

Original article

Prevalence of Diarrhoeal Disease, its Seasonal and Age Variation in under- fives in Kashmir, India

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Abstract

Background: Diarrhoeal disease forms one of the two major killer diseases in children under five years of age in the developing world. Data on the prevalence and related factors of diarrhea in Kashmir valley is quite scanty. Thus this study was carried out to find the burden of diarrhoeal disease and the effect of a temperate climate (as compared to a tropical one in rest of India) on the pattern of diarrhoeal disease in Kashmir valley.

Methods: Cross sectional study was carried out using pretested interview schedule.

Results: Overall period (last 15 days) and point (24 hrs) prevalence rates of diarrhoeal diseases among children under age of 5 years were calculated which came to the order of (25.2%) and (9.3%) respectively. Prevalence of diarrhoea decreased significantly with increased age and in summer months.

Conclusion: The burden of diarrhoeal disease in Kashmir is quite high, like most places in the developing world. The age pattern, and seasonal pattern of diarrhoeal disease also resembles that found in studies across India and the developing world.

Keywords: Diarrhoea, seasonal variation, age distribution.

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Introduction

It is a documented fact that diarrhoeal diseases form major public health problem in children under 5 years of age, especially in developing countries. In 2002, in these countries, an estimated 1.6 million children, died as a consequence of diarrhoeal disease. Thus diarrhoeal diseases form the major killer in addition to diseases like ARI, Measles and other such infections. In India, presently the diarrhoeal morbidity stands at 1.07 million cases and mortality stands at 2040 in these children⁽¹⁾ There are international and national efforts to overcome this problem especially in our country where diarrhoea forms a major part of the infectious diseases⁽²⁾. International efforts to combat this world wide problem include the recent Diarrhoeal Disease Control Programme, whose objectives are to reduce diarrhoeal morbidity and mortality⁽³⁾. In order to have a continuous monitoring activity over this Programme, quantification of the current incidence of diarrhoeal illnesses and the associated mortality is needed. Previous estimates of morbidity and mortality have been extrapolated from the results of a limited number of studies without attempting to evaluate such factors as frequency of surveillance, size and location of study

population, and definition of diarrhoea used⁽⁴⁾. Distinct seasonal patterns of diarrhoea occur in many geographical areas. In temperate climates, bacterial diarrhoea occur more frequently during the warm season, whereas viral diarrhoea, particularly diarrhoea caused by rotavirus peak during the winter. In tropical area, rotavirus diarrhoea occurs throughout the year, increasing in frequency during the drier, cool months, whereas bacterial diarrhoeas peak during the warmer, rainy season. The incidence of persistent diarrhoea follows the same seasonal patterns as that of acute watery diarrhoea⁽⁵⁾.

Kashmir being a temperate zone in the tropical areas, has a typical four season pattern of climate changes and it will be interesting to note what effects these climatic conditions produce on the prevalence of diarrhoeal episodes in children. Literature regarding the diarrhoeal diseases epidemiology for Kashmir province is very scanty, which prompted us to undertake this study.

Objectives

To determine the magnitude of Diarrhoeal diseases in children less than five years of age in Kashmir valley and to study the pattern of diarrhoeal disease across the four seasons in Kashmir.

Methods

Study Design: Cross Sectional

Sample Size: Sample size required was carried out using lowest prevalence of diarrhoeal diseases available in literature (13%)⁽⁶⁾. Keeping in view, the prevalence of 13%, a sample size of 10708 was estimated in all 4 seasons, considering 95% confidence level with 5% relative error.

Based on the calculated sample size, a village was taken as a cluster with size of each cluster being 1000-1500. Therefore a total of 96 clusters were to be studied (24 clusters in 4 seasons). The clusters were selected using the following sampling procedure.

Sampling Procedures: The study was carried out using Multi Stage Sampling Procedure.

Stage I: Kashmir division was divided into six districts administratively at the time of this study. Study was conducted in all districts.

Stage II: List of sub-centers in each district were procured from state health department. Two sub-centers from each district were selected using random tables. Thus, there were a total of twelve sub-centers.

Stage III: List of villages (clusters) falling within the operational areas of these specific sub centers were procured. Two villages (clusters) were randomly selected from each sub center and these formed the study clusters. Thus, there were a total of twenty four clusters

Stage IV: List of households from the selected villages were procured and all the households were surveyed. These households with children under five years of age from these selected villages (clusters) constituted our study sampling unit.

A house to house survey was conducted to determine the prevalence, epidemiological risk factors, seasonal patterns and type of diarrhoea among different set of children less than five years of age in different seasons.

The selected child population of less than five years was obtained and enrolled for the study. Accompanied by a nurse from the Department of Community Medicine, SKIMS, Srinagar, household visits were conducted at the end of each season and the details regarding any current episode of diarrhoea (Previous 24 hours) and any past episodes of diarrhoea (last, 15 days) were recorded. The effects of seasonal changes on these episodes were also determined.

Study Period: Data was collected from Jan. 2006 – Dec. 2006

Data analysis:

The data thus collected was subjected to statistical analysis using SPSS Software package. Data was expressed as percentages and the difference in proportions was measured by Chi-Square.

Results

Table 1 Shows an overall prevalence of diarrhoeal diseases in relation to district. Overall point prevalence (24 hours) of diarrhoeal diseases in children under 5 years was found to the order of (9.3%). The point prevalence varied from (8.9%) in district Kupwara to (9.8%) in district Srinagar. Similarly, period prevalence varied from (23.8%) in district Anantnag to (25.9%) in district Kupwara. The point and period prevalence did not differ significantly ($P > 0.05$) across the various districts of Kashmir.

Table 1: Prevalence of diarrhoeal diseases in children <5 yrs across the Districts

Prevalence of diarrhoeal diseases in children <5 yrs in Kashmir across the Districts								
Variable		Total	Diarrhoea during the last					
			24 hours			15 days		
			n	%	Result	n	%	Result
District	Anantnag	1988	188	9.5	p > 0.05 *	474	23.8	p > 0.05*
	Pulwama	1704	161	9.4		439	25.8	
	Srinagar	1812	178	9.8		449	24.8	
	Budgam	2188	202	9.2		564	25.8	
	Baramulla	1780	165	9.3		445	25.0	
	Kupwara	1812	161	8.9		470	25.9	

*($p > .05$) Not significant

Tables 2 and 3 show the association of age with the episodes of diarrhoea during four different seasons.

Table 2: Age distribution in relation with Diarrhoea (current) during four different Seasons

Age distribution in relation with Diarrhoea (current) during four different Seasons							Result	
Characteristics		Diarrhoea during Last 24 hours (Current)				Total 1055		
		Winter	Spring	Summer	Autumn			
Overall Prevalence		n	149	284	484	138	9.3	
		%	5.2	10.5	16.5	5.0		
Age (month)	0 to 5	n	6	13	43	2	64	p<.05*
		%	4.1	9.8	27.9	1.4	11.1	
	6 to 11	n	49	38	123	30	240	
		%	17.1	14.3	32.0	9.6	19.2	
	12 to 23	n	41	68	144	53	306	
		%	6.5	11.7	22.1	8.9	12.4	
	24 to 35	n	24	55	98	42	219	
		%	4.1	9.3	16.0	7.2	9.2	
	36 to 47	n	16	75	48	4	143	
		%	2.6	13.2	8.5	0.7	6.2	
	48 to 59	n	13	35	28	7	83	
		%	2.1	6.1	5.0	1.2	3.6	

*(p<.05) Significant

Table 3: Age distribution in relation with Diarrhoea (15 days) during four different Seasons

Age distribution in relation with Diarrhoea (15 days) during four different Seasons							Result	
Characteristics		Diarrhoea during Last 15days				Total		
		Winter	Spring	Summer	Autumn			
Overall Prevalence		n	389	660	1247	545	2841	p<.05
		%	13.5	24.4	42.6	19.7	25.2	
Age (month)	0 to 5	n	30	26	66	33	155	
		%	20.3	19.5	42.9	23.7	27.0	
	6 to 11	n	93	149	242	138	622.0	
		%	32.5	56.0	63.0	44.4	49.9	
	12 to 23	n	87	153	269	189	698.0	
		%	13.8	26.3	41.3	31.8	28.4	
	24 to 35	n	52	162	270	96	580.0	
		%	8.9	27.4	44.2	16.4	24.4	
	36 to 47	n	54	83	238	47	422.0	
		%	8.9	14.6	42.0	8.3	18.3	
	48 to 59	n	73	87	162	42	364.0	
		%	11.9	15.2	29.0	7.3	15.7	

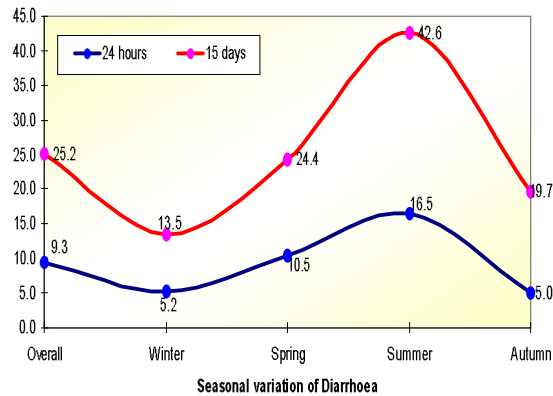
Table 4: Prevalence of diarrhoeal

diseases in children <5 yrs in Kashmir across the seasons

Prevalence of diarrhoeal diseases in children <5 yrs in Kashmir across the seasons								
Variable		Total	Diarrhoea during the last					
			24 hours			15 days		
			n	%	Result	n	%	Result
Season	Overall	11284	1055	9.3		2841	25.2	
	Winter	2876	149	5.2	p < 0.05	389	13.5	p < 0.05
	Spring	2709	284	10.5		660	24.4	
	Summer	2927	484	16.5		1247	42.6	
	Autumn	2772	138	5.0		545	19.7	

Fig 1:
Seasonal

Variation of Diarrhea



Overall point (24 hours) and period prevalence (last 15 days) of diarrhoea irrespective of age group and seasons was (9.3%) and (25.2%) respectively. 6 – 11 months age group showed higher prevalence of diarrhoea (19.2%) point prevalence and (49.9%) period prevalence on an average in all seasons. All age group had significantly higher prevalence of diarrhoea during summer season. This was found to be statistically significant.

Table 4 shows Point prevalence was highest during summer season (16.5%) followed by spring (10.5%). was found least during winter and autumn season i.e., (5.2%) and (5.0%). The point prevalence differed significantly (P<0.05) across the various seasons.

The overall period prevalence (last 15 days recall) of diarrhoeal diseases observed was 25.2%. Period prevalence was found to be highest during summer months (42.6%) and lowest during winter months (13.5%). The same was found to be (24.4%) and (19.7%) in spring and Autumn

seasons respectively. The period prevalence also varied significantly ($P < 0.05$) across various seasons.

Discussion

In the present study, an overall period (last 15 days) and the point (24 hrs) prevalence rates of diarrhoeal diseases among children under age of 5 years were found to be 25.2% and 9.3% respectively. Both period and point prevalence rates of diarrhoea decreased significantly with increased age. These rates were highest in the age group of 6–11 months (49.1%) and were lowest among children aged 48–59 months (15.7%). This might be the result of the decline in maternally acquired antibodies and the introduction of weaning foods that are given in unhygienic way in rural areas. In addition, crawling usually begins at this age and the risk of putting contaminated materials and fingers in the mouth during teething, is high especially in the rural environments, where these fingers are usually contaminated due to improper personal hygiene. In higher age groups, probably lower rate may be because the children have started adopted to the environment and food habits and the immunological system have developed to a large extent.

Prevalence of diarrhoea was found to be more during the summer months, (42.6%) because in hot and humid weather, the growth of pathogenic organisms in the food and other material is increased. Summer is also the breeding season for flies that act as mechanical vectors carrying enter pathogens to food and water. Whereas in winter, there is intense cold in this part of the country and all the routes of spread decline because of lower proliferation of organisms and lesser contact between people due to cold. However the prevalence of diarrhoeal disease did not differ significantly across the various districts of Kashmir Valley in this season.

The sex of the child had no significant effect on period prevalence rate of diarrhoea whereas in point prevalence, male gender (10.4%) was more prone to diarrhoea than that of females (8.1%) which were significant.

These results run conformity with the study conducted by Banerjee B et al ⁽⁷⁾ which showed diarrhoeal prevalence of 31.67% in the (2 wks) and also found that the frequency of diarrhoea was significantly higher among children of age group 6 – 24 months. Similarly study conducted by Gilany A H E L et al ⁽⁸⁾ in Egypt where in they found point prevalence (24 hrs) of 8.7% and period prevalence (last 14 days) of 23.6% of diarrhoeal disease respectively.

Prevalence of diarrhoea was found to be more during the summer months, (42.6%). Similarly, frequency of diarrhoea in these studies ^(7,8) was significantly higher among children aged 6–11 months and in the summer season. In another developing country Nigeria, ONIGA et al (1996) ⁽⁹⁾ also found diarrhoeal disease significantly higher among children aged 6 – 11 months and during summer season.

Sircar B.K. et al ⁽¹⁰⁾, conducted a study to determine the profile of diarrhoeal disease in a group of 383 children below 5 years of age in two typical slums of Kolkata (India). They found the overall annual incidence of diarrhoeal illness in these children during the first year of the study as 1.1 per child, however the incidence was higher 1.9/ child in children below two years of age and declined progressively with advancing age. Most (99.5%) of the diarrhoeal episodes were mild in

nature and not a single child required hospitalization, about 53.4% children had no diarrhoeal symptoms. Similar findings were seen by Kumar V et al⁽¹¹⁾, Bhan M.K. et al⁽¹²⁾, Robert E. Black et al⁽¹³⁾, Uribe F et al⁽¹⁴⁾, Singh J et al⁽¹⁵⁾ in various parts of India

Report of National Child Survival and Safe Motherhood Programme New Delhi (1994) showed incidence of diarrhoea as 1.2 episodes / child / year in Bihar and 3.5 episodes / child / year in Jammu and Kashmir and Tamil Nadu⁽¹⁶⁾

R.L. Guerrant et al⁽¹⁷⁾, conducted a study in North Eastern Brazil it was seen that prevalence of diarrhea was higher during rainy season of October & drier months.

WHO Report (1992)⁽⁵⁾ reveals that distinct seasonal patterns of diarrhoea occur in many geographical areas. In temperate climate, bacterial diarrhoea occurred more frequently during the warm season, whereas viral diarrhoea, particularly diarrhoea caused by Rota virus, peaked during the winter. In tropical areas, Rota virus diarrhoea occurred throughout the year, increasing in frequency during the drier, cool months, whereas bacterial diarrhoeas peaked during the warmer, rainy seasons. The incidence of persistent diarrhoea followed the same seasonal patterns as that of acute watery diarrhea.

Conclusion

Overall period (last 15 days) and point (24 hrs) prevalence rates of diarrhoeal diseases among children under age of 5 years were calculated which came to the order of (25.2%) and (9.3%) respectively. Prevalence of diarrhoea decreased significantly with increased age. These rates were highest in the age group of 6–11 months and were lowest among children aged 48-59 months. Prevalence of diarrhoeal disease did not differ significantly across the six districts studied in Kashmir Valley. Prevalence of diarrhoeal disease was significantly higher in summer months.

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