International Research Journal of Advanced Engineering and Science
ISSN: 2455-9024

Study of Anemia among Adolescent Females by the Method of Success Testing

M. Reni Sagayaraj[1], A. Merceline Anita[2], S. Kalaiarasi[3], A. Chandrababu[4]
[1, 2, 3]Department of Mathematics, Sacred Heart College, Tirupattur, India
[4]Department of Mathematics, Noorul Islam University, Nagercoil, India

***Abstract*—** *The Most Common Cause of Anemia is Iron deficiency. Growing number of cases of tiredness in college girls triggered us to suspect Anemia and undertake this study. The nutritional status as well as Haemoglobin level among Adolescent girls has been very low as compared to developed countries. Low consumption of Iron rich foods and faulty dietary pattern of developing countries attributes to this problem. This paper presents a Survey on the Study of Anemia among Adolescent girls using testing method. As a result of this Survey, we found that Rural college going girls are more healthier than college girls from Urban areas.*

***Keywords*—** *Reliability, haemoglobin, anemia, success testing.*

I. INTRODUCTION

The Physical transition from Childhood to Adolescent is called Adolescence. It is one of the fastest and gunning periods in human development. In this period, many physical changes take place due to secretion of hormones both in boys and girls. The changes of puberty are dramatic and momentous. During this period, Anemia is a widely prevalent nutritional problem among young generation, which is mainly caused due to iron deficiency [2]. Nutritional Anemia is one of the most common haemological abnormalities found in children. It can be defined as the reduction in oxygen carrying capacity or as a reduction in red cell mass of the body. Among the various types of nutritional Anemia, Iron-deficiency Anemia is the most common, affecting more than 2 billion people globally [6].

In Studies conducted in developing countries, Adolescent Anemia was reported as the greatest nutritional problem. Adolescence is a crucial phase of growth in the life cycle of an individual. It is a period of transition between childhood and occurring between 12 to 18 years of age. Anemia not only affects the present health status, but also has deleteriane effects in the future [3]. Learning cognitive function and scholastic performance is also severely affected. The rates of low birth weight, pre-maturity, neonatal and infant mortality among children born to under nourished adolescent girls is high. Later on, these under nourished girls become anemic and produce low birth weight babies. Anemia is a major public problem worldwide.

In India, Adolescent girls, who constitute a sizeable segment of its population form a vulnerable group and are at a greater risk of morbidity and mortality. The added burden of menstrual blood loss (normal/abnormal) precipitates the crisis too often [6].

The paper is organized as follows:

In Section 1, we give the Introduction. In Section 2, we present the method and materials. In Section 3, we deal with the concept of success testing in achieving Reliability. In Section 4, we present the numerical data collected for the study of Anemia in Adolescent girls. In Section 5, we give the conclusion of our study.

II. METHODS AND MATERIALS

As the prevalence of Anemia in females of Adolescent age is quite common due to the low consumption of healthy foods and fault dietary pattern; the study was conducted for the girls belonging to the age group of 18-22 of Sacred Heart College, Tirupattur, under the supervision of the medical officers. The Privacy of data is strictly maintained for the sake of the participants. Hemoglobin level was measured by experienced laboratory technician using Drabkin's method.

For Hemoglobin Estimation, 10 microlitre of capillary blood was taken in a hemoglobin micropipette and transformed to pre - numbered test tubes containing 2.5ml of Drabkin's reagent [6].

III. SUCCESS TESTING

This is an important type of testing that can be used in the medical devices, and it is practiced in receiving inspection and in engineering test laboratories where no-failure test is specified. Normally, the primary objective of this type of testing is to ensure that a specified Reliability level is achieved at a stated Level of Confidence. Thus, for zero failures, the lower 100 (1- α) percent confidence limit on the required level of Reliability can be expressed as follows:

$$R_L = \alpha^{\frac{1}{n}} \tag{1}$$

where

α is the consumer's risk (i.e., the level of significance)

n is the total number of items placed on test.

Thus, with 100 (1- α) percent confidence, we may write

$$R_L \leq R_A \tag{2}$$

where

R_A is the actual or true reliability.

By taking the natural logarithms of both sides of equation (1), we get

$$InR_L = \frac{1}{n} In\alpha \tag{3}$$

Rearranging Equation yields (3)

M. Reni Sagayaraj, A. Merceline Anita, S. Kalaiarasi, and A. Chandrababu, "Study of anemia among adolescent females by the method of success testing," *International Research Journal of Advanced Engineering and Science*, Volume 1, Issue 4, pp. 82-84, 2016.

International Research Journal of Advanced Engineering and Science
ISSN: 2455-9024

$$n = \frac{In\alpha}{InR_L} \quad (4)$$

The desired level of confidence, DLC, may be expressed as follows:

DLC= 1-α (5)

Rearranging Equation (5), we get

α=1-DLC (6)

Using equations (2) and (6) in equation (4) yields

$$n = \frac{ln(1-DLC)}{lnR_A} \quad (7)$$

The above equation can be used to determine the total number of units or items to be placed on test for given Reliability and Level of Confidence [1].

Numerical Data

In the present study of 160 students, their Hemoglobin level was measured by using Drabkin's method and the results are tabulated and given below.

Table of Hemoglobin Estimation by Drabkin's method (160 students)

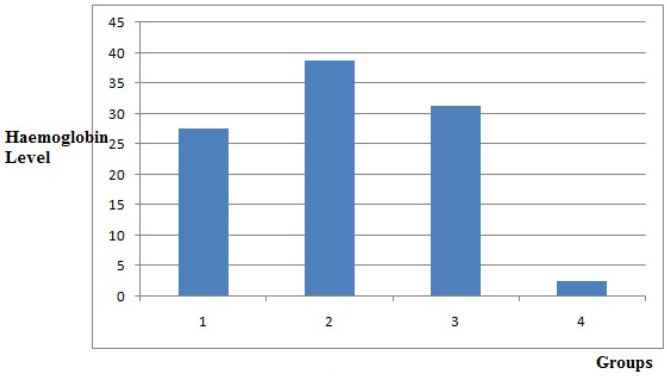
Sl. No	Haemoglobin level (gms %)	Sl. No	Haemoglobin level (gms%)	Sl. No	Haemoglobin level (gms %)
1	11.6	21	12.4	41	11.6
2	12.4	22	13.6	42	12.8
3	13	23	14	43	12.4
4	14	24	10.8	44	11.8
5	12	25	10	45	11.6
6	10.6	26	14.4	46	13.4
7	10	27	12.2	47	7
8	12.2	28	13.2	48	10.8
9	11	29	11.6	49	9
10	12.2	30	7.2	50	15.2
11	7	31	10	51	13.6
12	12	32	12.6	52	10.6
13	14.2	33	11.8	53	8.4
14	13	34	11	54	11.4
15	6.8	35	14	55	8.2
16	11.2	36	9.8	56	10.4
17	14	37	12	57	12.6
18	13.2	38	12.6	58	11.8
19	13	39	12.8	59	10.4
20	10	40	15	60	11.6

Sl. No	Haemoglobin level (gms %)	Sl. No	Haemoglobin level (gms%)	Sl. No	Haemoglobin level (gms %)
61	7	91	11.2	121	9
62	9.4	92	12	122	9.8
63	10.8	93	8.2	123	9.8
64	12.4	94	12.4	124	8.4
65	11.4	95	8	125	9.6
66	10.2	96	9.2	126	8.8
67	10.8	97	11.6	127	9
68	12	98	9.2	128	8.6
69	11.2	99	9.6	129	10
70	11.6	100	12.2	130	9.2
71	10.8	101	9.2	131	9.6
72	12.2	102	13.6	132	8.8
73	11.6	103	9.4	133	9.8
74	10	104	8.6	134	9.2
75	9	105	12.2	135	9.4
76	10	106	8	136	7.8
77	10.2	107	12.2	137	9.8
78	10.6	108	10	138	8.4
79	10.4	109	10.4	139	9.2
80	11.8	110	11	140	9.4
81	12.6	111	10	141	10.4
82	10.2	112	9.6	142	9
83	12.4	113	11	143	10.2
84	11	114	12	144	8.8
85	11.4	115	10.2	145	11.2
86	10.4	116	8.4	146	7.4
87	11.8	117	8.4	147	11.6
88	11.2	118	10.6	148	9.6
89	10	119	11	149	7.8
90	11.4	120	9.4	150	11.4

Sl. No	Haemoglobin level (gms %)	Sl. No	Haemoglobin level (gms%)
151	8.2	156	12.4
152	9.4	157	8.8
153	10.2	158	12
154	9.8	159	10.4
155	10.4	160	9

Haemoglobin-wise distribution

Hb (gm %)	No. of Student cases	Percentage %
Normal(>12)	44	27.50
Mild(10 – 11.9)	62	38.75
Moderate(7 – 9.9)	50	31.25
Severe(<7)	4	2.5
Total	160	100



Haemoglobin - wise distribution of the study Group

For 99% Reliability of the test at 80% confidence level, the number of students to be tested was found by using the formula (7) given in success testing, which ensures that a specified Reliability is achieved at a stated level of confidence.

$$n = \frac{l_n(1-0.80)}{l_n 0.99} = 160 \text{ students}$$

Therefore the above numerical data is calculated only for 160 students and the above test is 99% reliable at 80%confidence level.

IV. Conclusion

It can be concluded that Anemia is a Major health problem among the College going Girls, which triggered us to conduct

M. Reni Sagayaraj, A. Merceline Anita, S. Kalaiarasi, and A. Chandrababu, "Study of anemia among adolescent females by the method of success testing," *International Research Journal of Advanced Engineering and Science*, Volume 1, Issue 4, pp. 82-84, 2016.

this Study. In the Present Study, the Severity of Anemia was found. The Study revealed that 38.75% of Students reported Mild Anemia, 31.25% of Students reported as Moderate and 2.5% of Students as Severe. By means of Success Testing, we are able to predict that **t**his study is 99% reliable and it also reveals that the Rural girls are less anemic than Urban girls as their food depends mainly on Cereals, Grains and Natural Foods, while this is not so in Urban Girls due to their low consumption of Iron rich Food, Faulty Dietary Pattern and Junk Foods.

ACKNOWLEDGEMENT

The Authors would like to thank the Principal and the Management of Sacred Heart College, Tamil Nadu to conduct this Study and for the guidance in our Research Study. We thank Dr. Vidhya Bharathi, Government Hospital, Tirupattur for her suggestions in our Research study.

REFERENCES

[1] B. S. Dhillon, *Medical Device Reliability and Associated Areas*, CRC press, Washington, D.C., 2000

[2] S. M. Chaudhary and V. R. Dhage, "A study of anaemia among adolescent females in the urban area of Nagpur," *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, vol. 33, issue 4, pp. 243–245, 2008.

[3] Guidelines for the use of Iron Supplements to prevent and treat Iron Deficiency Anemia Washington DC, International Anemia Consultative Group 1997.

[4] K. M. Kurtz and C. J. Welch, "The nutrition and lives of adolescents in developing countries, findings from the nutrition of adolescent girl's research programme," Washington DC International Centre for Research on Women, 1994.

[5] B. Sudhagandhi, S. Sundaresan, W. E. Willium, and A. Prema, Prevalence of anemia in the school children of Kattankulathur, Tamil Nadu, India," *International Journal of Nutrition, Pharmacology, Neurological Diseases*, vol. 1, issue 2, pp. 184-188, 2011.

[6] S. M. Siddharam, A. M. Venkatesh, and H. L. Thejeshwari, "A study of anaemia among adolescent girls in rural area of Hassan district, Karnataka, South India," *International Journal of Biological & Medical Research*, vol. 2, issue 4, pp. 922-924, 2011.