



## A prospective clinical evaluation of quality of life and co-morbidity of patients with chronic blood transfusion and chelation therapy

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Received on:17-01-2013; Revised on: 28-01-2013; Accepted on:25-02-2013

### ABSTRACT

The patient with hemoglobinopathy like Thalassemia major (TM), Bone marrow dysfunction, and Sickle cell disease are requiring chronic blood transfusion in their life time to survive. Among these, thalassemia major is one of the most common hemoglobinopathy in world wide. This study was done to assess the quality of life of the patients with chronic blood transfusion and chelation therapy. The Quality of Life Scores were obtained through the self-administered SF-36 questionnaire. The study subjects were asked to answer the SF-36 questionnaire every three months once. After 6 months the SF 36 General Health mean score was  $63.58 \pm 12.98$  ( $P < 0.05$ ). The highest mean score was  $69.37 \pm 11.61$ . The mean difference after the final reviews was statistically significant. The preponderance of scores used to assess quality of life suggests that there is a direct and independent effect on quality of life when treated with transfusion and ironchelation therapy.

**Keywords:** chelation therapy, chronic blood transfusion, thalassemia

### 1. INTRODUCTION

The patient with hemoglobinopathy like Thalassemia major (TM), Bone marrow dysfunction, and Sickle cell disease are requiring chronic blood transfusion in their life time to survive. Among these, thalassemia major is one of the most common hemoglobinopathy in world wide. The purpose of the blood transfusion is to restore the blood hemoglobin level and to eliminate the complication of thalassemia major. State that patient are transfused at an early age may develop complications of iron overload in tissues, blood transfused infections, heart failure, diabetes mellitus, liver fibrosis, delayed puberty and growth retardation. <sup>[1, 2]</sup>

Iron chelators like desferrioxamine and defriprone are used to eliminate the toxic iron load and reduce the complications of iron overload in tissues.<sup>[3]</sup> Since introduction of iron chelators, the mortality and morbidity rate associated with thalassemia have been significantly reduced.

The quality of life (QOL) is one of the important index of effective treatment. It differs from other forms of medical assessment. QOL is focused study on the individual's views on their well being and aspect of life.

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The SF-36 yields an eight-scale profile of functional health and well-being scores as well as psychometrically-based physical and mental health summary measures and a preference-based health utility index. Accordingly, the SF-36 has proven useful in surveys of general and specific populations, comparing the relative burden of diseases, and in differentiating the health benefits produced by a wide range of different treatments.<sup>[4-8]</sup>

The morbidity associated with this treatment is known to have serious negative impact on the overall quality of life of effected individual's. The present study was planned to assess the quality of life and co-morbidity of patients with chronic blood transfusion and chelation therapy.

### 2. MATERIAL AND METHODS

This prospective study was performed on transfusion dependent patient with hemoglobinopathy in the department of transfusion medicine at Government General Hospital, Guntur, Andhrapradesh.

The study was approved by Institutional Review Board. Both genders with the age more than 5 years, a diagnosis of hemoglobinopathy and having more than 20 blood transfusions were included in this study. Patient with bone marrow transplantation and the history of chronic disease like COPD and AIDS were excluded from the study.

In total 47 patients were interviewed, 42 qualified, 38 completed the study. The Quality of Life Scores were obtained through the self administered SF-36 questionnaire. The study subjects were asked to

answer the SF-36 questionnaire once in every 3 months. Patient who were unable to answer the questionnaire were assisted by their parents or guardians. The subject's medical record was reviewed to assess the morbidity associated with chronic blood transfusion.

**2.1 Outcome Measures**

The SF-36 questionnaire is a self administered health status measures that is widely accepted and validated.<sup>[9]</sup> The SF -36 questionnaire consists of 36 question in eight dimension such as General Health, Physical function, Social function, emotional role, physical role, body pain, vitality and mental health. (General Health, Limitation of Activity, Physical health problem, Emotional Health Problem, Social Activity, Energy and Emotion, Social Activity General health) All questions are scored on a scale from 0 to 100, with 100 representing the highest level of functioning possible.<sup>[10-12]</sup>

**2.2 Patient Interview**

The interview transcripts of thirty eight patients with chronic blood transfusion were assessed to determine patients' experiences about the impact treatment on their daily lives. As part of this study, the patients were asked to provide an overview of the impact of chronic blood transfusion on their lives. We reviewed the transcripts from these historical interviews in order to gain further insight into how infusion impacts patient's lives.

**2.3 Statistical Analysis**

Documented data was analyzed by using Analysis of Variance (ANOVA) and Student 't' test. Statistical significance was taken at the 95% level (P < 0.05). Results were expressed as Mean ± Standard Deviation (SD).

**3.RESULTS**

This study was aimed to assess the quality of life and co-morbidity of patients with chronic blood transfusion and chelation therapy.

**3.1 Primary Variables**

In total 47 patients were interviewed and 42 patients were included in the study as per inclusion and exclusion criteria. From 42 subjects, 38 were completed the study and 4 were dropped out from the study because of they were lost follow up and refused. Result were expressed in Mean ± Standard Diviation (SD).

Out of 38 subjects studied, more subjects belong the age group between 10 to 15 years (47.3%) and male (68.4%) subjects were greater than the female (31.6 %) subjects. Most of the subjects have the family history of hemoglobinopathy (65.7%) (Table-1).

**Table-1 Demographic characteristics of the study sample (n=38)**

Characteristic	No	%
<b>Age (Years)</b>		
5-10	12	31.6
10-15	18	47.3
More than 15	8	21.1
Mean	12.18 (4.19)	31.6
<b>Sex</b>		
Male	26	68.4
Female	12	31.6
<b>Family History of Hemoglobinopathy</b>		
Yes	25	65.7
No	08	21.1
Do Not Know	05	13.2

**3.1.1 Physical Function**

The baseline mean score of SF-36 physical function was 62.87.87±23.58. The mean score difference was not statistical significant after 3 months (63.14 ± 21.02). At final review mean score (73.72 ± 21.98) was showed statistical significant from the base line mean score (P<0.05) (Table-2).

**Table-2 SF-36 Physical Function**

Review	Mean ±SD	t- Value
Baseline	62.87 ± 23.58	-
After 3 months	63.14 ± 21.02	1.38
After 6 months	71.25 ± 18.44	6.35*
After 9 months	72.59 ± 19.20	7.28*
After 12 months	73.72 ± 21.98	9.89*

\*P < 0.05

**3.1.2 Role - Physical Health**

The baseline means score of SF-36 Role-physical health was 43.75 ± 11.57. The mean score difference was statistical significant after 3 months (50.00 ± 18.89) (P<0.05). But, second review after 6 months mean score (44.75 ± 12.68) was not statistical significant. The final review mean score 56.87 ± 12.32 was showed statistical significant from the base line mean score (P<0.05) (Table-3).

**Table-3 Physical Health Score**

Review	Mean ± SD	t- Value
Baseline	43.75 ± 11.57	-
After 3 months	50.00 ± 18.89	2.53*
After 6 months	44.75 ± 12.68	1.22
After 9 months	52.32 ± 13.41	6.22*
After 12 months	56.87 ± 12.32	8.62*

\*P < 0.05

**3.1.3 Role- Emotional**

The baseline mean score of SF-36 role emotional was 58.50 ± 21.57. The mean score difference was statistical significant at every review. The final review mean score 65.96 ± 21.96 was showed statistical significant from the baseline mean score (P < 0.05) (Table-4).

**Table-4 Role Emotional Score**

Review	Mean ± SD	t- Value
Baseline	58.50 ± 21.57	-
After 3 months	59.32 ± 17.69	1.63
After 6 months	60.25 ± 23.21	5.97*
After 9 months	65.96 ± 21.96	8.78*
After 12 months	72.32 ± 19.94	10.56*

\*P < 0.05

**3.1.4 Energy/Fatigue**

The final review mean score of SF-36 Energy/Fatigue was 43.75 ± 11.57. The mean score was statistically significant form baseline mean score of 72.32 ± 19.94 (P<0.05). The first review mean score (59.32 ± 17.69) was not showed statistical significant from the base line mean score (Table-5).

**Table-5 Energy/Fatigue Score**

Review	Mean ± SD	t- Value
Baseline	47.50 ± 18.86	-
After 3 months	52.62 ± 17.52	3.52*
After 6 months	56.25 ± 21.48	5.64*
After 9 months	59.96 ± 11.57	6.26*
After 12 months	62.00 ± 19.55	9.77*

\*P < 0.05

### 3.1.5 Emotional Well Being

After 6 months SF 36 Emotional Well being mean score was 63.83 ± 21.52 (P < 0.05). The final review mean score 71.69 ± 22.46 (P < 0.05) was showed statistical significant from the base line mean score of 56.22 ± 17.39 (Table-6).

**Table-6 Emotional Well Being Score**

Review	Mean ± SD	t- Value
Baseline	56.22 ± 17.39	-
After 3 months	59.99 ± 16.81	2.01
After 6 months	63.83 ± 21.52	3.46*
After 9 months	69.75 ± 11.57	7.22*
After 12 months	71.69 ± 22.46	14.78*

\*P < 0.05

### 3.1.6 Social Functioning

The highest mean score of SF 36 Social Functioning was 75.69 ± 21.32 (P < 0.05). which was obtained after 9 months. The mean base line score was 62.22 ± 32.25 (Table-7).

**Table-7 Social Functioning Score**

Review	Mean ± SD	t- Value
Baseline	62.22 ± 32.25	-
After 3 months	61.99 ± 16.81	1.21
After 6 months	64.83 ± 19.36	4.36*
After 9 months	75.69 ± 21.32	12.98*
After 12 months	73.75 ± 24.62	8.91*

\*P < 0.05

### 3.1.7 Pain

The SF 36 pain mean score 54.81 ± 21.25 at final review was not statistically significant with baseline mean score of 52.64 ± 24.43 (Table-8).

**Table-8 Pain Score**

Review	Mean ± SD	t- Value
Baseline	52.64 ± 24.43	-
After 3 months	54.37 ± 22.95	1.73
After 6 months	51.56 ± 19.55	1.26
After 9 months	58.75 ± 17.98	2.52*
After 12 months	54.81 ± 21.25	1.98

\*P < 0.05

### 3.1.8 General Health

After 6 months the SF 36 General Health mean score was 63.58 ± 12.98 (P < 0.05). The heighest mean score was 69.37 ± 11.61. The mean difference after the final reviews was statistically significant (Table-9).

**Table-9 SF-36 General Health**

Review	Mean ±SD	t- Value
Baseline	58.60 ± 14.36	-
After 3 months	59.77 ± 13.02	2.12
After 6 months	63.58 ± 12.98	5.92*
After 9 months	58.75 ± 17.56	0.62
After 12 months	69.37 ± 11.61	7.59*

\*P < 0.05

### 3.1.9 Co-morbidity Assessment

In this study period 10 subjects were reported Hepatitis (26.3%). Headache percentage (28.9%) was high among others. The injection site infection / allergy were 23.7%. Cardiomyopathy, jaunties, lymphatinopathy, hypothyroidism and vertigo also reported (Table-10).

**Table-10 Co-morbidity Assessment**

Co-morbidity	No of Patients	Percentage
Hepatitis	10	26.3
Injection Site Infection/Allergy	9	23.7
Cardiomyopathy	3	7.9
Jaunties	7	18.4
Lymphatinopathy	4	10.5
Hypothyroidism	2	5.3
Vertigo	5	13.2
Headache	11	28.9
Anxiety	3	7.9

## 4. DISCUSSION

In developing countries TM has become a major health problem.<sup>[13]</sup> TM is usually recognized in childhood, at which time patient begin treatment with blood transfusion to maintain hemoglobin level and chelation therapy to overcome Iron overload in tissues later.

Due to distress from both illness and chelation treatment, patient repeatedly display high level of psychological problem with anxiety.<sup>[14,15]</sup> TM children behavioral abnormality has been estimated to be 1.6 times higher than normal healthy children.<sup>[14]</sup>

This study results support the other studies on the quality of life of TM patent with other chronic disease like hepatitis, hypothyroidism, ulcerative colitis, cystic fibrosis, congenital heart disease, epilepsy, and diabetes.<sup>[16-19]</sup> The rate of depression like psychological problems are high in girls with some diseases such as respiratory disease and convulsion disorders.<sup>[20]</sup> The long and complex treatment process of thalassemia major could be extremely traumatic to patients and parents.<sup>[21]</sup> However, the current study demonstrates that the QOL in patients surviving with chronic blood transfusion and chelation therapy is not worse than hematopoietic stem cell transplantation patients. Patients may even enjoy better QOL in some aspects. Very good scores were obtained for the physical, emotional, role and social function domains. In the current study, we found that patients rated their overall health significantly better with transfusion and iron-chelation therapy. The differences were mainly found in per-

ceived physical health that they considered themselves less dependent on other and medical aids, having good energy and less fatigue in their daily activity. The regimen of iron chelation probably has significant influence on the QOL of conventionally treated patients. TM patient had 21 % discomfort with the use of subcutaneous chelation therapy<sup>[22]</sup> and nearly 50% of them disliked desferrioxime treatment.<sup>[23]</sup> Some other studies also reported that desferrioxamine use was a strong barrier of QOL and oral chelation therapy might improve the quality of life of patient with iron overload<sup>[24-26]</sup>. The current study was demonstrated that patient on chronic blood transfusion with chelation therapy had significantly better self rated QOL in physical Mental and social domains.

#### AKNOWLEDGEMENT

The authors thank the study sites and instructors for their valuable contribution. The authors are thankful for contributions of those who helped to carry this study especially the researchers who evaluated the questionnaires and those who carried out the interviews.

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Source of support: Nil, Conflict of interest: None Declared