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## SERUM IGA LEVELS IN SCHOOL GOING CHILDREN IS INDEPENDENT OF NUTRITIONAL STATUS AND MORBIDITY Profile- a Cross Sectional Study of Urban Vadodara

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**ABSTRACT:** IgA levels are considered as one of the most important determinant of immunity in children and undernutrition may result in deviated IgA levels due to repetitive infection resulting in acute respiratory infections (ARI) and diarrhoea. Hence, the study was undertaken to determine serum IgA levels of 80 undernourished and 30 nourished children using Immunoturbidimetric assay and correlate with their nutritional and morbidity status. Due to the known variability of immunoglobulin levels, subjects were divided into three groups based on their age range i.e. 5-7; 7-10 and 10-12 years. Results indicated that mean IgA levels of undernourished children were 110.89 $\pm$ 37.78 mg/dl 131.81 $\pm$ 43.43 mg/dl and 168.00 $\pm$ 64.75 mg/dl for age group 5-7; 7-10 and 10-12 years respectively. Mean diarrhoeal episodes were reported to be 0.53 $\pm$ 1.20; 0.82 $\pm$ 1.14 and 1.17 $\pm$ 1.26 and mean episodes of acute respiratory infection (ARI) in past one month were 2.21 $\pm$ 1.89; 1.43 $\pm$ 1.47 and 1.83 $\pm$ 1.19 for above mentioned age range. The mean serum IgA level of undernourished children between 5-10 years and 7-10 years were higher than the healthy children, although this difference was not statistically significant. A significant positive correlation was seen between undernutrition status and serum IgA levels of 10-12 years of school children. **Key words:** Serum IgA, Undernutrition, School Children, Vadodara, Morbidity

## **INTRODUCTION**

Under nutrition, immune system, and infectious diseases are interlocked in a complex negative cascade (Scrimshaw et al 1968). There is growing evidence of considerable burden of morbidity and mortality due to infectious diseases and malnutrition in school children (Das *et al 2012*). Severe malnutrition leads to an immunodeficiency state known as NAIDs/ Nutritionally Acquired Immune Dysfunctions (Issac H, 1990). Charlotte et al (1975) also stated the significant association between the parameters of PCM (low total serum protein and albumin and/or markedly decreased anthropometric measurements for age) and decreased cellular immunity. Serum IgA is considered one of the important aspect of cell mediated immunity, as it is the predominant antibody in the secretions that bathe mucosal surfaces such as the gastrointestinal, respiratory, and genito-urinary tracts and in external secretion such as colostrums, milk, tears, and saliva. IgA represents by far the largest area of contact between the immune system and the environment and can be considered as an important point of exposure to inhaled and ingested pathogens (Kaetzel, 2007). To our best knowledge, there is scanty data in terms of serum IgA levels specifically in undernourished children belonging to India. Therefore, the objective of the present study is to communicate a profile of serum IgA levels and its relation with nutritional status and morbidity profile of school going children of urba Vadodara.

## METHODOLOGY

The present study was conducted in a semi private school located in a slum area of urban Vadodara, Gujarat, using purposive sampling. All (n=218) the children studying in class I-V were selected for anthropometric assessment and their nutritional status was determined using WHO standards of BMI for age and gender (2007). Based on their willingness to further continue their participation in the study, parents of 161 children out of 218 were interviewed for their, morbidity profile. The investigator recorded the number of episodes in past one month for occurrence of ARI and diarrhoea. Confirmation of diarrheal episodes was done by asking questions regarding number, time and duration of stools passed by the child at the time of diarrhoeal episodes (WHO, 2013).

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Information regarding episodes of ARI was limited to reported incidences of cold and cough by the parents. Further, Sera of 80 undernourished and 30 nourished children were collected at the school by trained and certified technician and stored at low temperature until analysis and serum IgA was determined through Immunoturbidimetric assay (DiaSys, 2007).

#### **Ethical statement**

The study approval was obtained from the ethical committee of the home institution ethical board in compliance with the guidelines issued by Indian council of Medical research

(No.F. C. Sc FN IECHR/2012/14).

Written permission from the school principal was availed to carry out the work. All the children from class I-V were enrolled for the study. Written consent from the parents of the children (in local language) was also availed.

### RESULTS

Undernutrition was prevalent in 71% of primary school children and only 24% of children were found to be nourished (Figure 1). More number of boys being under nourished (73%) than girls (69%).



Figure 1

Figure 2 depicts that most (86%) of the children belonged to undernutrition grade I and II and more boys were seen in grade III undernutrition (17.24%) compared to girls (10.29%).



Table 1, derives that mean ARI episodes  $(2.21\pm1.89, 1.43\pm1.47 \text{ and } 1.83\pm1.19 \text{ for the age group 5-7, 7-10 and 10-12 years respectively})$  shows a decreasing trend as the age advances.

International Journal of Applied Biology and Pharmaceutical Technology Page: 100 Available online at <u>www.ijabpt.com</u> Whereas, it is contrary in the case of mean diarrhoeal episodes  $(0.53\pm1.20\ 0.82\pm1.14$  and  $1.17\pm1.26$  for the age group 5-7, 7-10 and 10-12 years respectively).

Age Range	n	Mean ARI episodes	Mean Diarrhoeal episodes	Mean IgA level (mg/dl)
5-7 Years	28	2.21±1.89	0.53±1.20	110.89±37.78
7-10 Years	66	1.43±1.47	0.82±1.14	131.81±43.43
10-12 Years	12	1.83±1.19	1.17±1.26	168.00±64.75

Table 1 -Age Wise Mean Values For Diarrhoeal and ARI Episode And IgA Levels

Table 2 reveals non significant correlation between ARI, diarrhoeal episodes and serum IgA levels of school children.

Ago Dongo	n	ARI Episodes	Diarrhoeal Episodes
Age Kange	11	ʻr'	ʻr'
5-7 Years	28	0.319 NS	-0.182 NS
7-10 Years	66	-0.017 NS	0.060 NS
10-12Years	12	0.191 NS	0.80 NS

Table 2. Association between Morbidity Status and Serum IgA of School Children

The mean serum IgA level of undernourished children between 5-10 years and 7-10 years were higher than the healthy children, although this difference was not statistically significant (Table 3).

Table 3-Mean I	Difference in	Serum IgA	levels of No	urished and <b>I</b>	Undernourished (	Children

Age Range	Nutritional Status					"t"	
	Normal				Underno		
	n	Mean Nutritiona l Grade	Mean Serum IgA level mg/dl	n	Mean Nutritional Grade	Mean Serum IgA level mg/dl	
5-7 Years	11	Normal	98.9±36.31	18	-1.88	112.16±45.77	0.86 NS
7-10 Years	19	Normal	134.89±43.58	52	-1.94	138.76±72.52	0.27 NS
10-13 Years	2	Normal	192±19.79	10	-2.3	163.2±70.20	1.09 NS

# Mean Nutritional Grade= -3 Severe Undernutrition; -2 Moderate Undernutrition and -1 Mild Undernutrition

In Table 4, a significant positive correlation was seen between undernutrition status and serum IgA levels of 10-12 years of school children.

Table 4-Correlation between Undernutrition Status and Serum IgA Levels of Undernourished   Children						
Age Range	n	Mean Nutritional Grade#	Mean Serum IgA level mg/dl	''r''		
5-7 Years	18	-1.88 ±0.67	112.16±45.77	-0.36 NS		
7-10 Years	52	-1.94 ±0.66	138.76±72.52	0.216 NS		
10-12 Years	10	-2.3±0.48	163.2±70.20	0.519*		

# Mean Nutritional Grade= -3 Severe Undernutrition; -2 Moderate Undernutrition and -1 Mild Undernutrition \*Significant correlation

#### DISCUSSION

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Macpherson et al, in the year 2008 ascertained that immunization or infection at mucous membranes resulted in high titer of protective antibodies at the mucosal site with absent or low titers in serum, which is also the case of present study. Severity and frequency of respiratory tract infections were not found to be correlated with decreased serum concentrations of IgA (French et al, 1995).

Contrary to the present study, Suskind et al in 1995 said that IgA levels were higher in malnourished than control children and returned to normal with treatment.

#### CONCLUSION

Mean serum IgA levels were different in healthy and undernourished children but the difference was statistically insignificant. A trend of association was seen between the serum IgA level and Undernutrition status and it is more visible with increasing age (10-12years) of school children.

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