# Functional Limitations Associated with Chronic Health Conditions Among School-Aged Children in Kayseri, Turkey

## Kayseri'de Okul Çağı Çocukları Arasında Kronik Sağlık Sorunlarına Bağlı Fonksiyonel Kısıtlılıklar

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**ABSTRACT Objective:** The aims of this study were to assess the prevalence of activity limitations in school age children with chronic health conditions/impairments and to determine the affecting factors in Kayseri, Turkey. **Material and Methods:** This cross-sectional study was conducted in Kayseri, Turkey, in 2006. A questionnaire was given to the parents of 4508 children aged 7-17 years, selected randomly from 20 primary schools out of 99. Disability was defined as a long-term inability in social role activities in normal function or school, due to a chronic physical or mental health condition during the previous year. **Results:** Out of 4508 children aged 7 to 17 years, 35.3% had one or more chronic health conditions while 3.7% had activity-limiting conditions. The rate of activity limitations was 9.2% in children with chronic health conditions, which was significantly higher than their healthy peers (0.8%). Activity-limiting conditions were higher in children with low-educated and low-income families. They were also more common in children with teeth and periodontal diseases, visual impairment, speech impediments and psychiatric/nervous problems. **Conclusion:** Activity-limiting conditions in school-aged children with chronic health conditions are major public health problems. Long-term chronic health conditions and bad family and environmental factors are significant risk factors for activity limitation. Targeting on prevention and rehabilitation efforts in such children and families may be an important way of decreasing the impact of chronic conditiens.

**Key Words:** Disabled children; chronic disease; social class

**ÖZET Amaç:** Bu çalışmanın amaçları Türkiye'de, Kayseri'de okul çağı çocukları arasında kronik sağlık sorunları/bozukluklarına bağlı aktivite kısıtlılıkları prevalansını ve etkileyen faktörleri değerlendirmektir. **Gereç ve Yöntemler:** Bu kesitsel çalışma 2006 yılında, Türkiye'de, Kayseri'de yürütüldü. Doksan dokuz ilköğretim okulundan 20'sinde rastgele seçilen 7-17 yaş arası 4508 çocuğun ebeveynine anket uygulandı. Kısıtlılık (özürlülük) bir önceki yıl süresince okul veya günlük hayattaki sosyal rol çerçevesindeki aktivitelerini kronik fiziksel ve mental sağlık sorunları nedeniyle yerine getirememe olarak tanımlandı. **Bulgular:** Yaşları 7 ile 17 arası değişen 4508 çocuktan %35.3'ünde bir veya daha fazla kronik sağlık sorunu varken %3.7'sinde aktivite kısıtlılığı bulundu. Kronik sağlık sorunu olan çocuklarda aktivite kısıtlılık oranı %9.2 olup, sağlıklı olan yaşıtlarına göre (%0.8) anlamlı düzeyde yüksekti. Aktivite kısıtlılık oranları eğitim düzeyi yetersiz ve düşük gelirli ailelerden gelen çocuklarda eğitim ve gelir düzeyi iyi aile çocuklarına göre daha yüksekti. Aktivite kısıtlılıkları aynı zamanda diş ve diş eti hastalıkları, görme, konuşma bozuklukları ve psikiyatrik/nörolojik problemleri olan çocuklar arasında daha yaygındı. **Sonuç:** Kronik sağlık sorunu olan okul çağı çocukları arasında aktivite kısıtlılığı önemli bir halk sağlığı sorunudur. Uzun süreli-kronik sağlık sorunları, ailesel ve çevresel etkenlerin bozuk olması aktivite kısıtlılığı için önemli risk faktörleridir. Böyle çocuklar ve ailelerine yönelik olarak koruyucu ve rehabilite edici önlemlere odaklanmak kronik sağlık sorunlarının etkisini azaltabilecek anlamlı bir yol olabilir.

**Anahtar Kelimeler:** Engelli çocuklar; kronik hastalık; sosyal sınıf

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According to International Classification of Functional (ICF), disability, which is actually considered "an umbrella term" for impairment, activity limitations, and participation restriction, is defined as a long-term reduction in ability to conduct social role activities in school or normal function, because of a chronic physical or mental condition.[1,2] The term health condition is used to represent diseases, disorders, injury, or trauma, aging, and congenital anomaly. Health conditions are considered chronic when they are long-term (at least a six-month period) or are of a permanent nature, which has interfered with daily functions during the last year. Impairments refer to anatomical, physiological, mental or emotional abnormalities that include deviations from generally accepted population standards in the biomedical status of the body and its function and can be temporary or permanent.[1] Impairments affect bodily functioning and are non-purposive or spontaneous in nature. Activity limitations are defined as the difficulties an individual may have in executing activities with an impact on purposeful functioning; that is, on activities performed for particular reasons. Activity limitations include, among others, functional difficulties related to self-care, domestic life, and major life areas.[1]

Several studies indicate that both the number and proportion of children with activity-limiting chronic health conditions have been increasing for many years.[3,4] Although this rapidly increasing population is defined to be not only "epidemic of survival", but also the possibilities for public health[5], chronic health conditions have a widely varying impact on the activity levels of school aged-children. Newacheck and Taylor[6] found that among 31% of US children under the age of 18 with chronic health conditions, only 13% had limitations in their usual activities. Cadman et al.[7] found that among 18% of Ontario children aged 4 to 16 with chronic physical health conditions/impairments, only 4% had limitations in functioning related to physical activity, mobility, self care, or a major life area. Mcdougall et al.[8] found that among 30.3% of Canadian children aged 6 to 11 had one or more chronic condition, 3.6% had activity-limiting conditions. Msall et al.[9] examined only the limitations and found that the prevalence of functional limitations was 12% and the prevalence of school activity limitations was 5.7%.

While many studies have examined the family, social and medical situations of children with specific health conditions and developmental disabilities, a few studies have been able to distinguish the relation between chronic health conditions, disability and family ecology.[10,11,12]

Although considerable research concerning the prevalence and impact of childhood chronic health conditions/impairments and disability has been conducted in developed countries, the number of such studies is limited in Turkey. Our purposes were: 1) to examine children with limitations in mobility, self-care, communication and learning in a large, regionally representative survey of school-aged children with disabilities, 2) to cover an important gap in Turkey by describing the chronic health conditions in relation to the prevalence of activity limitations, and 3) to determine factors associated with family ecology that may have lead to disabilities in school-aged children.

## MATERIAL AND METHODS

This cross-sectional study was conducted in Kayseri, Turkey, in 2006. Based on the fact that the rate of children with chronic health conditions in Turkey is accepted as 30%,[13] at the confidence interval of 95% with an alpha error of 0.05, beta error of 0.20, and effect size (d) of 0.06, the number of sample was estimated as 4104 children using means of NCSS (Statistical and Power Analysis Software-PASS).

Based on the information given by the authorities of the Directorate of National Education in Kayseri, 99 primary schools in Kayseri were stratified according to the socioeconomic levels of the families of the children as: wealthy, middle-class, and poor and with simple random sampling technique. Twenty primary schools, wealthy (7), middle-class (6) and poor (7) were included in the sample, 1/5 from each stratum. Out of the 20 schools, eight classes from each school - one class from

each grade (from 1st to 8th), which covered a total of 4847 school children aged 7 to 17 were selected.

A questionnaire was send to the families of the children it was answered by their parents, especially mother by the, and then it was brought to the schools by the children. In total, the parents of 4508 children answered the questionnaires. The response rate was 93%. The questionnaire included chronic health conditions/impairments defined as a chronic health condition diagnosed by a physician before, demographic and socioeconomic variables, activity-limiting conditions and participation restriction in school activities such as school absence days, school performance and grade repetition.

The conditions observed for at least six months were considered as chronic conditions. Chronic physical health conditions were identified using a checklist of conditions which was standard in population-based surveys for gathering information on the prevalence of specific chronic health conditions.[14] Respondents were asked if their child had any long-term conditions (defined as lasting longer than six months) diagnosed by a health professional. To enable a manageable analysis and presentation, reported 29 chronic health conditions emerged under three headings: chronic diseases, impairments, and emotional/behavioral disorders. Chronic diseases included teeth and periodontal disease, frequent or repeated infections, asthma, arthritis or rheumatism, skin diseases, and others such as digestive and immune system diseases, epilepsy, kidney disease, type-I diabetes, heart disease, neoplasms, endocrine disorders, blood disorders, severe headache, high blood pressure, hepatitis-B, and convulsive disorder. Other diseases were pooled because they were in low frequency. Impairments covered visual, hearing, speech, musculoskeletal, and mental disability. Emotional/behavioral disorders included urinary incontinence, tic disorder, depression and school phobia, and drug abuse.

In order to identify activity limitations global disability item, families were asked whether their children were limited or prevented from participating in activities at school, at home, or in any other age-appropriate activities due to a long-term condition or health problem.[15] If answer was yes; families were then asked what health problem their children suffered in order to determine activity limitation. Based on responses, activity-limitations were grouped as mobility, self-care, communication with the content parallel to the subdomains included within the ICF handbook[16] and as in many similar studies.[7,10,15-17] Mobility included being in need of help or supervision when going to school; self-care, needing help while eating, dressing and bathing; and communication, having difficulties in communicating with friends and teachers. These three distinct limitations were then gathered under functional activity limitations.

School performance, school attendance and grade repetitions were evaluated to attain impact of chronic conditions and activity limitations on aspects of children's school life. School performance was classified as poor, fair, and good, based on parents' responses.

Environmental factors are defined in the ICF framework as the physical, social and attitudinal environment in which people live and conduct their lives.[1] In this study, family ecology included parental education (having equal to or less than 5 years vs. equal to or more than 6 years), occupation (housewife vs. worker for mothers and government employee, employee, self-employed, or unemployed for fathers) and family income (low, less than minimum wage, <350 TL; middle, 350-1050 TL; and favorable, 1051-2500 TL).

To determine significant differences in proportions among categorical variables, Chi-square test was used (SPSS version 13.0, Chicago, IL, USA). Two-tailed p-values of $<0.05$ were considered significant.

## METHODOLOGICAL STRENGTHS AND LIMITATIONS

The present study provided useful information about health and disability in a Central Anatolian city's school-aged children as well as contributed to minimize the limitations experienced in the comparison of prevalence between developed and developing countries, especially due to the lack of information in developing countries. The study il-

lustrated how WHO's definitions of health condition, impairment, and activity-limitation could be applied and used to enhance the usefulness of existing national surveys, as well. Sample size and high response rate resulted in an unbiased prevalence. Results can be extrapolated to the population of Kayseri children aged 7 to 17 years.

In addition to the effect of chronic conditions, this survey will let the families face the effect of family ecology risk factors on activity limitations and will increase their awareness.

Although our study identified certain demographic characteristics of children and socio-economic characteristics (parental education, occupation, monthly income) of their families association with health and disability of Turkish school-aged children, it did not clarify in depth the 'environmental factors' that make up the physical, social, and attitudinal context of life that may have an impact on child health. In addition, no severity criteria were used to examine activity-limiting conditions, which is a major limitation of the present study. There is an urgent need for further researches to examine the environmental factors more closely, including social participation and attitudinal context, and dummy variables influencing children's lives. It is important to develop a deeper understanding of the phenomenon "family ecology" and its meaning for children with chronic health and activity-limiting conditions. In the present study, all the measures rely on parental report and may vary when information is gathered from other sources such as teachers and clinicians. That is, the extent of chronic health conditions/impairments may have been reported over or under the actual one.

## RESULTS

According to parental reports, 35.3% of all the children had one or more chronic health conditions/impairments (Table 1). The rate of chronic diseases was 56.4%, the rate of impairments was 47.3%, and the rate of emotional/behavioral disorders was 31.2% in the children with chronic health conditions. The most commonly reported chronic conditions were teeth and periodontal diseases (32.7%), visual impairments (30.7%), and urinary incontinence (14.7%) (Table 2).

**TABLE 1:** Prevalence of chronic health conditions and functional activity limitations in school-aged children.

| | Number | % |
|---|---|---|
| Chronic health conditions (n:4508) | | |
| Children with one or more chronic conditions | 1592 | 35.3 |
| Children with one condition | 1004 | 22.3 |
| Children with two conditions | 353 | 7.8 |
| Children with three or more conditions | 235 | 5.2 |
| Functional activity limitations (n:1592) | | |
| Children with one or more limited functions in activity | 146 | 9.2 |
| Children with one limited function in activity | 104 | 6.5 |
| Children with two limited functions in activity | 30 | 1.9 |
| Children with three limited functions in activity | 12 | 0.8 |

In parent-reports, 3.7% of all the school-aged children (7-17 years) were reported to have at least one or more activity-limiting conditions. This rate was 9.2% in the children with chronic health conditions/impairments, and was higher than seen among those without chronic health conditions/impairments (0.8%). Among the activity limitations, the rate of mobility limitation was 4.3%, self-care limitation was 4.4%, and communication limitation was 4.0% in children with chronic health conditions/impairments. The rate of activity limitations was 65.1% in children with chronic diseases, 63.7% in children with impairments, and 36.3% in children with emotional/behavioral disorders. Activity limiting-conditions were significantly high in children with teeth and periodontal diseases (47.9%, $p<0.001$), visual impairments (31.5%, $p<0.001$), speech impediments (26.7%, $p<0.001$), depression (19.9%, $p<0.001$), and mental impairment (18.0%, $p<0.001$). Activity limitations in children with chronic health conditions varied widely with the children's demographic characteristics and their family ecology. Activity limitations were higher in the children from low educated ($p<0.05$) and low-income ($p<0.01$) families when compared to those with parents who had better socioeconomic states. These limitations were slightly more prevalent in girls and children whose fathers were unemployed (Table 3).

**TABLE 2:** Impact of chronic health conditions/impairments on school-aged children's functional activity levels.

| | Functional activity limitations* | | | | |
|---|---|---|---|---|---|
| | Present (n: 146) | | Absent (n: 1346) | | |
| **Chronic health conditions** | **Number** | **%** | **Number** | **%** | **P value** |
| Chronic diseases | 95 | **65.1** | 803 | **55.6** | **0.029** |
| Teeth and periodontal diseases | 70 | 47.9 | 452 | 31.3 | <0.001 |
| Frequent or repeated infections** | 9 | 6.2 | 144 | 10.0 | 0.185 |
| Arthritis or rheumatism | 16 | 11.0 | 91 | 6.3 | 0.038 |
| Asthma | 9 | 6.2 | 72 | 5.0 | 0.673 |
| Diseases of skin | 5 | 3.4 | 52 | 3.6 | 0.914 |
| Others*** | 21 | 14.4 | 155 | 10.7 | 0.229 |
| Impairments | 93 | **63.7** | 660 | **45.7** | **<0.001** |
| Visual impairments | 46 | 31.5 | 444 | 30.7 | <0.001 |
| Speech impediments | 39 | 26.7 | 149 | 10.3 | <0.001 |
| Hearing impairments | 13 | 8.9 | 70 | 4.8 | 0.048 |
| Mental impairments | 11 | 7.5 | 50 | 3.5 | 0.022 |
| Musculoskeletal impairments | 13 | 8.9 | 35 | 2.4 | <0.001 |
| Emotional/behavioral disorders | 53 | **36.3** | 443 | **30.7** | **0.161** |
| Urinary incontinence | 23 | 15.8 | 212 | 14.7 | 0.819 |
| Psychiatric/nervous problems | 29 | 19.9 | 118 | 8.2 | <0.001 |
| Tic | 12 | 8.2 | 98 | 6.8 | 0.630 |
| School phobia | 18 | 12.3 | 83 | 5.7 | <0.001 |
| Drug abuse | 0 | 0.0 | 5 | 0.3 | 0.477 |

* Functional activity limitation: mobility and self-care and communication restriction.

** Organ diseases such as otitis media and pharyngitis.

*** Others included diseases of digestive and immune and endocrine system, epilepsy, kidney disease, type I diabetes, heart disease, neoplasms, blood disorders, severe headache, high blood pressure, hepatitis-B, convulsive disorder.

The rates of school absence and grade repetition were 29.7 and 4.6% in children with chronic health conditions/impairments, which were higher than their healthy counterparts ($p<0.001$; Table 4). While the rate of school absence was higher in children with chronic diseases (61.5%, $p<0.01$), grade repetition was higher (59.5%, $p<0.05$) in children with impairments. Teeth and periodontal disease, visual impairments and speech impediments were significantly common in both children with school absence days (34.7%, $p<0.001$; 30.0%, $p>0.05$; 14.8%, $p<0.05$, respectively) and grade repetition (31.1%, $p<0.05$; 28.4%, $p>0.05$; 21.6%, $p<0.05$, respectively). Frequent or repeated infections were common in children with school absence days (5.7%, $p>0.05$) and mental impairment was frequent in children grade repetition (17.6%, $p<0.001$) (Table 5).

There was a significant difference between the children with and without chronic health conditions in terms of school performance. Of all children, 53.4% had poor school performance, which was similar in children with (53.5%) and without (53.3%) chronic health conditions. On the other hand, the success rate in the children who had chronic health problems was surprisingly higher than those who did not (20 vs. 6.0%; Table 4). In those with chronic health condition, poor school performance was associated with visual impairments (33.3%, $p<0.05$; data not shown).

## DISCUSSION

This study provided a useful district profile of the prevalence of chronic health conditions and impact of childhood disability among school-aged children. Similar to previous epidemiological research, chronic health conditions with activity limitations have been combined and their prevalence and impact have been studied together.[6,7,18,19] Moreover, this study also allowed us to examine the impact of

**TABLE 3:** Prevalence of functional activity limitations according to some sociodemographic characteristics in children with chronic health conditions.

| Socio-demographic variables | | CHC*(n: 1592) | Functional activity limitations* Presence % | Absence % | P value |
|---|---|---|---|---|---|
| Gender | Boys | 799 | 10.3 | 89.7 | 0.140 |
| | Girls | 793 | 8.1 | 91.9 | |
| Age groups | 7-12 | 1258 | 9.1 | 90.9 | 0.915 |
| | 13-17 | 334 | 9.3 | 90.7 | |
| Maternal education | Equal to or less than 5 years | 1126 | 10.3 | 89.7 | 0.017 |
| | Equal to or more than 6 years | 466 | 6.4 | 93.6 | |
| Paternal education | Equal to or less than 5 years | 775 | 10.3 | 89.7 | 0.140 |
| | Equal to or more than 6 years | 817 | 8.1 | 91.9 | |
| Maternal occupation | Housewife | 1475 | 9.4 | 90.6 | 0.247 |
| | Work outside home | 116 | 6.0 | 94.0 | |
| Paternal occupation | Government employee | 187 | 10.7 | 89.3 | 0.087 |
| | Employee | 704 | 9.9 | 90.1 | |
| | Self-employed | 536 | 6.7 | 93.3 | |
| | Unemployed | 165 | 12.1 | 87.9 | |
| Family income | Low | 566 | 11.3 | 88.7 | 0.007 |
| | Middle | 685 | 7.1 | 92.9 | |
| | Favorable | 89 | 4.6 | 95.4 | |

*CHC: Chronic health condition

**Functional-activity limitations: mobility, self-care and communication restriction

**TABLE 4:** Prevalence of activity limitations among school-aged children with and without chronic health conditions/impairments.

| Impact of chronic health conditions on children's activity | Children with chronic health conditions (n:1592) Number | % | Children without chronic health conditions (n:2916) Number | % | Total (n:4508) Number | % | P Value |
|---|---|---|---|---|---|---|---|
| Functional activity-limiting conditions | 146 | 9.2 | 22 | 0.8 | 168 | 3.7 | <0.001 |
| Mobility | 68 | 4.3 | 3 | 0.1 | 71 | 1.6 | <0.001 |
| Self-care | 70 | 4.4 | 16 | 0.5 | 86 | 1.9 | <0.001 |
| Communication | 63 | 4.0 | 6 | 0.2 | 69 | 1.5 | <0.001 |
| School absence days | 473 | 29.7 | 631 | 21.6 | 1104 | 24.5 | <0.001 |
| Level of academic performance | | | | | | | |
| Poor | 851 | 53.5 | 1554 | 53.3 | 2405 | 53.4 | <0.001 |
| Fair | 422 | 26.5 | 1188 | 40.7 | 1610 | 35.7 | |
| Good | 319 | 20.0 | 174 | 6.0 | 493 | 10.9 | |
| Grade repetition | 74 | 4.6 | 70 | 2.4 | 144 | 3.2 | <0.001 |

family ecology on activity-limiting conditions. Even though previous studies were able to distinguish the relation between chronic health conditions, disability and family ecology in developed countries, similar studies are limited in number in developing countries including Turkey, suggesting a necessity for further research.[20]

The prevalence of chronic health conditions/impairments (Table 1) was in accordance with previous studies.[6-8,18,21-25] In these studies, an esti-

**TABLO 5:** Impact of chronic health conditions on school-aged children's school-activity levels.

| | School absence days (n:473) | | | Grade repetition (n:74) | | |
|---|---|---|---|---|---|---|
| | Number | % | P value | Number | % | P value |
| Chronic diseases | 291 | 61.5 | 0.009 | 38 | 51.4 | 0.401 |
| Teeth and periodontal diseases | 164 | 34.7 | 0.326 | 23 | 31.1 | 0.801 |
| Frequent or repeated infections** | 46 | 31.9 | 0.079 | 8 | 5.2 | 0.686 |
| Arthritis or rheumatism | 43 | 9.1 | 0.016 | 4 | 5.4 | 0.814 |
| Asthma | 32 | 6.8 | 0.048 | 2 | 2.7 | 0.583 |
| Diseases of skin | 20 | 4.2 | 0.377 | 1 | 1.4 | 0.516 |
| Others ** | 70 | 14.8 | 0.003 | 13 | 17.6 | 0.086 |
| Impairments | 240 | 50.7 | 0.079 | 44 | 59.5 | 0.042 |
| Visual impairments | 142 | 30.0 | 0.714 | 21 | 28.4 | 0.700 |
| Speech impediments | 70 | 14.8 | 0.017 | 16 | 21.6 | 0.013 |
| Hearing impairments | 36 | 7.6 | 0.007 | 1 | 1.4 | 0.177 |
| Mental impairments | 27 | 5.7 | 0.015 | 14 | 18.9 | <0.001 |
| Musculoskeletal impairments | 17 | 3.6 | 0.473 | 3 | 4.1 | 0.486 |
| Emotional/behavioral disorders | 168 | 35.5 | 0.015 | 30 | 40.5 | 0.092 |
| Urinary incontinence | 63 | 13.3 | 0.315 | 9 | 12.2 | 0.616 |
| Psychiatric/nervous problems | 61 | 12.9 | 0.002 | 9 | 12.2 | 0.407 |
| Tic | 38 | 8.0 | 0.279 | 10 | 13.5 | 0.032 |
| School phobia | 46 | 9.7 | 0.001 | 13 | 17.6 | 0.001 |
| Drug abuse | 4 | 0.8 | 0.029 | 0 | 0 | 0 |

* Organ diseases such as otitis media and pharyngitis.

** Others included diseases of digestive and immune and endocrine system, epilepsy, kidney disease, type_I diabetes, heart disease, neoplasms, blood disorders, severe headache, high blood pressure, hepatitis-B, convulsive disorder.

mated prevalence for childhood chronic conditions has ranged from less than 5% to more than 30%. The rate of activity limitations in children with and without chronic health condition was also in accordance with previous studies.[7,8,19,22] In several studies, the prevalence of activity limitations in children with chronic health condition was reported to range from 3.6 to 14.8%.[7,9,15,23,26-28] Although the school absence days in children with chronic health conditions (Table 4) were slightly higher than that reported elsewhere[9,23] it was still within the reference points.[11,25,26,27]. Msall et al.[9] reported that the rate of school absence was 5.7%, whereas Newacheck and Halfon[18] reported that it was 23% in children with disabling chronic conditions limiting their ability to attend school on a long-term basis. In our study, the high rate of school absence may be due to absence days mistaken for absence days associated with acute conditions. Grade repetition, a good indicator of lower school performance, was examined in only a few other studies. Studies dealing with the relation between grade repetition and chronic health conditions showed that chronic health conditions were also a major risk factor to achieve repeated grades.[27,29]

The type and commonality of conditions/impairments in the present population greatly differed from those reported in previous studies. While the rate of activity limitations was the highest among children with the highest prevalent chronic conditions such as teeth and periodontal diseases and visual impairments, the rate of activity limitations was the lowest among children with the most prevalent chronic conditions such as urinary incontinence and frequent or repeated infections. Similar to a previous report[18], speech impediments were the most frequent activity-limiting conditions (Table 2). In contrast, Paul et al.[11] found that the conditions were most likely to cause disability with genitourinary disorders, respiratory diseases, impediments of speech, special sense and intelligence, whereas they were least likely to cause ina-

bility to conduct the child's major activity including sensory impairments (visual and hearing), which is partly consistent with our results.

In our population, poor school performance was a major health problem in school-aged children with and without chronic health conditions. According to parent-reports, more than half of the children with a chronic condition had learning disabilities (Table 4), similar to other reports.[9,28] Although Msall et al.[9] reported the rate of learning concerning disability as 27.1%, Silver et al.[28] reported it as 57.4% in children who had any chronic health problem. The increase of learning disabilities may actually be in a continuation trend.[24] In our study, poor school performance was more closely associated with chronic health and/or activity-limiting conditions. Absence from school is inevitable in children with chronic health conditions and/or activity limitations who may need regular treatments and who have illness flares or hospitalizations. Thus, education can be disrupted and the child begins to lose touch with its peers resulting in feelings of isolation, feeling different and struggling to keep up with academic work.[26]

Nonetheless, our findings suggest that activity-limiting conditions in children with chronic health conditions were associated more closely with them and their parents' sociodemographic characteristics (Table 3). Functional activity limitations were most prevalent in children of low-educated, unemployed and low-income families. Therefore, it is noted that these children who had limitations in mobility, self care, communication or learning live in homes with fewer resources, and their homes were less likely to be healthy and safe. Unfortunately, a few studies in accordance with our findings have been able to distinguish the relation between chronic health conditions, disability and family ecology.[10-12] For example, while Newacheck et al.[18] and Paul et al.[11] found disability to be more prevalent among children of families with incomes below the poverty level, Mcdougall et al.[8] reported that children whose families were receiving welfare income were more likely to have chronic health and activity-limiting conditions than those not receiving welfare income. Hogan et al.[10] and Witt et al.[30] reported that functional limitations were more closely associated with family ecology. In our study, the rate of activity-limitations was higher in boys than in girls, and in the 13-17 age group than in the 7-12. This result is in agreement with some studies[6,7,11,27,31] while it is negated by another.[8]

## CONCLUSION

In conclusion, this study shows that chronic health condition and activity limitations in school-aged children are the serious public health problem. Teeth and periodontal disease, visual impairments and speech impediments, psychiatric disorder and school phobia were the most prevalent problems. Long-term chronic health conditions and disrupted family environmental variables were likely to be significant risk factors for functional activity limitations. These conditions generally negatively affected the child's communication and learning ability and attendance to school, which would be necessary to prepare him/her for future pedagogic life. Families face the effect of family ecology risk factors on activity limitations and will increase the awareness. Better health promotion and disease prevention may reduce the prevalence of disability depending on chronic health conditions/impairments.

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