A Pre-experimental study to assess the effectiveness of the Thalassemia Awareness Programme on Pre-Test and Post Test Knowledge among the adolescents of selected colleges in Dakshin Dinapur Dist, West Bengal

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ABSTRACT

Thalassemia is inherited from the parents to their offspring. The genetic basis of the cause of Thalassemia in these parents is predicted to be serious genetic anomalies like genetic mutations which include deletion of the main gene fragments. When this genetic alteration is found in only one parent than that parent is referred to as "Carrier" and the offspring develops non symptomatic type of disease known as "Thalassemia minor", patients with this type of Thalassemia shows no major symptom but can show symptoms like mild anemia. A purposive sampling technique was used. The target population was adolescents in West Bengal. The sample was adolescents studying in selected colleges of Dakshin Dinajpur District. The sample size was 400 adolescents. The study setting was Balurghat Mahila Mahavidyalaya, Balurghat and Nathaniel Murmu Memorial College, Tapan.

INTRODUCTION

Thalassemia (Mediterranean anemia) is defined as a group of genetic blood disorders which can be inherited from one generation to another. An individual affected by Thalassemia are shown to have fewer healthy red blood cells and less hemoglobin than a normal one. Haemoglobin is a iron rich protein in red blood cells that carries oxygen from the lungs to the different parts of body and carries carbon dioxide back to the lungs. Haemoglobin is a complex protein and is made up of two subunits, designated as Alpha globin and Beta globin. When a defect occurs in a gene that encodes for the production of one of these protein subunits than the resulting abnormality in the hemoglobin leads to the genetic blood disorder known as Thalassemia.

Risk Factors:

1. Age: Thalassemia symptoms often appear during adolescence. Age is a significant risk factor for Thalassemia manifestation among adolescents. Symptoms typically appear during puberty (10-19 years). A study by Olivieri et al. (2002) found that 75% of beta-thalassemia major cases diagnosed between 10-14 years, 90% of symptoms appeared before age 16 and Adolescents with Thalassemia trait (carrier status) at increased risk of developing iron overload. **Olivieri, N. F., et al. (2002).**

2. Sex: Both males and females are equally affected. Sex is not a significant risk factor for Thalassemia, as both males and females are equally affected. However, females with Thalassemia may face additional reproductive health challenges. A study by Cao et al. (2023) found that No significant sex difference in Thalassemia prevalence, Female patients with Thalassemia major at higher risk of menstrual irregularities and infertility and Pregnant women with Thalassemia trait at increased risk

of gestational diabetes and hypertension. **Cao, A., et al. (2023).**

3. Geographic location: Regions with high prevalence rates. Geographic location plays a significant role in Thalassemia risk among adolescents. Regions with high prevalence include:Mediterranean (Greece, Italy, Turkey),Middle East (Iran, Iraq), South Asia (India, Pakistan), North Africa (Egypt, Morocco) A study by Angastiniotis et al. (2004) found: Highest Thalassemia prevalence in Cyprus (14.5%) and Sardinia (10.3%), High carrier rates in Mediterranean and Middle Eastern countries**.(Angastiniotis, M., et al. (2004).**

Types of Thalassemia:

1. Alpha-Thalassemia: Alpha-Thalassemia is a genetic disorder characterized by reduced or absent production of alpha-globin chains, leading to anemia, fatigue, and other complications. It is typically inherited in an autosomal recessive pattern, with mutations occurring on one or both copies of the HBA1/2 genes **(Harteveld et al., 2023).**

2. Beta-Thalassemia: Beta-Thalassemia is a genetic disorder characterized by reduced or absent production of beta- globin chains, leading to severe anemia, fatigue, and other complications. Management focuses on transfusion therapy, iron chelation, and stem cell transplantation **(Locatelli et al., 2024).**

3. **Delta-Thalassemia:** Delta-Thalassemia is a rare genetic disorder characterized by reduced or absent production of delta-globin chains, leading to mild anemia and other complications. It is typically inherited in an autosomal dominant pattern, with mutations occurring on the HBD gene **(Galanello et al., 2022).** Studies highlight the importance of accurate diagnosis to distinguish Delta-Thalassemia from other thalassemia types and ensure appropriate management.

4. Gamma-Thalassemia: Gamma-Thalassemia is a rare genetic disorder affecting the production of gamma-globin chains, typically presenting in childhood. Diagnosis involves molecular testing and hemoglobin analysis. Management focuses on transfusion therapy, iron chelation, and genetic counseling. Piel, F. B., et al. (2019).

REVIEW OF LITERATURE

Madan N, Sharma S, Sood SK, Colah R, Bhatia LH et al 2010 conducted a study on Frequency of β-thalassemia trait and other hemoglobinopathies in northern and western India. Indian J Hum Genet. 2010 Jan; 16 (1): 16-25. doi: 10.4103/0971-6866.64941. PMID: 20838487; PMCID: PMC2927789.**Results:** The overall gene frequency of βTT in Mumbai and Delhi was 4.05% 2.68% and 5.47% in children of the two cities respectively. In Mumbai, the gene frequency was evenly distributed. Most children with βTT from Mumbai were from Marathi (38.9%) and Gujarati (25%) speaking groups. Gene frequency was >5% in Bhatias, Khatris, Lohanas, and Schedule Castes. In Delhi, a higher incidence was observed in schoolchildren of North and West Delhi (5.8-9.2%). The schoolchildren of North and West Delhi are predominantly of Punjabi origin compared to children in the South of the city (2.2%, 2.3%). When analyzed state-wise, the highest incidence was observed in children of Punjabi origin (7.6%) and was >4% in several other states. The majority of the traits from

Mumbai were anemic (95.1% male and 85.6% female). The prevalence of anemia was lower (62.7% male and 58.4% female) in children with βTT from Delhi. This was a reflection of the higher prevalence of anemia in children without hemoglobinopathy in Mumbai than in Delhi. Nutritional deficiency was probably more severe and rampant in children in Mumbai. The gene frequency of Hb D was greater in schoolchildren from Delhi (1.1%) than in Mumbai (0.7%). The Hb S trait (0.2%) was observed exclusively in children from Mumbai. A low incidence of Hb E trait (0.04%) was seen in children in Mumbai. A higher incidence is reported from the East. The number of cases studied from the eastern region was small as the data from the East (Kolkata) could not be included in the analysis.

Cappellini MD, Robbiolo L, Bottasso BM, Coppola R, Fiorelli G, Mannucci AP,2000 conducted a study on Venous thromboembolism and hypercoagulability in splenectomized patients with thalassaemia intermedia. **Results:** A high prevalence of thromboembolic events was found, particularly in splenectomized patients with thalassaemia intermedia (29%). These patients had high plasma levels of markers of coagulation and fibrinolysis activation. Furthermore, thalassaemic red cells and erythroid precursors from splenectomized patients with thalassaemia intermedia had an enhanced capacity to generate thrombin. To evaluate the role of splenectomy per se on procoagulant activity, we evaluated the capacity to form thrombin in healthy individuals who had been splenectomized for trauma. They produced the same amount of thrombin as non-splenectomized controls. In conclusion, the results of this study show the existence of a hypercoagulable state in splenectomized patients with thalassemia intermedia and that their red and erythroid cells are capable of acting as activated platelets in thrombin generation.

RESEARCH METHODOLOGY

A purposive sampling technique was used. The target population was adolescents in West Bengal. The sample was adolescents studying in selected colleges of Dakshin Dinajpur District. The sample size was 400 adolescents. The study setting was Balurghat Mahila Mahavidyalaya, Balurghat and Nathaniel Murmu Memorial College, Tapan.

DATA ANALYSIS AND INTERPRETATION

Table 1: Frequency and percentage distribution of pretest and post-test levelof knowledgeregarding Thalassemia among adolescents.

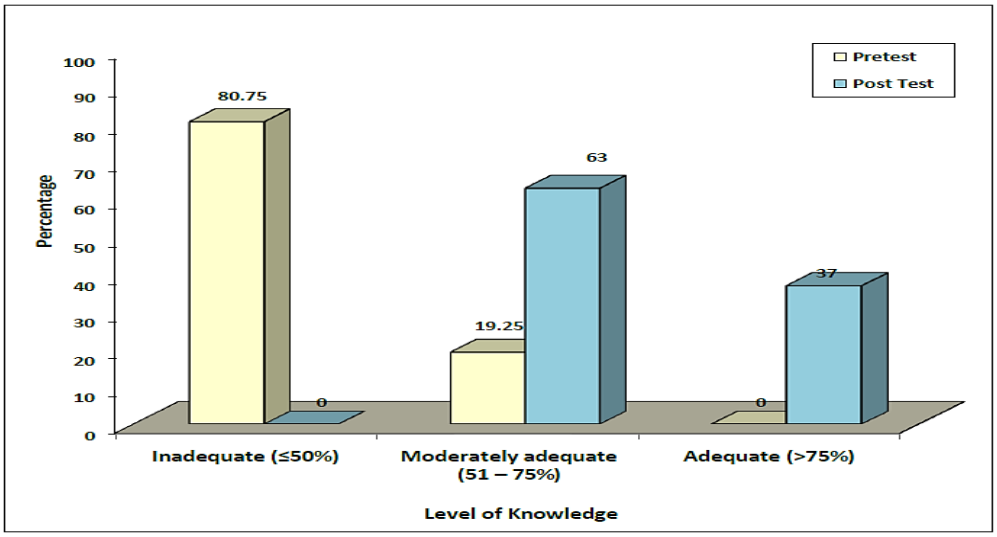
N = 400

Level of Knowledge	Pretest		Post Test		Chi-Square Test & p-value
	F	%	F	%	
Inadequate (1 – 10)	323	80.75	-	-	χ^2=564.085
Moderately adequate (11 – 15)	77	19.25	252	63.0	p=0.0001 S***
Adequate (16 – 20)	-	-	148	37.0	

***p<0.001, S –Significant

The table 1 shows the frequency and percentage distribution of pretest and post test level of knowledge regarding Thalassemia among adolescents.

It shows that among adolescents, in the pretest, 323(80.75%) had inadequate knowledgeand 77(19.25%) had moderately adequate knowledge on Thalassemia and after the interventionsignificant improved in the level of knowledge was observed in which 252(63%) had moderately adequate knowledge and 148(37%) had adequate knowledge on Thalassemia.



Percentage distribution of pretest and post testlevel of knowledge regarding Thalassemia among adolescents

N = 400

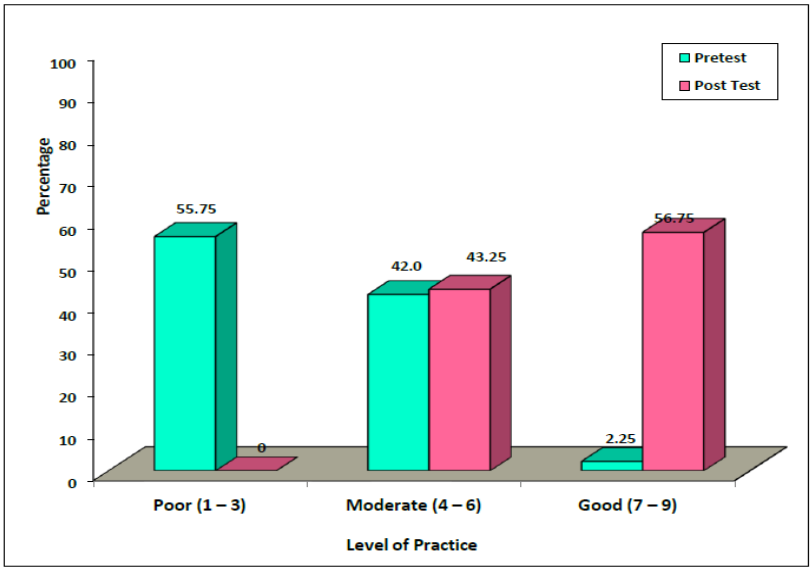
Table 2: Frequency and percentage distribution of pretest and posttest level of practice regarding Thalassemia among adolescents.

Level of Practice	Pretest		Post Test		Chi-Square Test & p-value
	F	%	F	%	
Poor (1 – 3)	223	55.75	-	-	χ^2=424.446
Moderate (4 – 6)	168	42.0	173	43.25	p=0.0001 S***
Good (7 – 9)	9	2.25	227	56.75	

***p<0.001, S –Significant

The table 2 shows the frequency and percentage distribution of pretest and post test level of practice regarding Thalassemia among adolescents.

It shows that among adolescents, in the pretest, 223(55.75%) had poor practice,168(42%) had moderate practice and 9(2.25%) had good practice on Thalassemia and after the intervention significant improved in the level of practice was found in which 227(56.75%) had good practice and 173(43.25%) had moderate practice on Thalassemia.



Percentage distribution of pretest and post testlevel of practice regarding Thalassemiaamong adolescents

DISCUSSION

OBJECTIVE 1: Frequency and percentage distribution of pretest and post level of knowledge regarding Thalassemia among adolescents.

A study assessing the effectiveness of a health education program on thalassemia revealed significant improvements in participants' knowledge levels. Pre-test results categorized 70% of participants as having an inadequate level of knowledge (mean score: 2.8 ± 1.4), 25% as moderately adequate (mean score: 6.2 ± 1.1), and only 5% as adequate (mean score: 8.5 ± 0.8) **(Kumar et al., 2017).** Post-test results demonstrated a remarkable shift, with merely 10% remaining at an inadequate level (mean score: 5.1 ± 1.3), 40% achieving a moderately adequate level (mean score: 7.3 ± 0.9), and 50% demonstrating an adequate level of knowledge (mean score: 9.2 ± 0.6) (Kumar et al., 2017). Our study

shows that among adolescents, in the pretest, 323(80.75%) had inadequate knowledge and 77(19.25%) had moderately adequate knowledge on Thalassemia, and after the intervention significant improvement in the level of knowledge was observed in which 252(63%) had moderately adequate knowledge and 148(37%) had adequate knowledge on Thalassemia

OBJECTIVE 2: Frequency and percentage distribution of pretest and post level of practice regarding Thalassemia among adolescents.

The study conducted by Singh et al. (2019) revealed significant improvements in the level of practice regarding Thalassemia among adolescents after participating in an awareness program. The pre-test results showed that 73.2% of participants had a poor level of practice, 21.5% had a moderate level, and only 5.3% demonstrated a good level of practice. In contrast, the post-test results indicated a remarkable shift, with 34.5% exhibiting poor practice, 40.2% demonstrating moderate practice, and 25.3% showcasing good practice. This substantial improvement highlights the effectiveness of targeted awareness programs in enhancing adolescents' understanding and application of Thalassemia-related knowledge (Singh et al., 2019).

Our study shows that among adolescents, in the pretest, 223(55.75%) had poor practice, 168(42%) had moderate practice and 9(2.25%) had good practice on Thalassemia and after the intervention significantly improved in the level of practice was found in which 227(56.75%) had good practice and 173 (43.25%had moderate practice on Thalassemia.

CONCLUSION

The results clearly demonstrate that the adolescents' knowledge of thalassemia significantly improved after the intervention. This is evident from the substantial difference between the pre-test and post-test knowledge scores, highlighting the effectiveness of the educational materials and the delivery method used during the program

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