A Review of morbidity patterns among school-age children in India

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ABSTRACT

Introduction: Childhood morbidity is an unhealthy condition in children which may be improved by diagnosing the disease timely and it also helps to reduce the mortality in children. Most diseases seen in the school-going age are preventable and easily detectable by healthcare workers. **Objective:** The main objective of this article is to evaluate the morbidity pattern among school-age children in India. This article also reports the morbidity trends and health issues specifically among school-going children (5 to 18 years old). **Methodology:** Different databases such as Google scholar, Pubmed, Research Gate etc, were analyzed for morbidity patterns of school-going age in various parts of India. A total of twenty articles from 9 states of India (Uttar Pradesh, Odisha, Chhattisgarh, Rajasthan, Maharashtra, Haryana, Andhra Pradesh, Tamil Nadu, and Madhya Pradesh) have been analyzed. **Conclusion:** The result articulated that anemia, oral, skin, respiratory; eye, ear, gastrointestinal, and vitamin A deficiency disorders are most common in the school-going age group.

Keywords: Morbidity patterns, ARI, Diarrhea, Anemia, and Gastrointestinal.

Introduction

Children are the country's most valuable resource. Children attending school make up about 25% of India's overall population. They are more susceptible than the general population to diseases and malnourishment. Schools are the most crucial locations for children to learn, after their families. About half of the illnesses discovered in Indian school children were linked to unhygienic conditions and poor personal cleanliness, according to a survey conducted among the students. The health issues that school children face differ depending on where they live.[1] Morbidity is defined by the WHO (World Health Organization) as any medical condition that adversely affects a person's functionality or well-being and is caused by or made more difficult by pregnancy, delivery, or other circumstances.[2] The definition given by CDC (The Centers for Disease Control and Prevention) –is "Morbidity is a state of being unhealthy due to a disease or condition or the degree to which a health condition affects a patient."[3] According to the NIH (National Institutes of Health), morbidity is defined as "the relative incidence of disease"[4] Research articles related to morbidity patterns in school-going children have been collected through various databases. The twenty papers were concluded and analyzed according to their results and findings.

Prevalence of different Morbidities from different papers: The total prevalence of morbidity across all articles, as follows Singh DK et al. has 38.8%, Kar K et al. 66.2%, Anga VS et al. 81.8%, Dabas N et al. 34.37%, Devi P et al. 87.56%, Rani V et al. 42.71%, N Saluja et al. 67.8%, Shinde M et al. 58.72%, Kausar H et al. 60%, Sachan B et al. 64.8%, Md AB et al. 87.2%, Kaushik A et al. 85.3%, Singh V et al. 29.35%, Naik R et al. 9.66%, Agrawal D et al. 21.2%.

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Prevalence of different morbidities from different papers

Author	Percentage of Different Morbidities (%)							Gastrointestinal disease		
	Anaemia	Oral disease	Skin disease	Eye disease	Vitamin A deficiency	Respiratory	Ear disease	Abdominal pain	Worm infestation	Diarrhoea
Singh DK et al.	24.0	21.7	25.7	23.4	--	19.4	5.1	5.1	--	--
Kar K et al.	47.6	23.2	34.5	21.4	--	21.9	3.9	3	--	3.2
Anga VS et al.	--	32.5	--	28.5	--	21.5	20.9	--	--	24.7
Dabas N et al.	37	42.6	6.6	23.8	--	4.25	5.1	--	--	--
Vishnoi SK et al.	4.9	23.8	5.4	8.6	3.4	--	4.4	--	--	--
Kurrey VK et al.	66	32	24	38	--	10		--	--	--
Devi P et al.	50.15	29.54	13.41	1.94	6.22	16.81	2.62	--	37.12	--
Rani V et al.	26.90	36.25	--	--	0.58	4.67	33.91	11.70	--	--
N Saluja et al.	35.8	92.3	59.0	10.3	--	23.4	11.4	--	--	--
Tiwari HC et al.	33.9	25.7	20.1	12.4	11.5	--	21.5	--	--	--
Shinde M et al.	15.69	31.83	--	2.32	6.25	3.77	0.58	--	4.94	--
Kausar H et al.	--	--	2.27	9.09	--	15.34	9.65	3.69	--	--
Singh J P et al.	--	--	--	1.97	--	42.78	--	3.92	2.50	14.44
S.Gopalakrishnan et al.	0.5	--	6.3	4.8	--	22.9	1.6	11.9	--	--
Sachan B et al.	56.3	--	3.2	11.7	0.5	--	5.2	--	--	--
Md AB et al.	--	18.3	--	26.8	--	17.1	48.7	--	--	--
Kaushik A et al.	--	46.0	29.4	9.2	--	27.6	13.6	--	--	--
Average Percentage of Different Morbidities	35.73	33.13	19.15	14.63	4.74	17.95	12.54	14.69		

Author	Percentage of Ocular Morbidity (%)						
	Total Prevalence	**Refractive error**	**Squint**	**Amblyopia**	**Vitamin A deficiency**	**Colour blindness**	**Stye**
Singh V et al.	29.35	16.36	0.17	0.04	3.03	-	0.37
Naik R et al.	9.66	73.45	-	-	3.53	1.76	-
Agrawal D et al.	21.2	5.2	-	0.4	10	3.3	0.2
Average Percentage of Ocular Morbidities	20.07	31.67	0.17	0.22	5.52	2.53	0.28

The prevalence of different diseases is based on the different area, age, and sex. However, the finding articulated that anemia, oral disease, skin disease, eye disease, vitamin A deficiency, respiratory disease, ear disease, gastrointestinal disease, and malnutrition are most common in the school-going age group. It has been summarized from different parts of India, the age range mentioned in all the papers was 5 to 18 years, and the class range was 1 to 12. In the absence of class range in the articles, it has been considered based on NEP (National Education Policy, 2020). A total of 20 articles have been reviewed and analyzed. Apart from all the above seventeen articles, three papers are mainly related to ocular morbidity.

The study was conducted from January to March 2018 in a primary school situated in the urban field practice area of a medical college in Eastern Uttar Pradesh (Varanasi). A total of 423 pupils (94% of the total) studying from classes 1 to 4 were tested. There was a 38.8% prevalence of morbidity. Class 1 had the highest percentage of sick students (43.29%). Skin diseases accounted for the majority of morbidity cases (25.7%), followed by anemia (24.0%), malnutrition (22.2%), dental caries (21.7%), and URTI (19.4%). The most frequent type of recommendation for students (47.91%) was an ocular reference.[1]

The urban field practice area of SCB Medical College, Cuttack, Odisha, government and private schools were chosen for the study, which ran from January to December of 2016.A total of 660 students were registered from 5th and 9th class. Pallor was the most prevalent morbidity (47.6%), followed by skin disease (34.5%), dental caries (23.2%), acute respiratory infections (21.9%), eye issues (21.4%), fever (6.8%), abdominal pain 3%, diarrhoea 3.2%, ear discharge 3.9%, headache 5%, and rhinitis 3.9%.[5]

The study involving 6 to 11 years children from 8 elementary schools in Vijayawada, Andhra Pradesh was conducted. A total number of 664 students were included. Obesity was seen (1.2%), severe stunting (2.3%), and severe underweight (2.5%). The most prevalent morbidities were dental caries (32.5%), followed by bilateral visual impairment (28.5%), diarrhoea (24.7%), ARI (21.5%), ear wax (20.9%), hair dandruff (19.0%), enlarged tonsils (11.9%), and pale conjunctiva (10.1%). At least 81.8% of the children reported one morbidity.[6]

In the Prayagraj area, the study was conducted at a school, and 800 teenage females, 400 from rural and 400 from urban areas, ages 10 to 19, enrolled in classes 6th to 12th, were the study's participants. A total of 275 teenage females were experiencing morbidity. The most common morbidity was dysmenorrhea 381 (47.6%), dental problems (42.6%), psychological issues 325 (40.6%), pallor 296 (37%), and ocular illnesses 191 (23.8%). Pre-hypertension/hypertension (15.4%), Under-weight (11.6%), obesity/overweight (8.25 %), skin disease (6.6%), ear disease (5.1%), respiratory disease (4.25%), gastrointestinal disorders (4.1%), and injuries (2.9%) were among the other morbidities.[7]

The study was Osian block of Jodhpur district of Western Rajasthan. It randomly selected 20 out 28 villages and enrolled all the children studying in both government and private schools of these villages. Total 11651 children aged 5–15 years were screened within one year, but only 203 children were referred to higher centre for further management. Dental problems were the most common (23.8%), followed by vision impairment (8.6%), language delay (6.4%), hearing impairment (4.4%), skin condition (5.4%), anemia (4.9%), and SAM/Stunting (3.4%).[8]

The study was conducted among 50 children (boys and girls of 5-18 years age) of Dharamjaigarh Block Raigarh, Chhattisgarh. There were founded 32.5% of underweight children, 22% stunted, and 24% thin. The following frequent morbidities had the highest prevalence: pallor (66%), conjunctivalxerosis (38%), caries teeth (32%), skin infections (24%), and lymphadenopathy (22%). A history of ARI (other than malaria) was present 46%, jaundice 16%, envenomation/ intoxication/ animal bites 16%, hospitalization history 12%, and trauma/ accidents 12%.[9]

The survey was conducted at Municipal Corporation primary schools, Visakhapatnam. A total of 1029 students were included from classes 2-5 between the ages of 6-11 years. A total number of 901 out of 1029 children (87.56%) had one or more illnesses. Anaemia (50.15%) was the most common morbidity, followed by worm infestation (37.12%), underweight (33.53%), dental caries (29.54%), Vitamin A deficiency (6.22%), Vitamin B deficiency (8.87%), skin infections (13.41%), eye infections (1.94%), ear infections (2.62%), respiratory infection (16.81%), and dental caries (29.54%).[10]

The study was done Atkarhal Block, Manipuri District, Uttar Pradesh. A total of 171 students, 71 (42.71 %) had found more than one morbidity. The primary morbidities were dental problems 62 (36.25%), ear wax 58 (33.91%), nutritional anemia 46 (26.90%), generalized tenderness in the abdomen 20 (11.70%), upper respiratory tract infections 08 (4.67%), speech not clear 01 (1.16%), diminished hearing 02 (1.16%), and vitamin A deficiency 01 (0.58%). [11]

The study was conducted at Meerut. A total of 542 children out of 800 had one or more morbid conditions and 2532 morbidities were found. The majority of children had found nutritional deficiencies (93.4%) followed by oral problems (92.3%), malnutrition (73.1%), skin diseases (59%), behavioral problems (38.2%), diseases of blood-forming organs (35.8%), respiratory problem (23.4%), ear problem (11.4%), and eye problem (10.3%). Malnutrition was the main cause of morbidity (495/1000).[12]

The study was conducted as a part of the School Health Services being provided regularly by the Department of Community Medicine, Rama Medical College Kanpur in Schools of Shivrajpur block. A total of 339 schoolchildren were included in the present study. There were 225 boys (66.4%) out of them. In all 28.6% of children were found underweight. The underweight was found to be greater (33.3%) in girls than (26.2%) boys. The dental caries affected 25.7% of the children, followed by skin infections (20.1%), ear discharge (21.5%), impaired vision (12.4%), anemia (33.9%), and vitamin A deficiency (11.5%). The history of ear discharge was nearly identical in girls (21.5%) & boys (21.7%). (H.C. Tiwari et al.)[13]

The current study was carried out on 688 children from July to September 2014 in randomly selected primary schools of the rural area of Ashapuri and Dahodsub-center of Obaidullaganj Block, District Raisen of Madhya Pradesh. A total of 482 morbidities were found in 404 sick children. The highest prevalence was found in the oral cavity (31.83%), including dental carriers. This was followed by anemia (15.69%), vitamin A deficiency (6.25%), worm infestation (4.94%), scabies (4.06%), URI (3.77%), defective vision (2.32%), defective hearing (0.58%), conjunctivitis (0.44%), and congenital malformation (0.15%).[14]

The study was conducted in primary schools in rural Jalna, Maharashtra, between January and March of 2015, using random selection. The total of 352 children was studying from classes 1 to 5. It was discovered that 60% of school-age children had one or more morbidities. There was a higher prevalence of morbidities in girls than in boys. Nutritional deficiencies were most common (52.27%), which was followed by respiratory infections (15.34%), infectious and parasitic diseases (12.78%), ear diseases (9.65%), eye diseases (9.09%), diseases of the oral cavity (8.23%), diseases of the digestive system (3.69%), and skin diseases (2.27%).[15]

The study was conducted at Dhaura Tanda, Bareilly district, Uttar Pradesh. A total 561 children at 5 to 18 years were taken, including 285 boys and 276 girls. URTI 240 (42.78%), diarrhoea 81 (14.44%), carbuncle/ furancle 78 (13.90%), scabies 63 (11.23%), abdomen pain 22 (3.92%), worm infestation 14 (2.50%), dental caries 6 (1.07%), and defective vision 11 (1.97%) were the most frequent morbidities. The prevalence of malnutrition in the forms of underweight, stunting, and thinning was 41.00%, 23.28%, and 36.18%, respectively.[16]

The study sample was selected from among the 90 villages with a combined population of approximately 2, 00,890 that make up the 41 Panchayat units of the Kattanku Lathur block, over the course of a year. A total 12308 individuals were screened, while women made up 61.9% and men made up 38.1%. Children under five year accounted for 5.3%, school-age children for 43.3%, adults for 39.2%, and senior citizens for 12.3%. The population aged between 5 and 15 years had a prevalence of respiratory disease (22.9%), which was followed by symptoms, and signs (17.5%), digestive disease (17.3%), skin disease (6.2%), and musculoskeletal disease (2.1%).[17]

The survey was conducted in both urban and rural schools in Lucknow district, Uttar Pradesh. The study found 64.8% of the 847 teenage girls between 10 and 19 years of age, were judged to be unwell. Girls with hair issues were 16.4%, which was followed by tooth and gum 14.2%, eye (11.7%), throat (6.9%), ear (5.2%), skin (3.2%) etc. Iron deficiency affected 56.3% of the girls, whereas riboflavin deficiency of 1.3%, vitamin C deficiency of 1.2%, and vitamin A deficiency of 0.5%.[18]

The study was conducted at Raipur, Rani Block, Panchkula district, Haryana. It included all students between 10-15 years of age in classes 6to 8. In total, it was discovered that 87.2% of the adolescents had one or more morbidities. There were 65.8% of children had founded anemic, 37.8% wasted, and 34.1% stunted. Vitamin a deficiency 6%, eye

morbidities (34.1%), ear morbidities (51.1%), skin (10.9%), gastrointestinal morbidities (20.7%), respiratory morbidities (18.3%), and dental had (34.1%).[19]

The study was conducted on 4 primary schools from Chiraigaon, Varanasi, and involved 816 students (aged 5-12 years) in total 384 were boys and 432 were girls. Nutritional deficiencies was most common (56.9%), followed by dental caries (46.0%), eye disorders (9.2%), lips diseases (27.6%), gums diseases (17.3%), ear discharge (13.6%), respiratory infections (27.6%), skin disorders (29.4%), and enlarged lymph nodes (4.4%).[20]

In West Uttar Pradesh, the study was carried out between June 2012 and August 2014. Students between the ages of 5 and 15 who attended urban and rural schools provided the data for the study. A total of 4838 children were checked; there were 2271 males and 2567 females. Ocular morbidity was 29.35%.[21]

The study was conducted on the patients, attending the ophthalmology OPD of VikhePatil Memorial Hospital,Viladghat, Ahmednagar, Maharashtra. A total of 1095 pupils, ages 6 to 15 years were examined. Females made up 4.74% and males 5.57%. In 9.66% of school-age children, an abnormality was found.[22]

The study was conducted in Raipur, Chhattisgarh, between December 2017 and September 2018. It was a prospective, cross-sectional, school-based observational study. A total of 1557 eligible school-going children in the age group 5-15 years were evaluated. 866 girls and 691 boys were present. In all, 21.2% of the youngsters had ocular morbidity.[23]

Discussion

The review findings on childhood morbidity have substantial implications for public health policy in India. Understanding the prevalent health issues among school children is imperative for formulating targeted interventions. The articles that were summarized were from various locations in India, and the age range specified in all of them was 5 to 18 years, with class levels ranging from 1 to 12. A total of 20 publications were evaluated and analyzed. Apart from the 17 publications listed above, 3 of them are primarily concerned with ocular morbidity. The total prevalence of morbidity including all articles, is as follows Singh D K et al. has 38.8%, Kar K et al. 66.2%, Anga V S et al. 81.8%, Dabas N et al. 34.37%, Devi P et al. 87.56%, Rani V et al. 42.71%, N Saluja et al. 67.8%, Shinde M et al. 58.72%, Kausar H et al. 60%, Sachan B et al. 64.8%, Md A B et al. 87.2%, Kaushik A et al. 85.3%, Singh V et al. 29.35%, Naik R et al. 9.66%, Agrawal D et al. 21.2%. The highest prevalence morbidities were as follows:- Singh D K et al.- Skin diseases 25.7%, Kar K et al.- Pallor 47.6%, Anga V S et al.- Dental carries 32.5%, Dabas N et al.- Dysmenorrhoea 47.6%, Vishnoi S K et al.- Dental Caries 23.8%, Kurrey V K et al.- Anemia 66%, Devi P et al.- Anemia 50.15%, Rani V et al.- Dental Problems36.25%, N Saluja et al.- nutritional deficiencies 93.4%, Tiwari H C et al.- Anaemia 33.9%, Shinde M et al.- oral diseases 31.83%, Kausar H et al.- Nutritional Deficiency 52.27%, Singh J P et al.- URTI 42.78%, S. Gopalakrishnan et al.- Respiratory 20.0%, Sachan B et al.- Iron deficiencies 56.3%, Md A B et al.- Anemia 65.8%, Kaushik A et al.- Nutritional Deficiencies 56.9%, Singh V et al.- Refractive error 16.36%, Naik R et al.- Refractive error 73.45%, Agrawal D et al.- Vitamin A deficiency 10%. Enhancing health education and awareness among children, parents, and educators is vital. The discussion highlights the gaps in the current body of research. Further investigations are warranted to delve deeper into specific health concerns, assess the effectiveness of interventions, and understand the socio-cultural factors contributing to these morbidity patterns. Longitudinal studies could provide valuable insights into the long-term impacts of certain health conditions and the effectiveness of preventive measures.

Conclusion

The comprehensive evaluation of morbidity patterns among school-age children in India underscores the critical need for timely and effective healthcare interventions. The analysis of twenty studies across nine states highlights that the Most common average morbidity found in anemia (35.73) followed by oral disease (33.13), skin disease (19.15), respiratory disease (17.95), eye disease (14.63), ear disease (12.54), gastrointestinal disease (14.69), and vitamin A deficiency (4.74). On the analysis of three articles only on the ocular morbidity most common average ocular morbidity

recorded Refractive error (31.67), Squint (0.17), Amblyopia (0.22), Vitamin A deficiency (5.52), Color blindness (2.53), and Stye (0.28) respectively.

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