

## STUDY OF THE EFFECT OF AGE AND GENDER ON PREVALENCE OF PALLOR IN CHILDREN BETWEEN TWO YEARS TO BELOW FIVE YEARS OF AGE

ANIL GUPTA<sup>a1</sup>

<sup>a</sup>Department of Biochemistry, Eklavya Dental College & Hospital, Kotputli, Rajasthan, India

### ABSTRACT

Anemia is a world-wide health problem in children. It can be easily detected, in routine practice by the presence of Pallor in diverse anatomical sites, mainly conjunctiva, nail beds and crease of palm. Descriptive, prospective study was conducted in the city of Fazilka, Punjab, to observe the prevalence of Pallor in children in different strata of city, who were between 2 years to below 5 years of age. Study included 440 children, selected by random multi stage sampling method. Analysis showed that 26% of the children exhibited Pallor. Children in age group, (>3y - <5y) had (32%) prevalence of Pallor, higher, than the children in younger age group, (2y -3y) with prevalence, (16.5%) of Pallor.

**KEYWORDS :** Pallor, Anemia

Pallor is the yellow discoloration of the skin, mucosa, body secretions. It is a vital clinical sign of Anemia. Primary health check-up and physicians in remote areas and in primary care centres, normally, rely on the detection of Pallor to sense the presence of anemia in patients (Weber et al, 1997).

Pallor is visible in those parts of body in which capillaries are superficial. Conjunctiva, Nail beds, Crease of palm, Labial mucosa are the important sites of body to observe pallor. Therefore, it can be easily and with little experience, detected by a clinician as well as by a health worker. It is a precious clinical parameter, where, laboratory facility is inadequate (Bunn, 1994).

Anemia due to deficiency of iron, vitamin B12 or folic acid, and/or due to composite cause, is the key health problem affecting children in both developed and developing countries. Iron deficiency anemia constitutes about 50% of the total anemic children in the world (WHO, 2001).

### Rationale

Anemia is the serious health disorder, affecting physical, mental and intellectual health of children under the age of five years. This is the prime period in the life cycle of human being, wherein, growth and development of a child takes place.

Prevalence of pallor is well documented at the national level, but least data is available specific to a region and locality. Hence, study was undertaken to assess prevalence of pallor in children aged between 2 years to below 5 years in city of Fazilka in Punjab.

### Aim and Objectives

#### Aim

The study aimed at to find out the prevalence of Pallor in children under age of five years.

#### Objectives

- To assess overall prevalence of Pallor in children.
- To assess differential prevalence of Pallor according to age groups and gender of children.
- To assess effect of Age and Gender on prevalence of Pallor in children.

### MATERIALS AND METHODS

#### Research Design

Descriptive and Prevalence study design.

#### Sampling Design

#### Study Area

Study was conducted in and around the city of Fazilka in Punjab. This city is located on Indo-Pak border in Punjab. As per census report of 2001, Fazilka has a population of 67,424, comprising 52% males and 48% females. In Fazilka, 13% of the population is under 6 years of age.

#### B. Sample Source and Sampling Units

Children below the age of five years, residing in and around Fazilka, Punjab, according to the inclusion and exclusion criteria, constituted the sample source and sampling units.

#### C. Sample Selection Criteria

##### Inclusion Criteria

Children between 2 years to below the age of 5

<sup>1</sup>Corresponding author

years.

All the children who were physically fit so as to cooperate in the study.

#### Exclusion Criteria

Children who were critically ill.

The children who were crying and agitated, did not participate in anthropometric measurements procedure.

#### D. Sampling Method

Random, Multi-stage sampling technique was adopted.

In the first stage, the city was divided into three strata as stated below:

Elementary schools

Anganwadi (child care centres)

Slum areas.

In the second stage, schools, anganwadi and slum areas were selected randomly from the sample frame.

In the third stage, all the children between two years to below five years of age, were selected as per the above stated sample selection criteria.

#### E. Sample Size Determination

Sample size was determined according to the following formula:

$$\text{Sample size (n)} = Z^2 \times p \times q / d^2$$

Z= value of 1.96 was used at 95% of confidence interval

p= 47% prevalence of malnutrition in india

q= ( 1- p)

d= 5% margin of error

Sample size of 382 was calculated by the above formula. To this sample size, non response rate of 15% was added, hence, after final adjustment, sample size of 440 was finalized.

#### Data Collection Design

Primary data were collected by the under stated methods.

#### Data Collection Instruments

Observation and Interview schedules

Used for demographic data and clinical signs & symptoms.

#### B. Data Collection Methods

### OBSERVATION

To assess the General physical appearance.

To collect information regarding Age, any abnormal habit, dietary habit of children.

Inspection

Anatomical sites were inspected to elucidate Pallor as:

Conjunctiva

Crease of palm

Nail beds

Palpation

Abdomen was palpated to find out the presence of Hepatomegaly and Splenomegaly.

Interview

Parents and care takers were interviewed to collect information regarding any abnormal habit and other relevant information about the children.

#### C. Data Measurement Scales

Interval scale was used for recording independent variable, Age.

Nominal scale was used for independent variable, Gender.

Clinical sign & symptoms, were expressed in percentage scale (n%).

Statistical Design

Descriptive study

Age and Gender were taken as Predictor variables. Pallor was taken as Out-come variable.

Pallor was described in the form of Prevalence.

(Prevalence of a variable) = number of participants affected / total number of participants × 100

#### B. Bivariate analysis

Odds ratio was computed with 95% C.I.

#### C. Inferential analysis

Inference was deduced by Chi square test for independence.

D. (p) value of  $\leq 0.05$  was taken as statistically significant.

### RESULTS

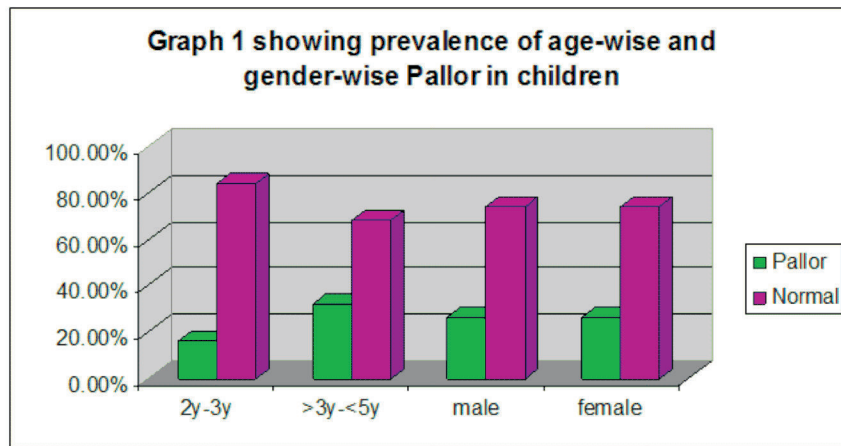
The descriptive and cohort study was under taken that involved the children between 2y to below 5y of age, selected from different sections of society in the city of Fazilka in Punjab. It had a proportion of 240, 127 and 73 children from Schools, Anganwadi and Slum areas,

**Table 1 : Distribution of Children in Different Strata**

Strata	Participants (n/N)
Schools	240/440
Anganwadi(child care centre)	127/440
Slum residents	73/440

**Table 2 : Age Wise and Gender Wise Prevalence of Pallor in Children Under Age of Five**

Category	Age		Gender	
	<3y	>3y -<5y	Male	Female
Pallor (n%)	16.5% (28/169)	32% (87/271)	26% (68/260)	26.1% (47/180)
Normal (n%)	83.4% (141/169)	68% (184/271)	74% (192/260)	73.9% (133/180)



**Table 3 : Chi Square Test of Independence Between Pallor and Age Groups in Children**

Characteristics	(2y – 3y)	(>3y – <5y)	Chi square value	P value
Pallor	28	87	(13.1)	(0.0003) highly significant

**Table 4 : Chi Square Test of Independence Between Pallor and Gender in Children**

Characteristics	Male	Female	Chi square value ( $\chi^2$ )	P value
Pallor	68	47	(0.0001)	(0.99)
Non- pallor	192	133		Not significant

respectively, as shown in Table 1.

The descriptive analysis of variables, revealed the prevalence of Pallor in children. It was found to be 16.5% (28/169) and 32% (87/271) in the age groups, (2y-3y) and (>3y - <5y), respectively. The overall prevalence of Pallor in children under five year of age was 26% (115/440).

Further, the prevalence of pallor was demarcated into two categories as 26% (68/260) in the Male group of children and 26.1% (47/180) in Female group of children

below age of five years as depicted in Table 2, Graph 1.

The bivariate analysis of categorical variable, (Pallor) was performed with another variable, Age with the help of computing Odd ratio with 95% C.I.

Odd ratio between Pallor and Age of children

$$\text{Odd Ratio (OR)} = (0.1986/0.4728)$$

$$R = (0.42)$$

95% C. I. of the odd ratio (0.2601 0.628).

This odd ratio was tested by non-parametric test,

Chi square test for independence. It provided a value, ( $\chi^2 = 13.1$ ,  $df=1$ ), at a significance level, ( $p=0.0003$ ), compared with than the table value ( $\chi^2 = 3.84$ , at  $df=1$ ,  $p=0.05$ ) as shown in Table 3. Hence, null hypothesis was rejected.

Another, bivariate analysis involving dichotomous categorical variable, (Gender) was performed with variable, Pallor with the help of computing Odd ratio with 95% C.I.

Odd ratio between Pallor and Gender of children

Odd Ratio (OR) = (0.354/0.353)

R = (1.002)

95% C. I. (0.6503 1.5446).

Again, this odd ratio was verified by Chi square test of independence between variables, Pallor and Gender in the children under five year of age. It furnished a value, ( $\chi^2 = 0.0001$ ,  $df=1$ ), at significance level, ( $p=0.99$ ), which was compared with table value, ( $\chi^2 = 3.84$  at  $df=1$ ,  $p=0.05$ ), as shown in Table 4. Hence, the null hypothesis was accepted at 5% significance level.

## DISCUSSION

Present study showed that 26% of the children under Age of five years in city Fazilka, Punjab, suffered from Anemia as depicted by physical sign of pallor. Anemia is a world -wide health crisis in children. Almost, similar prevalence of pallor (clinical pallor detected in 23% of children), by (Kapur et.al, 2002), in their study on children Aged 9months to 36months, in urban slum.

In another study by (Bazroy et all, 2005), on children under age of five years in refugee camp, detected prevalence of Pallor as 7.2% in general children and 22% in children of fishermen community.

Further, it has been found that the prevalence of Anemia is variable worldwide, depending on the contributory factors. Approximately, 50% of children are anemic globally by ( Maclean et. all, 2009).

The present study exhibited the statistically strong association, ( $p=0.0003$ ) between Age group of children and presence of Pallor. In the present study, children older than 3years had higher prevalence of pallor (32%) in comparison to children younger than 3 years (16.5%). This fact is

proved by Odd ratio, (0.42), stating that the younger age group of children has even less than half the probability of becoming Anemic in comparison to older age group. The finding in present study is contradictory to the earlier study by (Getaneh etall, 2000), in which it was observed that the pallor was higher in children younger than 2 years.

Plausible explanation is the rising trend of consumption of junk food, potato wafers and snacks, which is prevalent in all socio-economic strata in the society. These food stuff are severely deprived of iron content, give the children a feeling of satiety. Children of younger age group are dependent on food provided at home. But the children in older age group, are more habitual of the above said dietary habit, that take away the energy and minerals.

This study showed the prevalence of pallor in girls, a little higher, (26.1%) than boys (26%), not significant, ( $p=0.99$ ) statistically. This fact is also confirmed by odd ratio, (1.002), stating that both the groups have equal odd of getting anemia.

imilar data has been obtained from earlier study by (Singh, 2014), supporting present study, that the prevalence of Pallor in female children was higher than male children, non-significantly.

Contradictory findings were observed in study by (Gupta etall, 2012), on children in Tsunami affected areas in Tamil Nadu.

In this study, male children had 22% of pallor, non-significantly, higher than female children (21.4%).

## CONCLUSION

Pallor is a clinical manifestation of anemia. It is detected by a physician during health evaluation of a child. Parents, teachers, anganwadi workers should be made aware to assess the definite sign of Pallor on palm and nail beds, which has high sensitivity and specificity to anemia. Composite efforts are necessary to prevent and manage anemia.

## REFERENCES

- Bazroy J., Panda P., Purty A. J., Philip B., 2005. Refugee Children in India: A Comparative Study. HKJ Paediatr (new series), 10:101-8.

**GUPTA : STUDY OF THE EFFECT OF AGE AND GENDER ON PREVALENCE OF..**

- Bunn HF, 1994. Anemia. In: Harrison's Principles of Internal Medicine., Edited by Kasper D. L., Jameson J. L., Braunwald E., Fauci A. S., Hauser S. L., Longo D. L. 13th ed. New York, McGraw-Hill, 313-50.
- Getaneh T., Girma T., Belachew T., Teklemariam S., 2000. The utility of pallor detecting anemia in under five years old children. *Ethiop Med. J.*, 38 (2):77-84.
- Gupta S. K., Khare N. B., Gaur N. C., Varshney A. D., 2012. A Study to Assess the Health Status of Under Five Years Children in the Tsunami Affected Area of Rural Tamil Nadu. *National Journal of Medical and Dental Research*, 1(1): 09-13.
- Kapur D., Aggarwal N. K., Sharma S., 2002. Detecting iron deficiency anemia among children (9-36 months of age) by implementing a screening programme in an urban slum. *Indian Pediatrics*, 39: 671-676.
- McLean E., Cogswell M., Egli I., Wojdyla D., Benoist B. de, 2005. Worldwide prevalence of anaemia, WHO Vitamin and Mineral Nutrition Information System. *Public Health Nutrition*. 12(4):444-454.
- Singh S. P. C., 2014. Prevalence of Nutritional Anemia in Primary School Children in Urban Slums Areas of Hyderabad, Andhra Pradesh. *British Biomedical Bulletin*, 2 (1):147-154.
- Weber M. W., Kellingray S. D., Palmer A., Jaffar S., Mullholland E.K., Greenwood B.M, 1997. Pallor as a clinical sign of severe anaemia in children: an investigation in the Gambia. *Bull World Health Organ*. 75 (1):113-8.
- World Health Organization, 2001. Iron deficiency anemia assessment, prevention and control: A guide for programme managers. Geneva.