

[n = 166 (4.9%)]

Idiopathic convulsions were the most common presenting central nervous system disease with unknown etiology (47% of the cases), followed by hydrocephalus, coma, anoxic brain damage, meningitis sequelae and cerebrovascular accident.

Poisoning [n = 41 (1.2%)]

Kerosene poisoning was the most common poisoning (41.5% of the cases), followed

by snake bite, scorpion bite and organophosphate and atropine poisoning.

Conclusion

The state of health of children in the southern part of the Islamic Republic of Iran was assessed with a description of the diseases both among inpatients and outpatients. This will be helpful to paediatricians and general practitioners in the country to have an idea of what the content of their practice might be; to health educators in planning the training programme curricula for paediatric primary care residency and fellowship; to health planners and legislators in making decisions regarding the number and distribution of paediatricians nationally, prevention measures, case finding, management, therapy and surveillance; and to world health authorities in making future plans for worldwide health control.

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References

1. Behrman RE. The field of pediatrics. In: *Nelson textbook of pediatrics*. Philadelphia, WB Saunders Company, 1992: 1-5.
2. Hoekelman RA et al. A profile of pediatric practice in the United States. *American journal of diseases of children*, 1983, 137(1):1057-60.
3. National Center for Health Statistics. *Patterns of ambulatory care in pediatrics: The National Ambulatory Medical Care Survey*, series 13, No.75. US Department of Health and Human Services, 1983.
4. Hamil PVV et al. NCHS growth charts, 1976. *Monthly vital statistics report*, 1976, 25(3):1.

5. Scrimshaw NS. Synergism of malnutrition and infection. Evidence from field studies in Guatemala. *Journal of the American Medical Association*, 1970, 212(10):1685-92.
6. Veasy LG et al. Resurgence of acute rheumatic fever in the intermountain area of the United States. *New England journal of medicine*, 1987, 316(8):421-7.
7. Kaplan EL, Hill HR. Return of rheumatic fever: consequences, implications and needs. *Journal of pediatrics*, 1987, 111(2):244-6.
8. Kavey RE, Kaplan EL. Resurgence of acute rheumatic fever [letter]. *Pediatrics*, 1989, 84(3):585-6.
9. Markowitz M, Kaplan EL. Reappearance of rheumatic fever. *Advances in pediatrics*, 1989, 36:39-65.
10. *Rheumatic fever and rheumatic heart disease. Report of a WHO study group*. Geneva, World Health Organization, 1988 (WHO Technical Report Series, No.764).

The WHO/UNICEF Integrated Management of Childhood Illness strategy provides a systematic process for diagnosing and treating five conditions: diarrhoea, acute respiratory infections, malnutrition (including problems with breast-feeding), measles and malaria, which together are responsible for approximately 70% of all child deaths. WHO provides technical support to national programmes and contributes to worldwide research aimed at the prevention and control of these problems.

Source: The World Health Report 1997. World Health Organization, Geneva.