Research Article

Assessment of quality of life and its association with disease severity and nutritional status in heart failure

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Abstract

Objective: Heart failure (HF) affects quality of life (QoL) more profoundly than other chronic diseases resulting in increased disability and mortality. Investigations which include assessment of QoL and nutritional status using questionnaire if implemented could effectively improve HF outcomes. The study focuses on the association of QoL with severity of the disease, and nutrition in HF. **Materials and Methods**: A prospective observational study was conducted in forty eight HF patients of a teaching hospital. The QoL was assessed using Minessota living with HF (MLwHF) and Left Ventricular Dysfunction-36 (LVD-36) questionnaires; and nutritional status was examined using Mini Nutritional Assessment (MNA®). All the obtained scores were interpreted and presented as percentages and association of variables was measured statistically using Pearson correlation coefficient (r). **Results**: In a total of 48 HF patients 60.42% were men and 39.58% were women. The mean age of men of women were found to be 56.41 ± 13.08 years and 55.89 ± 8.379 years respectively with a significant difference (p=0.0001). Quality of Life assessed using MLwHF and LVD-36 has positive correlation with age (MLwHF r=0.1376; LVD-36 r=0.221), HF severity and negatively correlated with nutritional status (MLwHF r=-0.6382; LVD-36 r=-0.6523). **Conclusion**: Quality of life is an important patient outcome measure, if adequately addressed and treated accordingly could prevent frequent hospitalisations thus reducing disability and mortality rate in HF.

Keywords: Heart failure, quality of life, nutrition

Introduction

Heart failure (HF) affects quality of life (QoL) more profoundly than other chronic diseases worldwide (Jaarsma et al., 2010). Advanced HF is characterised by a debilitating late course, with increasingly frequent hospitalisations and considerable morbidity besides the obvious mortality (Ahluwalia et al., 2012). Even though QoL is a major concern, it appears that clinical management as well as research efforts do not focus sufficiently on this aspect. There is no good universal understanding of QoL in clinical practice (Sauser et al., 2014). The main outcome measures were mortality or hospital visits/ admissions due to disease and therapy related events, QoL and occurrence of adverse drug effects. In India, mortality rate after one year of HF diagnosis is reported to be 23%, greater than data of several developing countries except Africa (34%). Patients were approximately 10 years younger than patients of U.S. and Europe (Hisham et al., 2017).

Quality of life in HF can be assessed using Minnesota Living with Heart Failure (MLwHF) Questionnaire. It was designed as a self-administered measure of the effects of HF and treatments for HF on patients' QoL. The content of the questionnaire was selected to be representative of the ways HF can affect important physical, emotional, social and mental dimensions of a patient's life without being too long to administer during clinical trials or practice (Rector et al., 1987).

Some limitations like translation difficulties for few questions raised doubt in implementing the questionnaire. Therefore, a new instrument—the left ventricular dysfunction questionnaire (LVD-36)—has been developed

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specifically for patients with chronic left ventricular dysfunction (LVD) (Quirk and Jones, 1997; O'Leary and Jones, 1998). It was designed to measure the impact of LVD on daily life and wellbeing.

Malnutrition, and particularly cachexia, is very frequent in hospitalized and chronic HF patients with a prevalence estimated between 25 and 40% (Corish et al., 2001). In turn, this is associated with an increase in complications, length of stay, readmissions and mortality (Gastelurrutia et al., 2015). Therefore, an accurate evaluation of the nutritional status of HF patients has utmost importance. In fact, it is believed that malnutrition is at present underdiagnosed and consequently undertreated (Bonilla-Palomas et al., 2011).

Thus, the study aimed to assess QoL and identify any possible association with disease severity and nutritional status in HF patients.

Materials and methods

The study was a prospective observational study conducted in forty eight HF patients of a teaching hospital after obtaining ethical approval by the Kakatiya Institutional Ethical Committee (KIEC) (Approval No.: KIEC/KMC/MGMH/NCT/2016/12/001). The QoL in HF was measured using validated questionnaires, which assessed physical and emotional dimensions of the patient after chronic exposure to disease and treatment as well. The QoL was assessed using Minessota living with HF (MLwHF) and Left Ventricular Dysfunction-36 (LVD-36) questionnaires; and nutritional status was assessed using Mini Nutritional Assessment questionnaire (MNA®). All the obtained scores were interpreted and presented as percentages and association of variables was measured statistically using Pearson correlation coefficient (r).

Assessment of QoL and nutritional status using following questionnaires

Minnesota Living with Heart Failure (MLwHF) questionnaire contains 21 items (each holds zero to five scale) which identifies physical (Q1-7,12,13), emotional (Q17-21) and other dimension (Q8-11,14-16) score while each question has a likert scale ranging from 0-5. All the score is summated ranging from 0-105, where 105 is the worst possible score (*i.e.*, decreased QoL and severe disability) and 0 is the best possible score (*i.e.*, increased QoL and no disability). The MLwHF questionnaire takes approximately five minutes to complete. Therefore, the sum of responses reflects the overall effects of HF and

Table 1. Population percentage response in likert Scale of MLwHF questionnaire in the HF group

Dimensions/ Questions		Percentage of Heart Failure patients for their response					
		No	Very Little	Little	Moderate	Much	Very Much
Others	Q1	16.67	0	10.42	22.92	45.83	4.17
Physical Score	Q2	0	2.08	12.5	27.08	37.5	20.83
	Q3	0	2.08	16.67	29.12	41.67	10.42
	Q4	0	0	18.75	35.42	43.75	2.08
	Q5	0	2.08	20.83	35.42	33.33	8.33
	Q6	0	2.08	10.42	22.92	45.83	18.75
	Q7	0	4.17	25	37.5	33.33	0
Others	Q8	2.08	2.08	18.75	39.58	31.25	6.25
	Q9	22.92	4.17	25	22.92	12.5	12.5
	Q10	100	0	0	0	0	0
	Q11	0	2.08	8.33	47.92	37.5	4.17
Physical Score	Q12	0	0	0	18.75	52.08	8.33
	Q13	0	0	4.17	25	64.58	6.25
Others	Q14	4.17	8.33	35.42	25	20.83	6.25
	Q15	4.17	4.17	39.58	33.33	16.67	2.08
	Q16	93.75	4.17	2.08	0	0	0
Emotional Score	Q17	10.42	8.33	35.42	33.33	8.33	4.17
	Q18	10.42	12.5	37.5	22.92	16.67	0
	Q19	0	0	4.17	35.42	60.42	0
	Q20	0	2.08	8.33	52.08	33.33	4.17
	Q21	0	0	2.08	22.92	54.17	20.83

treatments on the individual's QoL.

Left Ventricular Dysfunction-36 (LVD-36) questionnaire is a 36 item questionnaire designed to measure the impact of left ventricular dysfunction on daily life and wellbeing. Responses are dichotomous (i.e., true or false). True responses are summed and the sum is expressed as a percentage, so that 100 is the worst possible score (*i.e.*, decreased QoL and severe disability) and 0 is the best possible score (*i.e.*, increased QoL and no disability). The LVD-36 questionnaire takes approximately five minutes to complete.

Mini nutritional assessment (MNA®) is an 18 item long form questionnaire with score ranging from 0-30, <17 indicates malnutrition, 17-23.5 indicates at risk of malnutrition and 24-30 indicates normal nutrition status (Rubenstein et al., 2001; Vellas et al., 2006; Guigoz et al., 2006; Kaiser et al., 2009)

Statistical analysis

The responses of all the questionnaires were collected and analysed for counts and percentages. Graphpad prism 7.0 was used for statistical analysis for mean and standard deviation and statistical level of significance was considered for $p< 0.05$. Pearson correlation coefficient 'r' analysis was also performed to assess the association between questionnaires and other variables.

Results

In a total of 48 HF patients 60.42% (n=29) were men and 39.58% (19) were women. The mean ± SD of age in men and women were found to be 56.41 ± 13.08years and 55.89 ± 8.379years respectively with a significant difference of p=0.0001.Most of the male admissions occurred between the age group 41-50 and 61-70 years while female admissions between the age group 51-60 years.

QoL was assessed in HF patients using disease-specific validated questionnaires MLwHF and LVD-36 respectively.

In the study total responses towards each question in MLwHF questionnaire was illustrated in Table 1, where most of the responses are 'much' in the likert scale predominantly towards physical and emotional dimension.

The MLwHF score (*i.e.*, 0-105) was divided into class intervals to classify the distribution of HF patients with varying score. Table 2 shows the distribution of HF patients falling under different scores. In 47.92% HF patients the score ranged

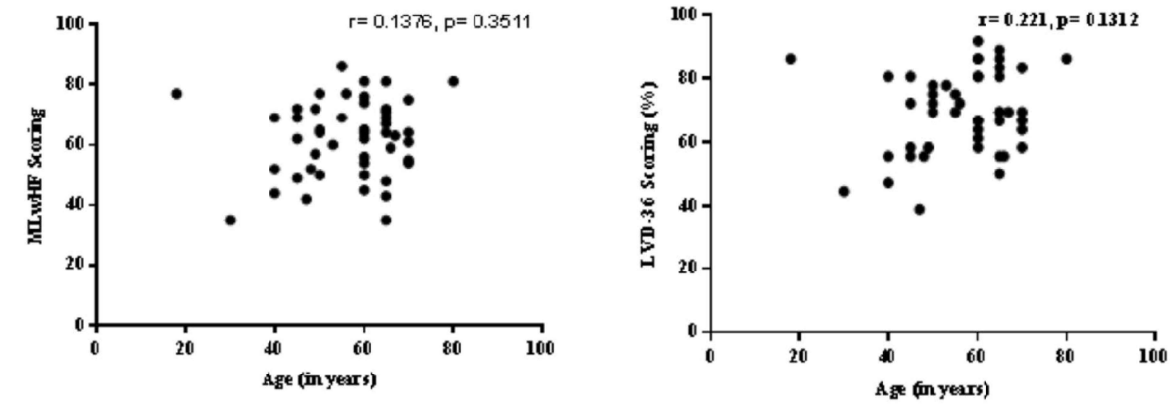

Figure 1. Correlation of MLwHF and LVD-36 Score with Age in HF group

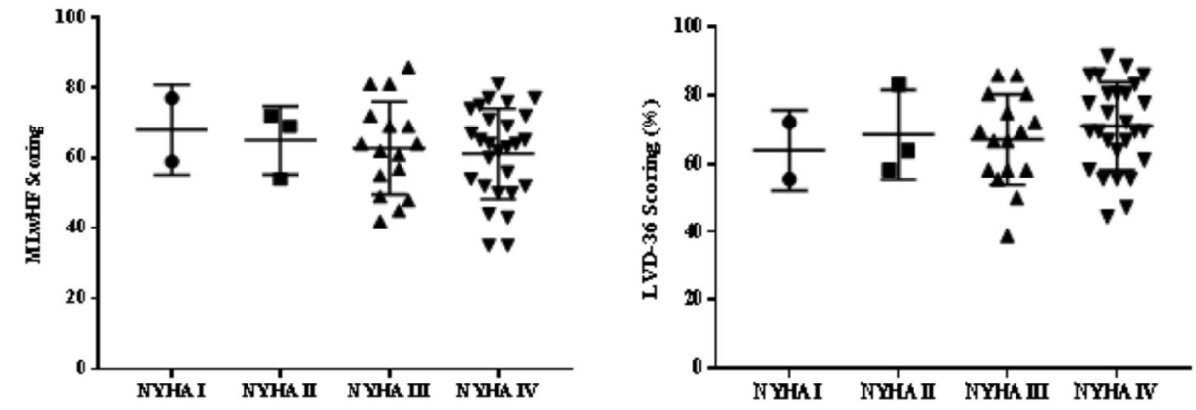

Figure 2. Comparison of MLwHF and LVD-36 Score with severity of HF

between 64-84 HF which may indicate that the disability due to HF was moderate affecting QoL. All the values in total population (males and females) were also shown in table 2.

The LVD-36 score (*i.e.*, 0-100%) was divided into class intervals to classify the distribution of HF patients with varying score. Table 3 shows the distribution of HF patients falling under different scores. In most of the HF patients the score ranged between 61-80% (41.67% HF patients) and 81-100% (29.17% HF patients) which may indicate that the disability due to HF was moderate and severe respectively affecting QoL. All the values in total population (men and women) were shown in table 3.

Table 2. Distribution of HF patients with their MLwHF score

MLwHF Score	Total Patients (%) N=48	Male (%) N=29	Female (%) N=19
0-21	0	0	0
22-42	3 (6.25%)	3 (10.34%)	0
43-63	22 (45.83%)	12 (41.38%)	10 (52.63%)
64-84	23 (47.92%)	14 (48.28%)	9 (47.37%)
85-105	0	0	0

Table 3. Distribution of HF patients with their LVD-36 score

LVD-36 Score (%)	Total Patients (%) N=48	Male (%) N=29	Female (%) N=19
0-20	0	0	0
21-40	1 (2.08%)	1 (3.44%)	0
41-60	13 (27.08%)	7 (24.14%)	6 (31.58%)
61-80	20 (41.67%)	13 (44.83%)	7 (36.84%)
81-100	14 (29.17)	8 (27.59%)	6 (31.58%)

Correlation of QoL with Age

To evaluate the relation between QoL and age, bivariate analysis was performed and found that a positive correlation exist between QoL and age, LVD-36 exhibited positive correlation (r=0.221) followed by MLwHF (r=0.1376) with age of HF patients and is shown in figure 1.

Comparison of QoL with HF Severity

To assess the relation between severity of HF and QoL, the score between all the functional classes of HF i.e., New York

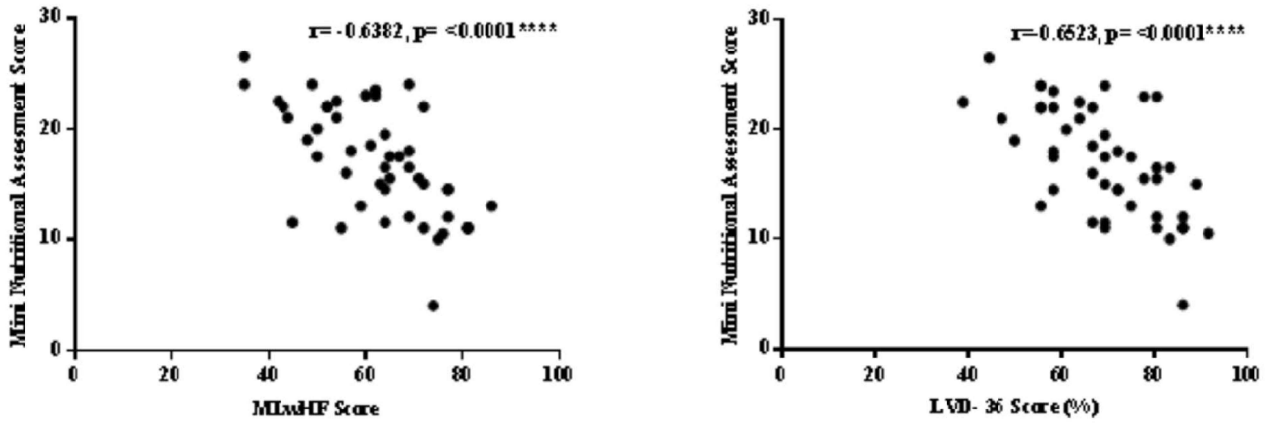

Figure 3. Correlation of MLwHF and LVD-36 Score with MNA® Score

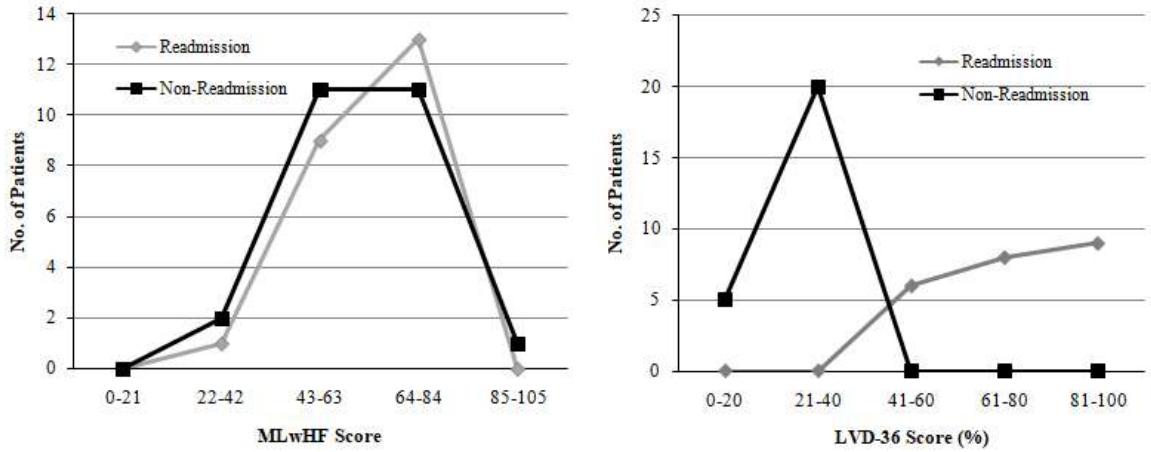

Figure 4. Comparison of MLwHF and LVD-36 score with readmissions and non-readmissions

Table 4. Mean ± SD of Scores of QoL questionnaires (MLwHF and LVD-36) with HF severity

QoL questionnaire	NYHA I (n=2)	NYHA II (n=3)	NYHA III (n=16)	NYHA IV (n=27)
MLwHF	68±12.73	65±9.644	62.81±13.22	61.22±12.89
LVD-36 (%)	63.89±11.79	68.52±13.13	67.01±13.26	71.09±12.87

Heart Association (NYHA) classification was compared and found that most of the HF patients having high scores are diagnosed with NYHA III and IV functional class of HF, depicted in Figure 2 and values are provided in table 4.

Correlation of QoL with Nutritional status

To further evaluate the relation between QoL and nutritional status, bivariate analysis was performed and found that there a strong negative correlation between QoL score and nutritional status which has more level of significance (****p=<0.0001). This indicates that QoL is decreasing with increase in malnutrition shown in Figure 3. Comparatively, both the questionnaire scores showed similar yet strong correlation with nutritional status (MLwHF r= -0.6382; LVD-36 r= -0.6523).

Comparison of Quality of life between readmissions and non-readmission

The QoL is affected more in re-admitted HF patients where considerable difference was found with LVD-36 score than MLwHF score, shown in figure 4.

Discussion

In the study most of the patients were young males. Mean age was 56.41±13.08 years in males and 55.89±8.379 years in females. The mean scores of the QoL using MLwHF and LVD-36 questionnaire was 63.13±12 and 69.75±12.82% respectively.

There was a positive correlation of QoL with age and found that LVD-36 (0.221) shows high correlation than MLwHF (r=0.1376). The present study found that most of patients diagnosed with NYHA III, IV functional class have increased scores and found that LVD-36 questionnaire showed more appropriate findings than MLwHF. Therefore, this might effectively help in predicting the severity of HF similar to other studies (Carels et al., 2004; Rodriguez-Artalejo et al., 2005; Zuluage et al., 2010; Holland et al., 2010).

Health related QoL is worsened with malnutrition in patients with HF (Young-Jung, 2012), similar the study findings reported that there is a strong negative association between QoL (MLwHF r= -0.6382 and LVD-36 r= -0.6523) and nutritional status. This indicates that as the normal nutritional status decreased the QoL was worsened.

A decrease in QoL mostly affects the disease condition (Rodriguez et al., 2005; Holland et al., 2010). HF increases frequency of hospitalizations (Ahluwalia et al., 2012) and more profoundly it affects QoL than many other chronic diseases (Jaarsma et al., 2010). Similarly the data obtained from the study illustrates that QoL may was affected by HF and it may be the possible reason for readmission.

Conclusion

In conclusion, the study has shown that validated questionnaire based clinical assessment offers better understanding the true cause of HF admissions or re-hospitalization which requires appropriate attention in addition to conventional therapy. Therefore, their application as a baseline tool in routine clinical assessment for HF is vital which could eventually reflect the pharmacological and non-pharmacological efficacy in HF.

Conflict of interest

Authors report no conflict of interest in this work.

Acknowledgments

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