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Impact of selected socio-demographic variables with selected clinical variables and growth parameters among transfusion dependent thalassemia children

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Abstract
An observational study was done on transfusion dependent thalassemic children selected from 2 hospitals considered as population of rural and Urban children. 50 samples were recruited by convenient sampling method and distributed into two groups with equal size (25 samples in each group) belonged to the age group of 9-18 years. The result of the present study reveals that parents of urban children found more responsible to find out their own & their sibling's carrier status of disease and in giving chelating agents and money spent on chelating agent was higher. Statically significance was found in height, but in weight was found insignificant differences. Most of these urban children taking transfusion twice in a month and were belongs to the socioeconomic status of I,II,III in comparison with socio economic status of V,IV,III,II. of rural children. Conclusion: Statistical significance indicates that the place of residence of the child found to be a significant factor that impacted in following areas; education, to know the carrier status of disease among parents& siblings, number of blood transfusion per month, the weight of the child, regular intake of chelation therapy and money spent on chelating agent.

Keywords: socio-demographic variables, clinical variables, growth parameters, socioeconomic status

Introduction
Thalassemia is an autosomal recessive disorder, although it may also be the result of spontaneous mutation[1]. Worldwide, approximately 15 million people are estimated to suffer from thalassemic disorders [2]. Reportedly worldwide are about 240 million carriers of beta thalassemia i:e 1.5% of world population and in India alone, the number is approximately 30 million with 505 in S.E.Asia. The burden of hemoglobin pathies in India is high with nearly 12,000 infants being born every year with a severe disorder. The carrier rate for β – thalassemia varies from 1-17% in India with an average of 3.2%.This means on an average 1 in every 25 Indians is a carrier of Thalassemia [3].
The need for prevention can be done by: Public awareness and education, screening to identify carriers, Provision of genetic counseling to couples who are at risk but adequate dialogue with legal, ethical and religious leaders in order to establish acceptability of the policy according to cultural environment of the country and the population is must [4]. Various reports have been documented so far in this direction to understand the causes and associated factors among transfusion dependent thalassemia children. The present study designed to observe the impaction of selected socio-demographic, clinical variables and growth parameters between urban and rural transfusion dependent thalassemia children in order to observe the area wise discrimination.

Materials and Methods
An observational study conducted among transfusion dependent thalassemia children who were enrolled at Chacha Nehru hospital (Rural area) and Choithram hospital and research center (Urban area) of Indore city. A maximum of 50 children suffered from transfusion dependent thalassemia of both sexes between the age group of 9 to 18 years recruited using convenient sampling technique from both the study centers were selected as subjects.
Fifty subjects divided equally into two groups which constituted group-I and group-II included children from rural and urban areas.

Age, gender, educational status, per capita income of family, type of family considered as socio-demographic variable, while age of the disease diagnosed, carrier statuses of disease among parents, iron chelating drug dosage, serum ferritin level, number of transfusion, expenses on chelating agents and blood transfusion per month considered as clinical variable while height and weight (according to IAP) were selected as growth parameters. The study was designed to get an idea about the discrimination between rural and urban transfusion dependent thalassemia. The tool used was Structured Interview Questionnaire to collect the data.The subjects and their parents had explained about the complete study procedure in his/her/their owns language and his/her/their willingness to participate in the study had recorded in a consent form dually signed by him/her/parents. Subjects weren't willing to participate in the study were excluded from the study. The data was collected during 8 months, starting from 12th April 2016 – 30th December 2016.

Statistical analysis: Continuous variables are expressed as mean ± standard deviation (or range) while the results on categorical measurements are presented in numbers (or %). The Chi-square test used to observe the association of selected socio-demographic, clinical variables and growth parameters with groups (urban and rural) of transfusion dependent thalassemia children. The data analyzed by using statistical software SPSS version 17.0 trial. The probability value $p \leq 0.05$ was considered as significant while $p \leq 0.01$ and above were considered as highly significant.

Results: Out of a total of 50 transfusion dependent thalassemia children, 15 (60.0%) children of group I while 13 (52.0%) of group II were boys but rest 10 (40.0%) of group I and 12 (48.0%) of group II were girls. The age of all children obtained to be in the range from 9 to 18 years and had mean spread (mean ± SD) of age for both the groups were 13.22±2.84 years. The other characteristics of the studied subjects depicted in below given tables.

Table 1: Distribution and comparison of age of children at the time of admission between groups

Age (year)	Rural		Urban	
	Frequency (n_1=10)	Percent (%)	Frequency (n_2=10)	Percent (%)
9-12	14	56.0	7	28.0
13-15	8	32.0	10	40.0
16-18	3	12.0	8	32.0
Mean ± SD	12.48±2.55 years		13.96±2.97 years	

Table 1 shows the age distribution of studied children in two groups (rural and urban). 56% children of group I (rural) recorded in the age group of 9-12 years more frequently but in group II (urban) 40% noted within age group of 13-15 years. 32% children of group I noted within age group of 13-15 years while 12% of same group noted within age group of 16-18 years. Among urban children, the age group of 9-12 years comprised of 28.0% but the age group of 16-18 years consisted of 32.0% children.

Average age (Mean ± SD) of children of group I (12.48±2.55 years) found to be smaller as compared to children of group II (13.96±2.97 years) but the age differences in groups couldn't satisfy the limit of statistical significance ($p>0.05$). Henceforth, the statistical agreement indicated that the distributions of ages of children in groups were noted similar at the time of admission for present study.

Table 2: Distribution and association of educational status, socio-economic status of a child with groups (Urban and Rural)

Parameter	*Variable*	Place of residence		Total	LOS
		Rural	Urban		
Educational Status	Primary education (1- 5th class)	13 52.0%	5 20.0%	18 36.0%	$\chi^2_3 = 11.27$ $p<0.01$ #
	Secondary Education (6–10th class)	11 44.0%	10 40.0%	21 42.0%	
	Higher secondary (11-12 class)	1 4.0%	5 20.0%	6 12.0%	
	Studying in college for graduation	0 0.0%	5 20.0%	5 10.0%	
Socio-Economic Status	Class I (Rupee ≥6186)	0 0.0%	10 40.0%	10 20.0%	$\chi^2_4 = 34.14$ $p<0.001$ #
	Class II (Rupee 3093-6185)	2 8.0%	12 48.0%	14 28.0%	
	Class III (Rupee 1856-3092)	9 36.0%	3 12.0%	12 24.0%	
	Class IV (Rupee 928-1855)	7 28.0%	0 0.0%	7 14.0%	
	Class V (Rupee ≤927)	7 28.0%	0 0.0%	7 14.0%	

The association is highly/strongly significant at the 0.01 level of significance. ⊗ The association isn't significant (insignificant) at the 0.05 and below levels of significance. [P-value: Probability value of Chi-square test; LOS: Level of significance]

Table 2 highlights the distribution and association of educational status and socio-economic status with respect to place of residence (rural and urban). Results of research indicated that the educational and socio-economic statuses of subjects noted with a strongly significant relationship with groups. The statuses of education and socio-economic among transfusion dependent thalassaemia patients were the dependent factors on place of residence.

Primary education was found to be most common revealed by 52.0% of the children residing in rural area and followed by secondary education possessed by 44.0%, whereas secondary education was most commonly recorded among

40.0% of the children residing in urban area are followed by primary, higher secondary and undergraduate level education possessed by each 20.0%. Statistically, these differences in proportion for educational status of studied children found to be associated strongly ($p<0.01$) with groups (rural and urban).

7(36%) children of rural area found socio-economic class of III which was most prevalent and were followed by class IV & V (28.0%), whereas the socio-economic class II: 12 (48%)found to be most prevalent among urban children and followed by upper class I: 10 (40.0%) and class III: 3(12.0%) were noted. The association of socio-economic class of studied children found to be associated highly significantly ($p<0.001$) with groups. Moreover, the statistically agreement indicated that the place of residence of thalassemia children found to be the significant factor that impacted strongly the educational and socio-economic statuses. Lastly, the place of residence is considered as the significant indices of educational and socio-economic statuses among thalassemia children which impacted the disease status

Table 3: Distribution and association of parent's carrier status of disease with groups (Urban and Rural)

Carrier status of disease	Place of residence		Total
	Rural	Rural	
Not investigated	17 68.0%	7 28.0%	24 48.0%
Minor	8 32.0%	18 72.0%	26 52.0%
Total	25 100.0%	25 100.0%	50 100.0%
$\chi_1^2 = 8.01$ and p<0.005 (Highly Significant)			

Table 3 reports the distribution and association of parent's carrier status of disease and the statuses observed similar for both mother and father and had a strong significant bonding with groups. The proportion for parent's carrier status of disease found to be different with respect to place of residence and marked as the dependent factor on domicile.

The study result also reveals that more than half i:e17(68%) parents (father, mother) of rural children & less than half i:e 7(28%) parents (father, mother) of urban children found not done investigation to find their carrier status about the disease.

Carrier status found to be positive among 32.0% of mother and father of studied children suffered from thalassemia lived in rural area was significantly lowered as compared to 72.0% of mother and father lived in urban area. Statistically, these differences in proportion for parent's carrier status of disease found to be associated strongly ($p<0.005$) with groups (rural and urban). Moreover, this was inference statistically that the place of residence of thalassemia children found to be the significant factor that highly impacted the parent's carrier status of disease. Therefore, the place of residence is considered as the significant indices of parent's carrier status of disease whose siblings found to be survivor of thalassemia.

Table 4: Distribution and association of number of blood transfusion with groups (Urban and Rural)

Number of blood transfusion	Place of residence		Total
	Rural	Urban	
Once a month	17 68.0%	6 24.0%	23 46.0%
Twice a month	8 32.0%	19 76.0%	27 54.0%
Total	25 100.0%	25 100.0%	50 100.0%
$\chi_1^2 = 9.74$ and p<0.002 (Highly Significant)			

Table 5: Distribution and association of growth parameter of a child with groups (Urban and Rural)

Parameter	*Variable*	Place of residence		Total	LOS
		Rural	Urban		
Height (According to Indian Academy of Pediatrics Growth chart)	< 3 centile	13 52.0%	12 48.0%	25 50.0%	$\chi_5^2 = 7.06$ p>0.05 ⊗
	3-10 centile	7 28.0%	4 16.0%	11 22.0%	
	11-25 centile	3 12.0%	1 4.0%	4 8.0%	
	26-50 centile	2 8.0%	3 12.0%	5 10.0%	
	51-75 centile	0 0.0%	4 16.0%	4 8.0%	
	76-90 percentile	0 0.0%	1 4.0%	1 2.0%	
Weight (According to Indian Academy of Pediatrics Growth chart	< 3 centile	14 56.0%	7 28.0%	21 42.0%	$\chi_4^2 = 9.80$ p<0.05 *
	3-10 centile	8 32.0%	5 20.0%	13 26.0%	
	11-25 centile	3 12.0%	10 40.0%	13 26.0%	
	26-50 centile	0 0.0%	2 8.0%	2 4.0%	
	51-75 centile 76 -90 centile	0 0.0% 00	1 4.0% 00	1 2.0% 00	

⊗ The association isn't significant (insignificant) at the 0.05 and below levels of significance. * The association is significant at the 0.05 level of significance. [P-value: Probability value of Chi-square test; LOS: Level of significance]

The number of blood transfusions of children suffered from thalassemia had a strong significant relationship with groups which can be easily sees in table 4. The number of blood transfusions found to be significantly different with respect to place of residence in both the groups and measured as the dependent factor on domicile.

More than half (68.0%) of the children used to live in villages suffered from thalassemia found with blood transfusion in a month were more as compared to (24.0%) children lived in cities.

Blood transfusion twice in a month was recorded among 32.0% of the children lived in rural area suffered from thalassemia was significantly lowered as compared to 76.0% lived in urban area. Statistically, these differences of proportion in number of blood transfusion of studied children suffered from thalassemia found to be associated strongly ($p<0.002$) with groups (rural and urban). Furthermore, the statistically agreement projected that the place of residence of thalassemia children found to be the significant factor that impacted the number of blood transfusion. Henceforth, the place of residence is considered as the significant indices of number of blood transfusion.

Table 5 clearly reports the differentiation with respect to weight of children suffered from thalassemia between residences in rural and urban areas while no significant relationship identified with respect to height. Results of research indicated that weight of the children with thalassemia found to be the dependent factor on residential statuses.

according to Indian Academy of Pediatrics (IAP) growth chart among 13 (52.0%) of children of rural area was of < 3 centile most prevalent and higher as compared to children of urban area 12(48.0%). Second most common centile of height was between 3 -10th centile was recorded among 28.0% rural and 16.0% urban children respectively. The height centile between 11 -25 noted among 12.0% in rural and 4.0% in urban children while between 26- 50th centile noted among 8.0% and 12.0% children of rural and urban areas respectively. Higher centile of height was not noted among children of rural area but 4 (16.0%) between 51-75 centile and 1(4.0%) between 76- 90 centile of urban children attained the height at this level. In height the differences were found but statistically it was insignificant at ($p>0.05$) with groups (rural and urban).

According to IAP growth chart the weight of < 3 centile noted among 14(56.0%) of children with thalassemia of rural area was most common and was greater than 7(28.0%) of urban area. Second common centile of weight was recorded between 3-10 among 8(32.0%) of rural and 5(20.0%) of urban children respectively while weight percentile between11- 25 centile was noted among 3(12.0%) of rural and 10(40.0%) of urban children. The higher centiles for weight were noted among few children of the urban group i:e 2 (8.0%) of 26-50th centile & 1(4.0%) of 51-75th centile. Overall, the association of weight of studied children found to be associated significantly ($p<0.05$) with groups.

Moreover, the statistically agreement indicated that the place of residence of children suffered from thalassemia found to be the significant factor that impacted the growth parameter such as weight. Lastly, the place of residence is considered as the significant indices of weight among thalassemia children which impacted the disease status.

Table 6: Distribution of type of family and carrier status of other siblings in groups

Population Parameters and variables		Rural (N_1=25)		Urban (N_2=25)	
		N_1	%	N_2	%
Type of family	*Joint family*	10	40.0	13	52.0
	Nuclear family	15	60.0	12	48.0
Other siblings carrier status of disease	*Not investigated*	17	68.0	8	32.0
	Minor	7	28.0	13	52.0
	Normal	1	4.0	2	8.0
	No child	0	0.0	2	8.0

The distribution of type of family and carrier status of disease of other siblings in family among studied children is shown by table 6. 15(60%) of rural area while 12(48%)of urban area more frequently used to live in nuclear family. But, 10(40.0%) children of rural area while 13 (52.0%) of urban area had joint family. More than twice of the children of rural area17 (68.0%) weren't investigated the carrier status of disease as compared to children of urban area8 (32.0%). History of investigation of other siblings done to find out the carrier status of disease was obtained in most of the siblings of urban 13(52.0%) area while noted some 7(28.0%) of rural area. 2(8.0%) other siblings of urban area while 1(4.0%) of rural area found to be normal.

Table 7: Distribution of iron chelating drug and other complications in groups

Population Parameters and variables		Rural (N_1=25)		Urban (N_2=25)	
		N_1	%	N_2	%
Name of Iron Chelating drug	*Kelfer*	1	4.0	4	16.0
	Deferasirox	0	0.0	4	16.0
	Desirox	19	76.0	10	40.0
	Desferol	1	4.0	2	8.0
	Desirox+Kelfer	0	0.0	2	8.0
	Desirox+Desferol	0	0.0	1	4.0
	Desirox+Asunra	0	0.0	1	4.0
	Asunra	0	0.0	1	4.0
	No drug	4	16.0	0	0.0
Any other complications	*Splenomegaly*	7	28.0	15	60.0
	Spleenectomy done	5	20.0	0	0.0
	Diabetes	0	0.0	1	4.0
	Liver enlargement	0	0.0	1	4.0
	Diabetes and spleenomegaly	1	4.0	0	0.0
	Diabetes, spleenomegaly and liver problem	2	8.0	0	0.0
	None	10	40.0	8	32.0

Table 7 shows the distribution of name of iron chelating drug and other complications of disease among studied children. Major part of the population of transfusion dependent thalassemia children of rural (76.0%) area had prescribed Desirox as compared to 40.0% of the children of urban area. The combination of Desirox with Kelfer (8.0%), Desferol (4.0%) and asunara (4.0%) was only prescribed among urban population while not preferred among children of rural area. Kelfer and Deferasirox were prescribed among urban population proportion of 16.0% while 8.0% were treated with Desferol. In 16.0% of thalassemic children iron chelating drug was started but due to poor economical condition children are not taking as they are not able to afford the cost of the drug at rural area.

Splenomegaly found to be the most common complication among transfusion dependent thalassemia children of urban

(60.0%) area than rural (28.0%) area and followed by 20.0% children of rural area noted with spleenectomy done. Diabetes and liver enlargement found only in one children of urban area while diabetes and spleenomegaly observed in one child of rural area and among two children the diabetes noted with spleenomegaly and liver problem. 40.0% children of rural area while 32.0% of urban area found without any other complications.

Table 8: Comparison of clinical and socio-economic variables of the studied samples in groups

Gr	Parameter	Min	Max	Mean	SD
Group I (Rural)	Age at which disease diagnosed (months)	3.0	84.0	14.0	16.7
	Monthly Family income/person (Rs)	429.0	5000.0	1805.8	1116.2
	Intake of chelation therapy (mg/day)	0.0	4000.0	811.2	1011.2
	Last serum ferritin level (ng/ml)	0.0	15000.0	3194.4	3039.1
	Expenses for blood transfusion (Rs)	0.0	0.0	0.0	0.0
	Expenses on Chelation Therapy (Rs)	0.0	5000.0	1356.2	1142.5
Group II (Urban)	Age at which disease diagnosed (months)	2.0	12.0	5.8	2.6
	Monthly Family income/person (Rs)	2143.0	20000.0	6269.4	3545.1
	Intake of chelation therapy (mg/day)	500.0	6200.0	1732.0	1290.7
	Last serum ferritin level (ng/ml)	893.0	10000.0	3524.9	2225.1
	Expenses for blood transfusion (Rs)	550.0	750.0	662.0	101.3
	Expenses on Chelation Therapy (Rs)	750.0	19000.0	4906.0	4792.1

Table 8 reports the descriptive statistics for clinical and socio-economic parameters of studied children. The parents of children of urban area (group II) found with awareness about the severity of the disease as compared to parents of children of rural area (group I). Because, the average age of the thalassemia children at the time of diagnosis of disease among children from villages found higher (14.0 months) than children from city (5.8 months) while the intake of chelation therapy was adequate (1732.0 mg/day) and higher among children from city than rural areas (811.2 mg/day)
Average money spend on blood transfusion was rupees 662.0/- per month among children from cities but found to be zero among children from villages. Among children from cities, the mean money spend on chelating agents per month was rupees 4906.0/- per month was higher as compared to rupees 1356.2/- per month among children from rural areas.

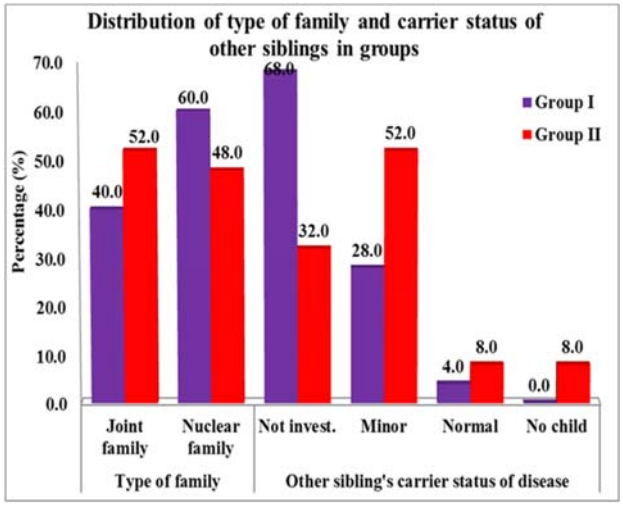

Fig 1: Bar diagram showing the distribution of type of family among children and carrier status of other siblings in both the groups.

Discussion

Children with Thalassemia Major experiences health related problems that can affect their daily functioning and QOL. Each group constituted 25 children, in Group I:15(60%) while in Group II :13(52%) were boys & rest 10(40%) of Group I and 12 (48%) of Group II were girls. These children were among the age group of : group I (rural) 11(56%) belongs to 9-12 years, 8 (32%)are 13-15 years, 3(12%) belongs to 16-18years & in group II (urban)10(40%) are of 13-15 yrs, 8 (32%) belongs to 16-18 yrs, 7(28%) are from 9-12 yrs. Regarding education : Primary education acquired by group I was 52% and in group II was 20%, secondary education was attained by group I was 44% and in group II was 40%,Higher secondary education possed by group I was 1(4%) but in group II, it was 5(20%) and for under graduation college education only from group II 5(20%) children are studying but none of them are found from rural area. Statistically, these differences in proportion for educational status of studied children found to be associated strongly ($p<0.01$) with groups (rural and urban). Mohit *et al* (2013) stated that school dropouts and school absenteeism are perceived as a major handicap to care of chronic childhood illness like thalassemia in India [5]. One another study conducted by Montarat T *et al* (2010) explained the fact that frequent absenteeism from school for hospital visits, and a lack of energy when performing academic activities, had a significant negative impact on the children's HRQOL [6]. Wamed H *et al* (2013) also revealed negative impact on school functioning in thalassemia patients which was also found to be worse than the adolescence healthy counterparts [7]. Socioeconomic class of data among rural children comprised off Class III was 9(36%), Class IV & V were 7 (28%) of each & nobody is coming in the category of Class I & II, while in urban group, 12(48%) belongs to class II, 10 (40%) belongs to class I & none of them belongs to the category of class IV & V. The association of socio-economic class of studied children found to be associated highly significant ($p<0.001$) with groups. Moreover, the statistically agreement indicated that the place of residence of thalassemia children found to be the significant factor that impacted strongly the educational and socio-economic statuses.
In relation to their own carrier status of parents (father, mother) 17(68%) of rural & 7(28%) of urban found not investigated but the remaining 18(72%) of urban & 8(32%)of rural done the investigation & found both of them are carriers. Statistically, these differences in proportion for parent's carrier status of disease found to be associated strongly ($p<0.005$) with groups (rural and urban). Therefore, the place of residence is considered as the significant indices of parent's carrier status of disease whose siblings found to

be survivor of thalassemia disease due to not understanding the importance of knowing the carrier status, fear of social stigma, economical condition. Mausumi B *et al* (2015) discussed that 99.06% of the participants viewed that premarital screening for thalassemia carrier is necessary. Only 57.48% were of the opinion that couples who are thalassemia carriers should have children. About 81.31% believed that it is better to terminate pregnancy than to let the child suffer after he/she is born [8].

One another study carried out Asha B. *et al* (2013) explored that institutional prevention programs like carrier screening has proven cost-effective in populations with a high frequency of carriers. Screening of pregnant women early in pregnancy followed by prenatal diagnosis is acceptable and effective strategy for control of thalassemia in developing countries like India [9]. Anita saxena *et al* (2002) also mentioned that 62% parent accepted the risk of being carrier but 14% families got tested, the remaining not tested due to non availability of screening facilities in the nearby town, high cost of the test & of sufficient motivation [10].

In relation with blood transfusion more than half (68.0%) of the children used to live in villages suffered from thalassemia found with blood transfusion in a month were more as compared to (24.0%) children lived in cities. Blood transfusion twice in a month was recorded among 32.0% of the children lived in rural area suffered from thalassemia was significantly lowered as compared to 76.0% lived in urban area. Statistically, these differences of proportion in number of blood transfusion of studied children suffered from thalassemia found to be associated strongly ($p<0.002$) with groups. Furthermore, the place of residence is considered as the significant indices of number of blood transfusion. The reason may be due to travel, sometimes non availability of cross matched blood for transfusion and less importance were given to maintain the Hemoglobin level up to the desired level. This is with agreement with the study conducted by Pranter C *et al* (2013) clarified that urban patients had a better score of pre-transfusion hemoglobin level due to better compliance, motivation on the part of the patients and their families who were sure of the availability of the facilities including NAT screening and bed side Leukodepletion [11]. Similar kind of clarification given by Mohammad Nafees & *et al* [12] and Jameel T (2016) mentioned that at rural areas they could not get blood transfusion facilities from the government hospitals due to poor services, non-availability of blood & no thalassemia care centers in their vicinity. Lack of resources for transportation of their children to and back from Thalassemia center is another factor of not taking of timely blood transfusion [13].

According to Indian Academy of Pediatrics (IAP) growth chart among 13 (52.0%) of children of rural area were of < 3 centile most prevalent and higher as compared to children of urban area 12(48.0%). Second most common centile of height was between 3 -10th centile was recorded among 28.0% of rural and 16.0% of urban children respectively. The height centile between 11 -25 noted among 12.0% in rural and 4.0% in urban children while between 26- 50th centile noted among 8.0% and 12.0% children of rural and urban areas respectively. Higher centile of height was not noted among children of rural area but 4 (16.0%) between 51-75 centile and 1(4.0%) between 76- 90 centile of urban children attained the height at this level. In height the differences were found but statistically it was insignificant ($p>0.05$) between groups (rural and urban).

According to IAP growth chart the weight of < 3 centile noted among 14(56.0%) of children with thalassemia of rural area was most common and was greater than 7(28.0%) of urban area. Second common centile of weight was recorded between 3-10 among 8(32.0%) of rural and 5(20.0%) of urban children respectively while weight percentile between11- 25 centile was noted among 3(12.0%) of rural and 10(40.0%) of urban children. The higher centiles for weight were noted among few children of the urban group i:e 2 (8.0%) of 26-50th centile & 1(4.0%) of 51-75th centile. Overall, the association of weight of studied children found to be associated significantly ($p<0.05$) with groups. Somewhat similar study done by HarishK Pande *et al* (2011) revealed that one third (33.11%) of patients with transfusion dependent thalassemia major were of short stature. No patient were overweight or obese. This is mainly due to chronic anemia and iron overload [15]

Regarding the distribution of type of family 15 (60%) of rural, 12(48%) of urban are living in nuclear family but remaining of 10(40%) of children of rural and 13(52%) had joint family. The carrier status of these thalassemic children's siblings of rural 68.0% not investigated as compared to 32.0% of urban children and it was noted that from investigated siblings of thalassemic children 13(52.0%) of urban and 7(28%) had been found the carrier of thalassemia & remaining siblings of these 8.0% urban & 4.0% of rural thalassemic children were free from the disease Thalassemia. The result highlighted that these children's parents still not convinced about the importance to know the carrier status of other children of their family to avoid future birth of thalassemia child in their family. The study result of Kamran I *et al* (2013) also mentioned, nearly same kind of result i:e only 16 families undertaken the thalassemia carrier test & 184 families did not undertake a carrier test due to unawareness of inherited nature of the disease [16].

Among rural children 19(76%) were on desirox, & only one (4.0%) was on inj. Desferol. But among the group of urban children 4(16%) of were on Kelfer & Defesirox, 10(40%) were only on Desirox, 2 (8.0) each was on Inj. Desferol & Desirox. 16% of rural children not taking any medicine because of extra burden to purchase of drugs or these specified drugs always not easily available. Karanjit S *et al* (2013) also reveals in his study that the cost factor prevailed in discontinuation of Iron chelation therapy in majority of the cases [17].

Among both the groups of children most of them were suffering with complications. 7(28.0%) children of rural, 15(60.0 %) of urban were suffer with spleenomegaly & 5(20%) children of rural underwent spleenectomy, 2(8.0%) suffer with Diabetes, spleenomegaly & liver problem & 1(4.0%) suffer with diabetes & spleenomegaly in comparison from children of urban 1(4.0%) suffer with Diabetes & Liver enlargement. Only 10 (40.0%) of rural & 8(32.0%) of urban children are not suffer with any complication. The result was in contrast with the study conducted by Shraddha D *et al* (2016) revealed that among 24 patients 12(33-34%) had hepatospleenomegaly followed by infection in 9 (25%) patients, spleenomegaly in 6(16.6%),cardiac conditions etc. [18].

The present study also done comparison of socioeconomic variables of the studied samples in groups and found that the

parents of urban children (Group II) found more aware about the severity of the disease as compared to parents of children of rural area (group I). Because, the average age of the thalassemia children at the time of diagnosis of disease among children from villages was found higher (14.0 months) than children from city (5.8 months) while the intake of chelation therapy was adequate (1732.0 mg/day) and higher among children from city than rural areas (811.2 mg/day).

Average money spend on blood transfusion was rupees 662.0/- per month among children from cities but found to be zero among children from rural, Among children from cities, the mean money spend on chelating agents per month was rupees 4906.0/- per month was higher as compared to rupees 1356.2/- per month among children from rural areas.

Conclusion: The present study concluded that the place of residence of Thalassemic children statistically shown significant difference in association with the following areas i:e education, knowing the carrier status of disease among parents & siblings, number of blood transfusion per month, the weight of the child, regular intake of chelation therapy, money spent on chelating agent.

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