Chapter 4

Educational level and quality of life in heart failure patients

Giorgio Barbareschi
Robbert Sanderman
Tiny Jaarsma

In preparation
Abstract

Aims: We investigated the role of educational level in determining differential response in terms of Quality of Life (QoL) among Heart Failure (HF) patients.

Methods and Results: The study employs a longitudinal design. QoL of 553 patients with HF was assessed during their hospitalisation and at four assessments after discharge. Data on patients’ QoL were collected using the RAND 36-Item Health Survey questionnaire. Cross-sectional disparities at different assessment points generally favoured high-educated patients. Most of the differences between high- and low-education patients were reported in physical and social domains and in limitation in role functioning due to emotional problems. Almost no differences between the educational levels were found in physical distress and limitation in role functioning due to physical problems. Longitudinal results show that high-educated patients, in comparison with others, significantly improved their limitations in role functioning due to emotional problems over time.

Conclusions: Educational disparities in HF patients are principally present in physical and social domains. However, equal levels of psychological distress resulted in a different response between high- and low-education groups in terms of limits in role functioning over time. Psychosocial resources in HF patients with low education are more limited and tend to degrade, resulting in worse role functioning in response to the same level of distress.
Introduction

Heart Failure (HF) is a severe condition which has become a major worldwide public health problem. The number of people living with a HF condition is alarming, with 1-5 newly diagnosed cases per 1,000 population annually (Murray-Thomas & Cowie, 2003), resulting in substantial costs for the public health and, in most cases, serious limitations in Quality of Life (QoL) for the patients (McMurray & Stewart, 2002; Cline, Willenheimer, Erhardt, Wiklund, & Israelsson, 1999).

There is consistent evidence showing that low socioeconomic status (SES) is an independent predictor of future development of HF (Ingelsson, Lind, Arnlov, & Sundstrom, 2006) and consequent hospitalisation (Stewart et al., 2006). In addition, there is an association between low SES and higher mortality, more barriers to healthcare and repeated hospital readmissions in HF patients (Auerbach et al., 2000; Blair, Lloyd-Williams, & Mair, 2002; Philbin, DiSalvo, & Dec, 1999; Sharma, Schwartz, & Schocken, 2000). Yet, remarkably, little attention has been paid to SES as a possible determinant of differences in QoL as a consequence of HF. There are a few cross-sectional studies which identify low SES as one of the significant factors associated with poor QoL in HF patients (Clark, Tu, Weiner, & Murray, 2003; Gary, 2006; Lee, Yu, Woo, & Thompson, 2005), and a prospective study on coronary heart disease showed that high SES leads to better outcomes in functional domains of QoL, particularly in relation to physical functioning up to one year after the diagnosis (Barbareschi, Sanderman, Kempen, & Ranchor, 2008). However, we are unaware of any other longitudinal research which addresses SES as a possible factor to explain disparities in QoL in HF patients. In order to tailor both clinical interventions and education programmes among HF patients, it is essential to identify how different socioeconomic groups respond to the disease over time.

Previous studies showed an association between educational level in HF patients and certain aspects of QoL, such as higher anxiety, lower levels of physical functioning and worse general health ratings (Riedinger, Dracup, & Brecht, 2000). Additionally, low-educated HF patients were less likely to receive care from a
cardiologist (Auerbach et al., 2000) and reported more than a 50% increase in the risk of hospitalization (which is undoubtedly associated with poor QoL outcomes) compared to high-educated patients (Sui, Gheorghiade, Zannad, Young, & Ahmed, 2007). As a result, educational level is often used as a proxy for SES variables in medical research. The aim of this study is to examine whether educational level is related to QoL and particularly to the change in QoL over time after a HF hospitalization. As HF results in severe limitations mainly in physical and functional status (Jennings & Esler, 1990; Rich, 1997), we expect low-educated patients to report a lower level of QoL in these domains especially. For the same reason we expect low-educated patients to show a smaller increase (or greater detriment) in QoL in the long term after discharge, compared to high-educated patients.

**Method**

Secondary analyses were performed using data from the Coordinating study evaluating Outcomes of Advising and Counselling in Heart failure (COACH). The project is based on a multi-centre collaboration between 17 hospitals in the Netherlands, aimed at studying the effect of education and counselling in heart-failure patients (Jaarsma et al., 2004; Jaarsma et al., 2008). However, for the present research we focused on educational disparities and did not consider differences between intervention groups.

*Recruitment procedures*

Following confirmation of suitability and informed consent, 1023 patients were included in the COACH study between November 2002 and February 2005 and each was followed for 18 months. The two main criteria for inclusion in the study were: (1) hospitalization following a symptomatic heart failure, confirmed by a cardiologist, and (2) a documented underlying heart disease. Patients were excluded if they had received an invasive cardiac intervention within 6 months
before their hospitalisation, had such an intervention planned in the coming 3 months, were already included in another study or were under evaluation for heart transplantation. Information on the clinical conditions and socio-demographical characteristics of the patients was collected from medical records and in interviews at the baseline assessment (admission to the hospital). Baseline data on QoL were collected at hospital admission through a structured interview and questionnaires. Four follow-up assessments of QoL took place at 1, 6, 12 and 18 months after discharge, by means of interviews at the patients’ homes carried out by a well-trained and independent data collector.

For the present study we selected those patients of known educational level who responded to all five assessments, giving us a final sample of 553 participants. The COACH study was approved by the Medical Ethical Committee of the University Medical Centre of Groningen in compliance with the Declaration of Helsinki.

**Measures**

QoL. QoL was quantified using 35 items of the RAND 36-Item Health Survey (Version 1.0), grouped into eight scales: emotional well-being (five items), energy/fatigue (four items), social functioning (two items), physical functioning (10 items), pain (two items), general health (five items), limitations in role functioning due to personal or emotional problems (three items) and limitations in role functioning due to physical health problems (four items). In the present study we excluded a single-item scale which provides an indication of perceived change in health within one year, since, changes in QoL were more accurately quantified by comparing the patients’ score at different assessments. All the scales range from 0 to 100, with high scores indicating a more favourable health state. The psychometric qualities and other properties of the Dutch version of the RAND 36 have been discussed in previous studies (VanderZee, Sanderman, & Heyink, 1996; VanderZee, Sanderman, Heyink, & deHaes, 1996).
Educational level. Educational level was used as index of SES in the present study. Compared to other socioeconomic indexes, educational level better represents the socio-cultural part of SES, reflects more stably the individual situation of the subject (Mirowsky & Ross, 1998; Ross & Mirowsky, 1999; Winkleby, Jatulis, Frank, & Fortmann, 1992), is strongly related to personal psychosocial resources (Ranchor & Sanderman, 2000) and positively affects personal well-being (Ross & VanWilligen, 1997). Educational level was defined as the highest level of education attained by the patient, with the score ranging from 1 (elementary school) to 8 (higher education, second phase). These scores were then recoded into four categories to represent groups with distinct backgrounds: (1) very low (elementary school), (2) low (vocational education, lower level), (3) medium (junior general secondary education; vocational education, higher level; secondary education) and (4) high (professional higher education, university education).

Covariates. Other clinical and demographic characteristics, considered in the literature as candidate variables for adjustment in cardiac disease (Penninx et al., 2001; Van Jaarsveld, Ranchor, Sanderman, Ormel, & Kempen, 2005), were collected at the baseline from the patient’s medical chart and patient interview. The following characteristics were included as covariates in the present study: age, gender, Left Ventricular Ejection Fraction (LVEF) and number of active chronic conditions (comorbidity). The chronic conditions considered in the latter variable included diabetes, stroke, Chronic Obstructive Pulmonary Disease (COPD), asthma, kidney disease, liver disease, gastrointestinal disease, hypertension, peripheral arterial disease and arthritis.

Statistical Analyses
Firstly we performed a bivariate correlation analysis including educational level, the eight scales of QoL, gender, age and LVEF, to study the associations between the variables included in the following analyses.
In order to examine the relationship between educational level and QoL at different assessment points, mean values of the outcome variables were compared between the four groups with different educational levels using a one-way analysis of co-variance (univariate ANCOVA).

To measure longitudinal change between admission and 18 months after discharge, difference-score variables were calculated for each aspect of QoL by subtracting the value reported at the final follow-up assessment (18 months) from the corresponding value reported at the first assessment (hospitalization). Difference-score values were then recoded into three categories, according to whether QoL increased (positive difference), decreased (negative difference) or remained at the baseline level (difference of 0). The distribution of patients across these three categories for different domains of QoL provides an overview of the general longitudinal trends for each educational level. Finally, in order to evaluate the actual extent of such changes in QoL, we tested whether the difference-score values differed among educational groups using an additional one-way ANCOVA. All the results were controlled for socio-demographic and clinical covariates (age, gender, LVEF and comorbidity).

Results

Characteristics of the sample

The sample comprised a high number of men (62%), an average age of 69 years (varying between 26 and 89) and a small number of high-educated patients (11.6%) (table 1). For the clinical parameters, LVEF was less than 33% on average, and the average number of chronic conditions in addition to heart failure was 1.4 per patient. The high-educated group contained a notably higher number of male patients, of younger age and with less comorbidity, especially when compared to the very low-educated patients.

In addition, we compared participants with non-participants (patients who did not participate in all follow-up assessments) at the baseline assessment for socio-
demographic characteristics and QoL. Participants were significantly younger (on average 68.7 years versus 73.3 years; F= 45.6, p<0.001), reported fewer chronic conditions (on average 1.2 versus 1.5; F= 18.7, p<0.001), better emotional well-being (on average 66.5 versus 63.2; F= 4.4, p<0.05), higher levels of physical functioning (on average 37.5 versus 30.9; F=14.8, p<0.001) and better general well-being (on average 44.5 versus 41.8; F=4.5, p<0.05).

Table 1. Description of the sample at the point of admission to the hospital

<table>
<thead>
<tr>
<th></th>
<th>Total Sample N 553 (100 %)</th>
<th>Very Low Education N 176 (32 %)</th>
<th>Low Education N 134 (24 %)</th>
<th>Medium Education N 179 (32 %)</th>
<th>High Education N 64 (12 %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males N (%)</td>
<td>343 (62 %)</td>
<td>90 (26%)</td>
<td>91 (27 %)</td>
<td>110 (32 %)</td>
<td>52 (15 %)</td>
</tr>
<tr>
<td>Females N (%)</td>
<td>210 (38 %)</td>
<td>86 (41 %)</td>
<td>43 (20 %)</td>
<td>69 (33 %)</td>
<td>12 (6 %)</td>
</tr>
<tr>
<td>Age, mean (SD)</td>
<td>69 (11.5)</td>
<td>73 (9.4)</td>
<td>67 (10.2)</td>
<td>67 (12.4)</td>
<td>66 (13.1)</td>
</tr>
<tr>
<td>Comorbidity, mean (SD)</td>
<td>1.4 (1.2)</td>
<td>1.6 (1.3)</td>
<td>1.5 (1.3)</td>
<td>1.3 (1.1)</td>
<td>1.1 (1.1)</td>
</tr>
<tr>
<td>LVEF*, mean (SD)</td>
<td>33 (14)</td>
<td>33 (14)</td>
<td>33 (15)</td>
<td>33 (14)</td>
<td>30 (14)</td>
</tr>
</tbody>
</table>

* LVEF = Left Ventricular Ejection Fraction

Relations between educational level, age, gender, LVEF, comorbidity and QoL

Differences in gender, age and comorbidity between educational groups are confirmed by the results of the correlation analysis (table 2), while no significant relation was found between educational level and LVEF. Several, but not all, domains of QoL are related to educational level. Weak but significant correlations with educational level were found in relation to physical functioning, role limitations due to emotional problems, energy or fatigue and pain at most of the assessment points. Fewer associations with educational level were found for emotional well-being, social functioning, role limitations due to physical problems and general health.
Table 2. Correlation between educational level, covariates and QoL at different assessment points

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>1 month</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-0.16***</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age</td>
<td>-0.22***</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Severity of disease (LVEF)</td>
<td>-0.06</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Comorbidity</td>
<td>-0.10*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Emotional well-being</td>
<td>0.05</td>
<td>0.08</td>
<td>0.10*</td>
<td>0.03</td>
<td>0.07</td>
</tr>
<tr>
<td>Role limitations due to emotional problems</td>
<td>0.01</td>
<td>0.12**</td>
<td>0.15***</td>
<td>0.10*</td>
<td>0.14**</td>
</tr>
<tr>
<td>Energy/Fatigue</td>
<td>0.10*</td>
<td>0.02</td>
<td>0.09*</td>
<td>0.13**</td>
<td>0.12**</td>
</tr>
<tr>
<td>Social functioning</td>
<td>0.00</td>
<td>-0.05</td>
<td>0.05</td>
<td>0.02</td>
<td>0.10*</td>
</tr>
<tr>
<td>Physical functioning</td>
<td>0.14**</td>
<td>0.17***</td>
<td>0.21***</td>
<td>0.20***</td>
<td>0.21***</td>
</tr>
<tr>
<td>Role limitations due to physical problems</td>
<td>0.07</td>
<td>0.04</td>
<td>0.10*</td>
<td>0.06</td>
<td>0.11*</td>
</tr>
<tr>
<td>Pain</td>
<td>0.11**</td>
<td>0.12**</td>
<td>0.09*</td>
<td>0.10*</td>
<td>0.05</td>
</tr>
<tr>
<td>General health</td>
<td>0.08</td>
<td>0.03</td>
<td>0.02</td>
<td>0.10*</td>
<td>0.08</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001

Differences in QoL between educational levels at different assessments

Most cross-sectional differences between the educational levels were found for physical functioning, role limitations due to emotional problems, energy or fatigue and social functioning (table 3). Regarding physical functioning, very low-educated patients were significantly worse than high-educated patients at 6, 12 and 18 months and worse than patients with medium education at 12 months. In the same domain, low-educated patients reported significantly lower values than high-educated patients at 6 months. Regarding role limitations due to emotional problems, patients with low education reported significantly worse outcomes than high-educated patients at 1, 6 and 18 months, and significantly worse outcomes than medium-educated patients at 6 months after hospitalization. In the same domain, patients with very low education scored significantly worse than the high-educated ones at 18 months. Very low-educated patients reported significantly more fatigue than patients with low and medium education at the baseline assessment and more fatigue than high-educated patients at 12 and 18 months. In
addition, low-educated patients reported a significantly lower level of energy than high-educated patients 12 months after discharge. Finally, concerning social functioning, patients with high education scored significantly worse than those with low and very low educational levels at 1 month, while at 6 months low-educated patients reported significantly worse outcomes than all the other educational groups.

Fewer differences were found for emotional well-being, pain and role limitation due to physical functioning. At 6 months, low-educated patients were significantly more distressed than medium-educated patients, reported significantly higher levels of pain than participants of all the other educational groups and reported significantly more limitations due to physical functioning than high-educated patients. Differences in pain persisted to 12 months, when low-educated patients reported more pain than those with high education.

In the various domains of QoL, differences between educational levels were more frequently found between the very low-educated or low-educated group and the high-educated one. Regarding the assessment points, cross-sectional differences between educational groups were more frequent 6 and 18 months after discharge compared to at patient inclusion and the 1-month and 12-month follow-ups.

*Longitudinal changes in QoL*

Figure 1 shows the percentage of patients whose QoL increased, decreased or remained at the baseline level over time, in relation to their educational level. In domains such as emotional well-being, energy/fatigue, physical functioning, general health and limitation in role functioning due to physical functioning, the educational groups reported quite similar results. In general, the participants increased most in energy/fatigue compared to the other domains (varying between 55% of the low-educated group and 62% of the high-educated one), tended to remain at their baseline level of pain (varying between 41% of the very low-educated group and 54% of the low-educated group) and suffered a further
Table 3. Differences in QoL between educational levels at different assessment points

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline</th>
<th>1 month</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Emotional well-being</td>
<td>66.0 (1.9)</td>
<td>64.6</td>
<td>66.3</td>
<td>69.4</td>
<td>69.8</td>
</tr>
<tr>
<td>Fatigue</td>
<td>35.4</td>
<td>43.3</td>
<td>42.1</td>
<td>41.8</td>
<td>49.2</td>
</tr>
<tr>
<td>Social functioning</td>
<td>51.8</td>
<td>55.7</td>
<td>50.7</td>
<td>51.8</td>
<td>61.0</td>
</tr>
<tr>
<td>Physical functioning</td>
<td>36.0</td>
<td>40.6</td>
<td>38.7</td>
<td>44.1</td>
<td>42.0</td>
</tr>
<tr>
<td>Pain</td>
<td>62.0 (2.7)</td>
<td>68.3</td>
<td>67.6</td>
<td>70.6</td>
<td>74.7</td>
</tr>
<tr>
<td>General health</td>
<td>42.7 (1.6)</td>
<td>46.0</td>
<td>44.9</td>
<td>47.3</td>
<td>45.5</td>
</tr>
<tr>
<td>Role limitations</td>
<td>55.0</td>
<td>55.5</td>
<td>53.6</td>
<td>44.9</td>
<td>49.0</td>
</tr>
<tr>
<td>Physical limitations</td>
<td>16.2</td>
<td>22.4</td>
<td>20.7</td>
<td>21.7</td>
<td>20.9</td>
</tr>
</tbody>
</table>

1) very low education; 2) low education; 3) medium education; 4) high education.
One-way ANOVA: * p<0.05; ** p<0.01. Means and standard errors adjusted for gender, age, LVF and comorbidity.
*) significant difference between very low education and low education; **) significant difference between very low education and medium education; ***) significant difference between very low education and high education; ****) significant difference between low education and medium education; *****) significant difference between low education and high education.
**Figure 1.** Proportions of patients whose QoL increased, decreased or remained at the baseline level between their admission and 18 months after discharge

V. L.) very low education; L.) low education; M.)medium education; H.) high education.

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decrement in general health (varying between 29% of the high-educated group and 33.5% of the medium-educated group).

Differences between education levels for patients who increased, decreased or remained at the baseline level seemed more prominent in social functioning, pain and limitations in role functioning due to personal or emotional problems. Concerning social functioning, a higher percentage of patients who decreased in this domain were present at the very low educational level, especially compared with the high-educated group, in which a higher proportion of increasers was reported. In the domain of physical pain, very low-educated and low-educated patients reported a smaller decrease compared to the medium-educated and high-educated groups. Regarding limitations in role functioning due to emotional problems, 24% of very low-educated, 21% of low-educated and 21% of medium-educated patients reported a decrease, in contrast to only 10% of high-educated patients. The high-educated group also contained a higher percentage of increasers in this domain compared to the other groups.

To compare the actual change in different domains of QoL across educational levels, we calculated mean differences in QoL between baseline and 18 months after discharge, controlling the outcomes for age, gender, LVEF and comorbidity (figure 2). The very low-educated patients increased significantly more than the low-educated ones. However, the main difference was in relation to limitations in role functioning due to emotional problems, where high-educated patients improved significantly more than all the other groups, particularly when compared to the very low and low educational levels (p<0.05).
Figure 2. Patients’ longitudinal changes in QoL between their admission and 18 months after discharge.
Discussion

This study adds new information on the impact of educational level on QoL in HF patients, in particular concerning the relationship between educational level and QoL during the 18 months after discharge from hospital. We examined whether cross-sectional and longitudinal inequalities in QoL of HF patients were attributable to educational level, independently of other clinical and socio-demographic factors. As expected, we found better outcomes for high-educated patients in physical and functional domains, specifically in physical functioning, energy, social functioning and limitations in role functioning consequent to emotional problems.

The greatest inequalities were found when the high-educated patients were compared to the very low-educated and low-educated patients. However, when we examined the differences over time, we found that high-educated patients increased significantly compared to the other groups only in relation to limitations in role functioning due to emotional problems. The difference in these limitations was clearly marked between high-educated patients and lower educational groups, both cross-sectionally and longitudinally. Such a result appears to contradict the fact that we found almost no inequalities in relation to emotional well-being in our analysis. We can reconcile these apparently incongruent outcomes referring to the reserve capacity model proposed by Gallo and Matthews (Gallo & Matthews, 2003). According to this model, people with low SES are more exposed to stressful situations and live in an environment which prevents the development or replenishment of new resources. This could partially explain why people with low SES are more likely to report poorer health outcomes (Taylor & Seeman, 1999). Furthermore, long-term exposure to stress progressively reduces the resources available, leaving the individual even more vulnerable when exposed to new stressors (Ensel & Lin, 1991). In other words, the resources of low-SES people are more limited and tend to degrade, resulting in worse health outcomes in response to stressful situations, when compared to high-SES people. In general, the reserve
capacity model is used to explain why individuals with different SES who are exposed to the same stressors report different levels of distress. We extend this concept to our results, concluding that same levels of psychological distress, experienced by HF patients of different educational backgrounds, produce a differential response, in terms of limits in role functioning, because of disparities in resources among the groups.

With regard to physical pain, we found that very low-educated patients improved in this domain more than the low-educated ones. Beside the observation that very low-educated patients started from a lower level at the baseline, while at 18 months they improved in their physical pain up to the level of the other groups, we could not find a clear explanation for this result. It should, however, be remembered that although pain is increasingly described as associated with HF, it remains unclear whether this symptom is directly related to heart failure (Godfrey, Harrison, Medves, & Tranmer, 2006).

In other domains of QoL such as energy and fatigue, social functioning and physical functioning, the differences between educational groups are not accompanied by longitudinal differences. This is because the gap between educational groups reported at hospitalization is more or less proportional to the gap at the last assessment. Low- and high-educated HF patients differ in levels of energy, social functioning and physical functioning at different assessment points, but their degree of improvement or decline in the long term is comparable.

As expected, general physical domains were particularly compromised during hospitalisation, since in our sample the lowest scores at the baseline were reported in energy and fatigue, physical functioning and limitations in role functioning due to physical problems. In our study, educational disparities in physical functioning were more frequent than in any other domain, showing better outcomes for medium-educated and high-educated patients compared to very low-educated and low-educated ones. Somehow, education restrained the negative effect of HF on physical functioning. More generally, inequalities related to educational levels
were reported in domains which represented the functional status of the patients (physical, social and role functioning). HF patients have been shown to be worse off in their functional status already at a premorbid stage when compared to a reference group (Van Jaarsveld, Sanderman, Miedema, Ranchor, & Kempen, 2001). In this case, disparities may be due to the fact that high education is related to a greater degree of personal control, such as a higher level of self-efficacy, which has been found to be a predictor of functional status in HF patients (Kempen, Sanderman, Miedema, Meyboom-de Jong, & Ormel, 2000).

Two points which emerged from this study require further consideration. First, most of the patients in our sample increased their QoL between their admission to the hospital and 18 months after discharge. Generally, an admission to hospital following HF implies severe symptoms and the exacerbation of clinical conditions which results in impaired QoL. Patients who survive this phase are expected to ameliorate and stabilise at a higher level. This is what we observed in the largest part of our sample. However, it is striking that a relatively large portion of the sample further deteriorated in the various domains, ranging from 15% in limitations in role functioning due to physical problems, to 32% in general health. An important direction for future research is to define more sharply the subgroup of decreasers in each domain, to elucidate the determinants of such a trend.

The second point for consideration is that for this study we selected only those patients who responded to all assessments. The patients dropping out of the study may have been those with poorer health, in which case our sample was biased towards HF patients with milder disease and better QoL (van den Bos, Smits, Westert, & van Straten, 2002). As we reported in the description of the sample, participants in the study were significantly younger and better off in terms of comorbidity, emotional distress, physical functioning and general well-being. Furthermore, about 40% of the non-participants did not respond because they died within 18 months of being discharged. The participants in our study might therefore represent a subgroup of patients who adapted better after discharge,
enhancing their chances of surviving or at least being capable of respond to further assessments. Nonetheless, these outcomes do not necessarily represent a bias for the present study, since the main purpose of this research was to describe the QoL of HF patients at the different measurement points.

A possible limitation of our study is the lack of pre-morbid measurements of QoL. It might be that the educational differences in QoL reported in our research were not a consequence of HF, but rather the aggravation of a pre-morbid situation. A prospective study showed that socioeconomic differences in physical functioning among coronary heart disease patients preceded the onset of the disease and were repeated 6 and 12 months after diagnosis (Barbareschi et al., 2008). Such pre-morbid differences may have been present in the current sample too, so we cannot take for granted that educational differences in QoL are directly consequent to the disease. Further studies reporting pre-morbid information for the sample would help to understand the real impact of HF on the patients’ QoL.

In conclusion, this research shows that differences in QoL in relation to educational level were more pronounced in domains related to functional status, particularly physical functioning. Regarding limitations in role functioning due to emotional problems, high-educated patients improved more compared to all the other educational groups.

To our knowledge, there are no other longitudinal studies addressing the QoL of HF patients in relation to educational level. The findings of our study thus provide new information on this topic and highlight an avenue for further research in this field. The first results point to the conclusion that very low-educated patients would benefit from an intervention aimed at ameliorating their functional status. Caregivers should not underestimate the consequences of psychological distress on the regular daily activities of low-educated HF patients. Clearly, there is a need for further longitudinal studies to clarify the role of education, as well as other background factors, in the process of adjustment to HF.
Reference List


