



Prevalence Of Morbidity And Morbidity Pattern Among Government Primary School Children Aged 6-11 Years In An Urban Area Of Block Barwala, Haryana: A Cross-Sectional Study

¹Ritu, ²*Saluja N, ³Choudhary S, ⁴Pandey S.M

¹Assistant Professor, ²Professor, ³Professor & Head, ⁴Assistant Professor (Stats.),

Department of Community Medicine,

^{2,3,4}Maharaja Agrasen Medical College, Agroha

¹MM College of Medical Sciences & Research, Sadopur, Ambala

***Corresponding Author:**

Dr. Neelu Saluja

Professor, Community Medicine, Maharaja Agrasen Medical College Agroha

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Introduction: Morbidity in children is a major public health concern as this adversely affects their physical and mental growth.

Objectives: 1) To estimate the prevalence of morbidity among primary school children aged 6-11 years in an urban area of block Barwala, Haryana. 2) To study the pattern of morbidity among study subjects.

Method: The present cross-sectional study was carried out in five government schools located in the Barwala block of district Hisar, Haryana. A total of 560 students were included in the study and to cover the desired sample size 112 students from each of the selected schools and twenty eight (14 boys and 14 girls) students from each class (1st to 5th) were selected by simple random sampling. Predesigned and pretested questionnaire was used for recording of individual information. Statistical analysis was done by using Percentages and chi-square test.

Results: Three hundred twenty (57.1%) children (61.4% boys and 52.9% girls) were found to be suffering with one or more morbid conditions accounting for the sickness rate of 57.1%. A total of 1556 morbidities were found to be present in 320 sick children accounting for 4.86 morbidities per sick child. Maximum children (90.6%) were having morbidity related to blood forming organs followed by oral cavity (87.5%), infective & parasitic diseases (76.2%), nutritional deficiencies (66.6%) and malnutrition (35.6%).

Conclusion: The present study reveals a high prevalence of morbidity (57.1%) among school children with most affected children suffering from multiple morbid conditions.

Keywords: Morbidity | School children| Urban

Introduction

Children in the age group of 6-11 years represent the primary school going population and constitute a vital segment of the community. Twenty eight percent of the population in India comprises of children aged 0-14 years¹, whereas school children aged 5-14 years constitute around 25% of total population². The 6-11 yrs age group i.e. the primary school children constitute a large part of it. This period is crucial for physical growth, cognitive development and establishment of lifelong health behaviors. The health status of these children directly influences school attendance, academic performance, and future productivity of the nation. Morbidity in school children is a major public health concern as this adversely affects their physical and mental growth. School children are vulnerable to a wide range of morbidities due to exposure to unhygienic conditions, poor nutrition,

overcrowding in classrooms, and lack of awareness regarding personal hygiene. Studies in different countries have identified that the major causes of morbidity in primary school age children are respiratory problems, diarrheal disease, nutritional disorders, anaemia, parasitic infestations, pediculosis, dental caries, refractive errors, skin diseases, ear and throat problems, tic disorders, sleeping disorders etc³. According to a survey carried out in India, major health problems of the school children are malnutrition, infectious diseases, intestinal parasites, diseases of skin, eye and ear and dental caries⁵. Many of these conditions are preventable and treatable if detected early.

Despite various national health programs like the School Health Programme, Rashtriya Bal Swasthya Karyakram and Mid-Day Meal Scheme, a high burden of morbidity persists among primary school children in India. Government of India has also directed many policies and programs to integrate health deep within the school activities. In spite of all these initiatives, sickness and morbidity rates in India are among the highest in the world⁷. Assessment of morbidity among school children is essential because school provides an organized setting for early detection, health education, and intervention. Regular health check-ups can help identify health problems at an early stage and reduce complications, thereby improving learning outcomes and quality of life. With this background the present study was conducted to assess the prevalence of morbidity and its patterns among primary school children in urban area of Barwala, district Hisar, Haryana.

Material And Methods

Ethical clearance for conducting this study was obtained from the Institutional Ethical Committee. For the purpose of study a list of all government primary schools located in urban area of Barwala was taken from the Block Education Office Barwala. The prevalence of malnutrition is considered as a common health problem in school children; therefore, it was used for calculating the sample size. Thus, by taking the prevalence of malnutrition among school children between 6-11 years of age as 43%⁸ with a permissible level of error of 10%, the sample for present study came out to be

$$n = \frac{4pq}{L^2}$$

$$n = \frac{4 \times 43 \times 57}{4.3 \times 4.3}$$

$$n = 530$$

where

n= Size of Population

p= Prevalence

q= 100-p

L = Permissible level of error of prevalence

To cover the boys and girls equally from each class a total of 560 students were included in the study and to cover the desired sample size 112 students from each of the selected schools were interviewed and examined. Twenty eight (14 boys and 14 girls) students from each class were selected by simple random sampling.

Inclusion Criteria:

1. Children aged between 6-11 years.
2. Children who were present on the day of examination.

Exclusion Criteria:

1. Children below 5 years and above 11 years.
2. Children who were absent for three consecutive visits

A written permission from the District Education Office (DEO) Hisar was obtained prior to conducting the study. After explaining the purpose of study to the principals of concerned schools, the study subjects were interviewed and thoroughly clinically examined by investigator herself in a separate classroom which was made available for the purpose. Predesigned and pretested proforma was used for recording the information.

The date of birth of the student was taken from the school records and the actual age of the child was recorded in years. Socio economic status was categorized using the Modified Kuppaswamy classification⁹ for urban families. A thorough clinical examination was made along with anthropometric measurements. Signs of general malnutrition were sought with pallor, edema, skin and hair changes. The skin was examined for any evidence of xerosis, hypopigmentation, hyperkeratosis and any other dermatosis. Eyes were examined for presence of xerosis and bitot spots. Lips, gums and tongue of the children were examined for the presence of angular lesions, cheilosis, gum swelling & bleeding, glossitis, papillary atrophy and other signs of deficiency. The skeletal system was examined for the presence of any deformity and signs of rickets like costochondral beading, epiphyseal widening, bowing of legs, knock knees. Also screening of anterior-posterior & lateral postures, feet conditions and other forms of body mechanics was done. Dental inspection was carried out for dental caries, malocclusion, periodontal diseases (diseases of the gums and supporting structure of teeth) and dental fluorosis or mottled enamel. Ear, Nose and Throat Examination was carried out for signs of adenitis, adenoids, chronic otitis media, mastoiditis and tonsillitis. Thyroid Gland and Lymph nodes were examined to find out any abnormality. A thorough systemic examination was done to detect any abnormality in the respiratory, gastro-intestinal, cardiovascular system, skeletal and central nervous systems. Eyes and eyelids were examined for any signs of trachoma, conjunctivitis, sty, congenital abnormality, ptosis and strabismus. The visual acuity was measured by means of Snellen chart test¹⁰. Hearing was assessed by Rinne and Weber tests¹¹. The child was asked to say familiar words and simple sentences to note any defect in his speech. The child was asked pertinent questions like whether he sucks his thumb and does he bite his nails or wet his bed while sleeping. Weight of the child was measured to the nearest 0.1kg using a standard weighing (Bathroom) scale. A Stadiometer (measuring rod) capable of measuring to an accuracy of 0.1cm was used to assess height of the subjects. The height was measured while the child was standing by the side of a wall upright with heels close to each other and arm hanging by the side. Different morbidities were classified according to ICD-10 classification¹².

The data thus collected was first coded and then transferred on the MS excel sheet and then exported to Statistical Package for Social Studies (SPSS version 20.0) software from which simple as well as correlative table were prepared, analyzed and statistically evaluated using percentages and chi-square test.

Results

As shown in table 1, maximum number of children (25.0%) were in the age group of 9 years and minimum (11.6%) in the age group of 6 years. The same was the case in boys and girls distribution.

Table 2 shows that out of 560 children, 320 were suffering from one or more morbid conditions accounting for the sickness rate of 57.1%. Morbidity was maximum (61.4%) in boys as compared to girls (52.9%) and this difference in prevalence of morbidity was found to be statistically significant ($p < 0.05$).

Table 3 shows that a total of 1556 morbidities present in 320 sick children accounting for 4.86 morbidities per sick child. Maximum children (90.6%) were having morbidity related to blood forming organs followed by oral cavity (87.5%), infective & parasitic diseases (76.2%), nutritional deficiencies (66.6%), malnutrition (35.6%), skin diseases (30.0%), diseases of the respiratory system (34.7%), behavioural problems (21.6%) and eye diseases (19.4%).

Table 4 shows the prevalence of various diseases in children. The morbidity was maximum due to anaemia (517.8/1000). Next in order were morbidity due to dental caries (325/1000), intestinal helminthiasis (242.8/1000), malnutrition (203.5/1000), vitamin B deficiency (126.7/1000), vitamin C deficiency (116/1000), acute upper respiratory infections (112.5/1000), nail biting and thumb sucking (91/1000) and vitamin D deficiency (80.3/1000).

Discussion

In the present study a total of 560 children (280 boys and 280 girls) in the age group of 6-11 years were examined. The percentage of male and female children was 50% each. Maximum number of children (25.0%) belonged to the age group of 9 years and minimum (11.6%) to the age group of 6 years. In the present study, 57.1% children (61.4% boys and 52.9% girls) were found to be suffering with one or more morbid conditions accounting for the sickness rate of 57.1%. Almost similar findings were reported by Shinde M et al.¹³ and Kausar H et al.¹⁴ who observed 58.72% and 60% children suffering from one or more morbid condition, respectively. In contrast a lower prevalence of morbidity (28.37%) was reported by Manandhar N et al.¹⁵ and a very high prevalence of morbidity was observed in their study by Gokhale CN et al.¹⁶ (73%) and Kalyani P et al.¹⁷ (97%). In our study a total of 1556 morbidities were found to be present in 320 sick children accounting for 4.86 morbidities per sick child which is almost similar to a study done by Kalyani P et al.¹⁷ However, Kaushik A et al.¹⁸ and Kausar H et al.¹⁴ reported 2.8 and 1.89 morbidities per sick child respectively which is lower than that reported in the present study. In our study, the morbidity was maximum due to clinically detected pallor (51.8%) followed by dental caries (32.5%), intestinal helminthiasis (24.2%), malnutrition (20.3%), vitamin B deficiency (12.6%), vitamin C deficiency (11.6%), acute upper respiratory infections (11.2%), nail biting and thumb sucking (9.1%) and vitamin D deficiency (8.03%). Similarly, Talukdar K & Baruah R¹⁹ and Deb S et al.²⁰ also observed clinically detected pallor as the most common infirmity.

As compared to our study, a lower prevalence of dental caries was observed by Devi P et al.¹ (29.54%), Singh JP & Singh AK²¹ (26.4%), Patel N et al.²² (25.19%) and Sharma M et al.²³ (25.4%) while a higher prevalence of caries was reported by Kalyani P et al.¹⁷ (61.6%), Kaushik A et al.¹⁸ (46.0%) and Asghar SA et al.²⁴ (37.05%).

In our study, vitamin A deficiency was observed amongst 32 (5.7%) children which is almost near to the findings of Shinde M et al.¹³ (6.25%) but quite higher than the observations made by Srivastava A et al.²⁵ (3.4%) and Damhare DG et al.²⁶ (0.86%). Vitamin B deficiency and vitamin C deficiency was observed in 12.6% & 11.6% children, respectively which is higher than that reported by Gupta SK et al.²⁷ (4.4% & 4.6%, respectively) amongst school children in the coastal rural areas of Tamilnadu.

In present study, 63 (11.2%) children had upper respiratory tract infection which is much higher than that reported by Shinde M et al.¹³ (3.77%) and Nigudgi et al.²⁸ (3.61%) but much lower than that reported by Gupta SK et al.²⁷ (40.0%) and Talukdar K et al.¹⁹ (31.75%). This can be attributed to the poor infrastructure and sanitary facilities in government schools and increasing number of enrolments leading to overcrowded classrooms without provision for proper cross ventilation. Also malnutrition being an underlying factor, primary school children are more vulnerable to respiratory infections.

In the present study, morbidity was maximum (61.4%) in boys as compared to girls (52.9%) and this difference in prevalence of morbidity in relation to gender was found to be statistically significant ($p < 0.05$). Similarly, Saluja N et al.²⁹, Shinde M et al.¹³ and Bhovi RA³⁰ also reported that prevalence of morbidity was higher in boys (70%, 62.13% & 40.1%, respectively) as compared to girls (65.2%, 54.8% & 17.8%, respectively). A similar result was found by Deb et al.²⁰ in a study done at Kolkata where boys had more morbidities than girls (76% vs. 74%). However, Kaushik A et al.¹⁸, Kausar H et al.¹⁴ and Talukdar K et al.¹⁹ in their studies reported that prevalence of morbidity was higher in girls (86.1%, 62.6% & 57.4%, respectively) as compared to boys (84.4%, 56.96% & 56.7%, respectively).

Conclusion And Recommendations

The present study reveals a high prevalence of morbidity (57.1%) among school children with most affected children suffering from multiple morbid conditions, averaging 4.86 morbidities per sick child. These findings indicate poor overall health status and highlight the need for regular school health check-ups, health education, improved nutrition and better hygiene/sanitation practices. Targeted interventions focusing on anemia, oral health, and prevention of infections are needed to reduce the high morbidity burden especially among boys.

References

1. Devi P, Srigiri S. Morbidity profile of children [6-11yrs] attending municipal corporation primary school in Visakhapatnam city, Andra Pradesh. IOSR Journal of Dental and Medical Science. 2015;14(11):118-122.
2. Sunder Lal, Adarsh, Pankaj. Reproductive and Child Health, Policy and Programmes in India. Textbook of Community Medicine Preventive and Social Medicine. 4th Edition: New Delhi, CBS Publishers & Distributors Pvt Ltd 2014;161p.
3. Das P, Basu M, Dhar G, Mallik S, Pal R. Nutritional status and morbidity pattern of government primary school children in north Kolkata of West Bengal, India. South East Asia Journal of Public Health. 2012;2(1):13-7.
4. Uncu Y, Irgil E, Karadag M. Smoking Patterns among Primary School Students in Turkey. Scientific World J 2006; 6:1667-73.
5. Park K. Preventive Medicine in Obstetrics, Paediatrics and Geriatrics. Park's Textbook of Preventive and Social Medicine. 25th Edition: Jabalpur, M/s Banarsidas Bhanot Publishers 2019; 633p.
6. Kaushik A, Bansal A, Jain PK, Kumar S, Yadav RK, Singh SP. Morbidity pattern and their socio-demographic co-relates among rural primary school children in eastern Uttar Pradesh: A cross-sectional study. Ind J Comm Health. 2014;26(1):30-36.
7. Allensworth D, Lawson E, Nicholson L, Wyche J. Evolution of school health programs. In Schools & Health: Our Nation's Investment 1997. National Academies Press (US). Available from <https://www.ncbi.nlm.nih.gov/books/NBK232693/>
8. Chajhlana SPS, Mahabhasyam RN, Varaprasada M. Nutritional deficiencies among school children in urban areas of Hyderabad, Telangana, India. International Journal of Community Medicine and Public Health. 2017 Feb;4(2):607-12.
9. Sheikh Mohd Saleem. Modified Kuppuswamy socioeconomic scale updated for the year 2019. Indian J Forensic Community Med 2019;6(1):1-3.
10. Sue S. Test distance vision using a Snellen chart. Community Eye Health. 2007;20(63):52.
11. Turton L, Batty S. Rinne's and Weber tuning fork test. British Society of Audiology, 2016. [available from www.thebsa.org.]
12. Park K. Concepts of health and disease. *Park's Textbook of Preventive and Social Medicine*. 25th Edition: Jabalpur, M/s Banarsidas Bhanot Publishers 2019; 56-7p.
13. Shinde M, Joshi A, Trivedi A. Morbidity pattern among school children of rural area of Obaidullaganj block of Raichur District of Madhya Pradesh. Int J Adv Med. 2015 May;2(2):144-6.
14. Kausar H, Sambutwad RC, Shafee M. Prevalence of morbidity and morbidity pattern among primary school children in rural area of Jalna, Maharashtra, India. International Journal of Community Medicine and Public Health. 2016 Jun;3(6):1623.
15. Manandhar N, Pathak P, Lama P, Joshi SK. Morbidity of School Children in Panauti Municipality of Kavrepalanchowk: A Descriptive Cross-sectional Study. JNMA: Journal of the Nepal Medical Association. 2020 Apr;58(224):230.
16. Gokhale CN, Borgaonkar CA, Shanbhag SS, Solanki MJ, Rasal MM. Morbidity pattern among primary school children in a tribal area of Maharashtra. Int J Community Med Public Health. 2018 Jan;5(1):165-9.
17. Kalyani P, Felix AJW, Arulmani A. Morbidity pattern of primary school children in an urban area of Tamilnadu. National Journal of Public Health. 2016 April;1(2).58-61.

18. Kaushik A, Bansal A, Jain PK, Kumar S, Yadav RK, Singh SP. Morbidity pattern and their socio-demographic co-relates among rural primary school children in eastern Uttar Pradesh: A cross-sectional study. *Ind J Comm Health*. 2014;26(1):30-36.
19. Talukdar K, Baruah R. Health status of primary school children: A community based cross sectional study in rural areas of Kamrup district, Assam. *Journal of Evolution of Medical and Dental Sciences*. 2015 Feb 12;4(13):2093-101.
20. Deb S, Dutta S, Dasgupta A, Misra R. Relationship of personal hygiene with nutrition and morbidity profile: A study among primary school children in South Kolkata. *Indian J Community Med* 2010;35:280-4.
21. Singh JP, Singh AK. A Study on Health Status of Urban School Children (7-18 Years): A School Based Cross Sectional Study.
22. Patel N, Gunjana G, Patel S, Thanvi R, Sathvara P, Joshi R. Nutrition and health status of school children in urban area of Ahmedabad, India: Comparison with Indian Council of Medical Research and body mass index standards. *Journal of natural science, biology, and medicine*. 2015 Jul;6(2):372.
23. Sharma M, Watode B, Srivastava A. Nutritional status of primary school children through anthropometric assessment in rural areas of Moradabad. *Ann Int Med Dental Res*. 2017;3(2).
24. Asghar SA, Gupta P, Srivastava MR, Srivastava JP, Zaidi ZH. Health status of primary school children: study from a rural health block of Lucknow. *Int J Community Med Public Health*. 2017;4:2498-501.
25. Srivastava A, Mahmood SE, Srivastava PM, Shrotriya VP, Kumar B. Nutritional status of school-age children-A scenario of urban slums in India. *Archives of public health*. 2012 Dec;70(1):1-8.
26. Damhare DG, Bharambe MS, Mehendale AM, Garg BS. Nutritional status and morbidity among school going adolescents in Wardha, a Peri-Urban area. *Online Journal of Health and Allied Sciences*. 2010 Jul 30;9(2).
27. Gupta SK, Sharma S, Bazroy J. Health status of school children of costal areas of rural Tamil Nadu (India). *International Journal of Collaborative Research on Internal Medicine & Public Health*. 2012;4(12):0-.
28. Nigudgi.S.R, Reddy Shrinivas, Kapate Rajsekhar. Morbidity pattern among school children of Gulbarga city. *Medica innovatica*. 2012; 1(2).
29. Saluja N, Garg S, Chopra H. Prevalence of morbidity and morbidity pattern in school children (5-11 yrs) in urban area of Meerut. *Int J Epidemiol*. 2011;9(2):1-5.
30. Bhovi R A, Biradar M K, Holyachi S, Morbidity profile of primary school children in rural Koppal, Karnataka. *Indian J Forensic Community Med* 2017; 4(3):164-66.

Tables:

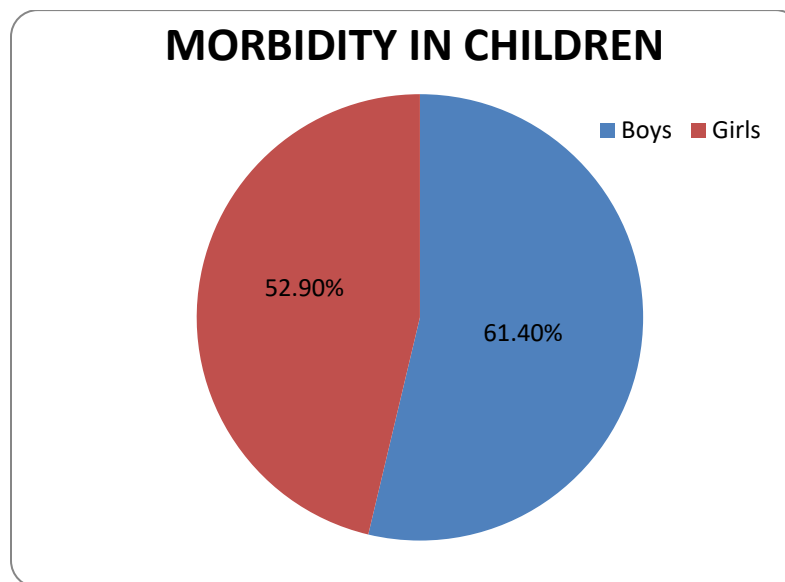
Table 1:Age and Gender wise distribution of children

Age years	Boys		Girls		Total	
	No.	Percent	No.	Percent	No.	Percent
6	31	11.1	34	12.1	65	11.6
7	41	14.6	38	13.6	79	14.1
8	44	15.7	60	21.4	104	18.6

9	74	26.4	66	23.6	140	25.0
10	56	20.0	40	14.3	96	17.1
11	34	12.1	42	15.0	76	13.6
Total	280	50.0	280	50.0	560	100.0

Table 2: Distribution of children according to morbidity

Morbidity	Boys		Girls		Total		χ^2	p-value
	No.	Percent	No.	Percent	No.	Percent		
Present	172	61.4	148	52.9	320	57.1	4.200 df=1	0.04
Absent	108	38.6	132	47.1	240	42.9		
Total	280	100.0	280	100.0	560	100.0		

**Table 3: Distribution of children according to various morbidities as per ICD-10 classification (Multiple response)**

Code ICD-10	Diseases	Number	Percentage
A00-B99	Infective and parasitic	244	76.2
D50-D89	Blood forming organs	290	90.6
E40-E46	Malnutrition	114	35.6
E50-E64	Other nutritional deficiencies	213	66.6

F00-F99	Mental and behavioural problems	69	21.6
H00-H59	Eye	62	19.4
H60-H95	Ear	36	11.3
J00-J99	Respiratory	111	34.7
K00-K14	Diseases of oral cavity	280	87.5
L00-L99	Skin and subcutaneous tissue	96	30.0
M00-M99	Musculoskeletal	2	0.6
N00-N99	Genitourinary	6	1.9
Q10-Q15	Congenital malformations of eye	1	0.3
R00-R09	Symptoms and signs involving the circulatory and respiratory system	2	0.6
R10-R19	Symptoms and signs involving the digestive system	9	2.8
R-59	Enlarged lymph nodes	21	6.6
Base		320	

Table 4: Distribution of children according to types of morbidities:

Code	Diseases	Boys	Girls	Total	Prevalence/ 1000
A00-A09	Intestinal infectious diseases	10	17	27	48.2
A71	Trachoma	5	3	8	14.2
B35-B49	Mycosis	12	6	18	32.1
B82	Intestinal helminthiasis	52	84	36	242.8
B85	Pediculosis	6	32	38	67.8
B86	Scabies	10	7	17	30.3
D50-D53	Anaemias	142	148	290	517.8
E40-E46	Malnutrition	69	45	114	203.5
E50	Vitamin A deficiency	19	13	32	57.1
E53	Vitamin B deficiency	42	29	71	126.7
E54	Ascorbic acid def.	39	26	65	116.0
E55	Vitamin D deficiency	18	27	45	80.3
F80	Lalling	1	1	2	3.6
F80.8	Other developmental disorders of speech or language	2	3	5	8.9
F98.5	Stammering	2	1	3	5.3

F98	Enuresis	3	5	8	14.2
F98.8	Nail biting and thumb sucking	33	18	51	91.0
H10	Conjunctivitis	11	9	20	35.7
H52	Hypermetropia	1	1	2	3.6
H52.1	Myopia	26	14	40	71.4
H65-H75	Diseases of middle ear and mastoid	28	8	36	64.2
J00-J06	Acute upper respiratory infections	42	21	63	112.5
J30-J39	Other disease of upper respiratory tract	18	15	33	58.92
J40-J47	Chronic lower respiratory diseases	8	7	15	26.8
K00.3	Mottled teeth	24	16	40	71.42
K00.4	Enamel hypoplasia	4	4	8	14.2
K02	Dental caries	83	99	182	325
K03.2	Erosion of teeth	6	9	15	26.8
K08	Other disorders of teeth and supporting structures	21	14	35	62.5
L02.92	Furunculosis	6	3	9	16.0
M00-M99	Diseases of musculoskeletal system and connective tissue	2	0	2	3.6
N00-N99	Genitourinary	3	3	6	10.7
Q10-Q15	Congenital malformations of eye	1	0	1	1.8
R01	Cardiac murmurs	1	1	2	3.6
R16	Hepatomegaly	2	1	3	5.3
R16.1	Splenomegaly	1	1	2	3.6
R17	Jaundice	2	2	4	7.1
R-59	Enlarged lymph nodes	12	9	21	37.5
Base				560	