Quality of Life in Survivors of Myocardial Infarction

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Contents

Abstract

The concepts of quality of life and health-related quality of life (HRQoL) are wildly used in literature but lack agreed formal definitions. It is however broadly accepted that they are complex, multidimensional, and dynamic constructs,

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M.E. Alvarenga, D. Byrne (eds.), *Handbook of Psychocardiology*,
DOI 10.1007/978-981-287-206-7_63

which should be assessed on the basis of positive and negative indicators. The term HRQoL is used to clarify the health-disease context of the analyzed QoL. Both generic and disease-specific instruments are used for HRQoL measurement.

Results of the studies on the level and changes in HRQoL after MI are inconsistent. Some studies show HRQoL as being minimally affected by MI, while others indicate major reduction in at least some of its dimensions. Moreover, minor fluctuations to significant changes in HRQoL's different dimensions are reported. The dynamic of these changes varies depending on the period since an MI and between different dimensions of HRQoL.

A number of clinical, sociodemographic, and psychosocial characteristics are recognized as predictors of HRQoL in MI survivors. Among sociodemographic characteristics, age, gender, and education are of a special interest with higher education predicting better HRQoL, but age and gender's role being unclear. Among psychosocial resources, e.g., self-esteem and various social resources were recognized as strong predictors of HRQoL, with higher levels of psychosocial resources predicting better HRQoL.

More work still needs to be performed to fully understand the dynamics and complexity of quality of life in the context of myocardial infarction and CVD in general. But the results support a need for a comprehensive and patient-centered medical practice.

Keywords

Quality of life • Health-related quality of life • Psychosocial resources • Self-esteem • Social cohesion • Social support • General life satisfaction • Myocardial infarction

Introduction

Progress in medicine, pharmacology, and technology allowed to eliminate many infectious diseases and allows to conduct increasingly sophisticated medical procedures and life-saving surgeries. The advances in the last 20–30 years in medical therapies of myocardial infarction and its sequelae (ranging from improvement of accurate medication to successful heart transplants) are indisputable. This triumph has, however, automatically triggered a new clinical challenge: a need to consider the long-term quality of life of the growing number of long-term MI survivors rather than only suppress morbidity or mortality in this group. A need for broadening the perspective on the goals in cardiac practice has been recognized by the European Society of Cardiology and reflected by including maintenance and improvement of quality of life as treatment goals in the guidelines for patients with different heart diseases (Fox et al. 2006; Swedberg et al. 2005). A focus on the constellation of challenges that patients face during treatment and recovery period, on their ways of coping with these challenges and the achieved outcomes (in terms of physical, psychological, social, and spiritual functioning), became a priority for many practitioners and researchers (Fox et al. 2006; Swedberg et al. 2005).

Nowadays, a shift from concentrating solely on prolonging the patient's life to also focusing on the quality of years added to life is observed in a medical and health sciences. A good example of this conceptual transition is the process of changes in the USA federal government's *Healthy People* reports (as cited in Drewnowski and Evans 2001). In the *Healthy People 2000* report (U.S. Department of Health and Human Services [U.S. DHHS] 1991), the main goal of primary and secondary health promotion was to increase the span of healthy life, with the focus on mortality and morbidity data and symptom checklists as the principal measures of ill health. In the *Healthy People 2010* and *2020* reports (U.S. DHHS, 1998, 2008), the emphasis is on overall well-being, with helping people to increase life expectancy and to improve their quality of life across all life stages. Similar tendencies are observed in Europe and are, e.g., reflected in the *Horizon 2020* – the new research and innovation program for 2014–2020 (European Commission 2012). This conceptual transition is also reflected by patients increasing expectations to receive comprehensive information about the consequences of disease and therapy, including the impact of both upon aspects of their quality of life (Fayers and Machin 2007).

In this chapter the concept of quality of life will be discussed, the differences between general and health-related quality of life will be indicated, and ways of measuring quality of life for clinical and research goals will be presented. This introduction will be followed by a presentation of a state-of-the-art knowledge on health-related quality of life in cardiovascular patients, especially MI survivors.

Introducing the Concept of Quality of Life

The concept of quality of life (QoL) was rarely mentioned in the literature until the twentieth century (Fayers and Machin 2007). Though Shaw, an early commentator on the subject, noted in 1900 that "happiness" could be "sacrificed" for quality of life: "Life at its noblest leaves mere happiness far behind; and indeed cannot endure it . . .Happiness is not the object of life: life has no object: it is an end in itself; and courage consists in the readiness to sacrifice happiness for an intenser quality of life" (as cited in Fayers and Machin 2007, p. 6). As Fayers and Machin (2007) suggest, this note made by Shaw in 1900 indicates that by his time, "quality of life" had become a familiar term that did not require further explanation. In fact, some modern investigators argue that, at least in the Western world, most people are generally familiar with the term "quality of life" and intuitively understand what it comprises, and thus no formal definition is needed (Fayers and Machin 2007). Such approach, even though satisfactory for a general deliberation, seems insufficient for the goals of scientific research and clinical practice. Thus, numerous attempts across many disciplines (not only medical, health and social sciences, or philosophy but also economy, geography, literature, architecture, banking, or advertising) were made to clarify the concept of quality of life (Bowling 2001).

In medical, health, and health-related social sciences, quality of life has been defined as, e.g., the degree of human needs satisfaction (Hörnquist 1982), the sum of those aspects of life, and human function considered essential for living fully (Mor 1987), "…the degree to which a person enjoys the important possibilities of his or her life in the area of …*being* ["who one is" on the physical, psychological, and spiritual components], …*belonging* [the fit between a person and his or her physical, social, and community environments] …and *becoming* [whether one achieves one's personal goals, hopes, and aspirations]" (Raphael et al. 2001, p. 181). Finally, according to WHO quality of life is "an individual's perception of their position in life in context of the culture and value system in which they live and in relation to their goals, expectations, standard, and concerns" (1995, p. 1405). QoL has been referred to or used interchangeably with such terms as "personal well-being", "health status" (Bergner 1987), or "life satisfaction" (Campbell 1981). When operationalized, its measurements range from assessment of functional ability, physical and social activity, or activities of daily living (historically assessed by healthcare staff) through physical and psychological symptoms checklists, pain, sexual performance, and impact of illness to emotional, role, social, and cognitive functioning and self-assessment of global life satisfaction (Fayers and Machin 2007).

The above presentation of a variety of definitions, terms, and measurements serves to highlight the lack of agreement within the literature regarding what exactly quality of life is: what are its indicators and what is its true nature. It is often addressed as a vague or amorphous concept (Fayers and Machin 2007). Nevertheless, even in the absence of a formally agreed definition of QoL, some common trends in its conceptualization and operationalization are observed. Ever since the review of QoL concepts, formulation of the definition and suggestions for ways of assessment of QoL has been published by the World Health Organization Quality Of Life Assessment Group (WHO 1995, the definition was already cited above), and there is a consensus between the medical, health, and social sciences' researchers about some of the characteristics of this construct. It is nowadays broadly accepted that QoL:

- Is a complex and multidimensional concept, incorporating a physical dimension, social dimension, psychological dimension, and, still somewhat less frequently considered, spiritual dimension (WHO 1995)
- Should be assessed from the patient's perspective, thus, on the basis of subjective rather than "objective" indicators and on the basis of the person's global evaluations of behaviors, states, and capacities and satisfaction/dissatisfaction with behaviors, states, and capacities rather than simply on the basis of the person's report of functioning (Fayers and Machin 2007; WHO 1995)
- Includes both positive (e.g., mobility, role functioning, positive feelings, general contentment) and negative dimensions (e.g., dependence on medication, fatigue, pain, negative feelings) (Bowling 2001; WHO 1995)
- Is rather dynamic than static (Moons et al. 2006)

Moreover, in the healthcare setting, to emphasize the key interest in health aspects, a term "health-related quality of life" (HRQoL) is frequently used to remove ambiguity. Within HRQoL, in the context of a specific disease, a term "*disease*-specific QoL" (e.g., MI-specific QoL) or "HRQoL after a *disease*" (e.g., HRQoL after MI) may be used, to indicate that unique aspects of a particular disease are also considered. The use of such terms clearly distinguishes between the patient-reported outcomes in health/disease and quality of life in its more general sense, which would also include such aspects as adequacy of income, housing, or perceptions of immediate environment (Bowling 2001; Fayers and Machin 2007).

Health-Related Quality of Life

HRQoL focuses on an impact of perceived health status on the ability to lead a fulfilling life (Bullinger et al. 1993). Its theoretical framework is embedded in a WHO's definition of health as a "state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (1946, p. 100). Having such roots, HRQoL is a concept incorporating positive (optimal) as well as negative (pathological) aspects of well-being and life. It is multidimensional, embracing physical, psychological, and social functioning, overall life satisfaction/well-being, and perception of health status, with additional dimensions including satisfaction with treatment, intimacy, sexual functioning, sleep disturbance, pain, and symptoms (Bowling 2001). Anxiety and depression are often incorporated to HRQoL as its aspects particularly important to patients with chronic or advanced diseases (Fayers and Machin 2007). HRQoL is a dynamic construct, because as health status changes, perspectives on personal needs, relationships, experiences, and generally on life also change (Sherwood et al. 1977 as cited in Bowling 2001).

In the clinical setting, HRQoL – as a subjective patient-reported outcome measure – is an important information additional to morbidity, response to treatment, and survival (the "classic" and "hard" clinical outcome measures) (Fayers and Machin 2007). Considering this patient-reported outcome, one is not only looking at how to prevent death but also at ways to improve life. The incorporation of the values only known by patients into research and clinical practice reflects a movement toward a more patient-centered care (Sullivan 2003). Simultaneously, the assessment of HRQoL also has a prognostic significance in terms of predicting morbidity and survival (Dixon et al. 2001; Ernstsen et al. 2011; Norekvål et al. 2010; Svärdsudd and Tibblin 1990).

As in case of the general QoL concept, HRQoL also lacks an agreed formal definition. Thus, when reviewing the available research, it is important to remember that different authors understand and operationalize this concept in different ways. However, most operationalizations seem to stay in line with the already quoted WHO QoL Assessment Group's definition of QoL from 1995 and with the presented above agreed characteristics of this construct.

Measuring HRQoL in MI Survivors: Methodological Issues

Preparing for HRQoL measurement both for clinical practice and for research, it is important to begin with a clear definition of HRQoL and its operationalization. The next step is a choice (or preparation) of a questionnaire that will satisfy specific psychometric standards and perform best in providing the most appropriate and required information. Methods of developing and testing new QoL instruments and standards for adequate psychometric properties of the inventories are broadly described in the literature and will not be discussed in this chapter (see, e.g., Fayers and Machin 2007). When selecting the inventory most appropriate for the particular aim, one may choose a generic instrument, a disease-specific instrument.

Generic and Disease-Specific Instrument for HRQoL Measurement

Generic HRQoL instruments are intended for general use and are applicable for healthy and sick people and for patients with various conditions. Thus, they are a good choice when, e.g., MI survivors' QoL is to be compared with healthy people's QoL. Generic instruments are usually multidimensional (e.g., they measure physical, social, and emotional functioning as well as enquire about overall QoL). The examples of reliable and valid generic HRQoL instruments include the Nottingham Health Profile (NHP) developed by Hunt et al. (1981), the Medical Outcomes Study 36-Item Short Form (SF-36) developed by Ware et al. (1993), EuroQoL (EQ-5D) by Brooks and EuroQoL Group (1996), or WHOQOL-100 and WHOQOL-BREF developed by WHOQOL Group (1998). All of the above have a number of cultural and language adaptations allowing transcultural comparisons.

Disease-specific HRQoL instruments assess the influence of a particular disease or condition on QOL. When compared to generic instruments, they are more clinically sensitive, potentially more responsive in detecting change, and are better discriminators of differences between subgroups within a disease category (Wiebe et al. 2003). However, they will not allow comparisons with a control group of healthy people or patients with another condition. Examples of instruments designed to examine specifically the impact of angina or MI on QoL include: the Seattle Angina Questionnaire (Spertus et al. 1995), the MacNew questionnaire (Dixon et al. 2002), or the Myocardial Infarction Dimensional Assessment Scale (Thompson et al. 2002). The abovementioned questionnaires were broadly discussed by Thompson and Yu (2003).

HRQoL Scale Versus Single-Item Measures

Classical test theory has generally been fairly consistent in indicating that single items are at a relative disadvantage to multi-item measures, as more items will allow the random error of the measurement to be ruled out and therefore the results to be more reliable and precise (Gardner et al. 1998). Single-item measures of QoL are often thought to generate less reliable responses over time (Fayers and Machin 2007), to be less responsive to specific treatment effects (Bernhard et al. 2001), and, generally, to provide less information about participants' QoL than multi-item questionnaires. The use of single-item measures also limits or at least complicates some of the analyses, as not all of the parametric tests have nonparametric equivalents. However, single-item instruments also have a number of advantages, being the simplest approach to measure QoL (Boer et al. 2004), being easier to administer (Fayers and Machin 2007), and being less burdensome to participants than multi-item measures (Cunny and Perri 1991). This simplicity and ease of use may prevent missing data and result in operational efficiency such as data entry and data analyses (Boer et al. 2004). Generally, valid, reliable, and responsive single-item questions are of great interest for use in clinical setting (especially when the participants are severely ill, have concentration problems and poor eyesight, are in pain, etc.) or when a broad set of variables are to be measured at the same time as it is, for instance, in population-based health surveys. Single-item self-rated health measures were used in a number of studies and were found to be very good predictors of future health, morbidity, mortality, and health service attendance (e.g., Idler and Benjamini 1997).

Several single-item general life satisfaction or global QoL measures were previously used in clinical and population-based studies and were compared to multi-item questionnaires. Basing on such comparisons, they were found to be instruments with good validity and reliability, moderate estimates of distribution-based responsiveness, and good anchor-based responsiveness (e.g., Boer et al. 2004, where a visual analog scale for global quality of life was used and compared to Medical Outcome Studies SF-20 and the Rotterdam Symptom Checklist, or Kuppens et al. 2008, where results of single-item measures of global life satisfaction and Satisfaction With Life Scale were compared for 37 countries).

Procedure of HRQoL Data Collection

According to the methodological recommendations for psychological testing, the HRQoL measurements should be conducted in comparable controlled settings (preferably a quiet room, in the presence of the researcher/pollster, without a third party), and the particular questionnaire should always be identical in the order of items or the way it is graphically presented. Lack of researchers control over the circumstances in which the survey is filled in may constitute a serious methodological problem. These rules, however, seem to loosen up slightly in recent years. There is, for example, a growing acceptance of arbitrary use of only selected subscales of the complete scales (e.g., Schulz and Schwarzer 2003) or of the use of electronic versions of tests or surveys posted online (i.e., "e-surveys") (Eysenbach and Wyatt 2002), which are graphically modified and obviously filled in in settings staying beyond researchers' control.

What Do We Know About Quality of Life After MI?

A number of previous studies indicated a significant prognostic role of HRQoL for morbidity and mortality in general population (Svärdsudd and Tibblin 1990) and in cardiac patients (Dixon et al. 2001; Ernstsen et al. 2011; Norekvål et al. 2010).

Level of HRQoL After MI

Simultaneously, numerous studies indicated that in many groups of cardiac patients (e.g., patients with ischemic heart disease, stable angina pectoris, coronary artery disease, or chronic heart failure), the QoL is significantly diminished (Bennett et al. 2001; Bosworth et al. 2000). However, the above remains unclear in the case of MI survivors. A systematic review of the quality of life after MI presented by Simpson and Pilote (2003) revealed that HRQoL is minimally affected by an experience of MI. On the other hand, there are examples from the population-based studies indicating significant differences between pre- and post-MI HRQoL (van Jaarsveld et al. 2001) and significant reduction in at least some dimensions of HRQoL in MI survivors compared to age-specific healthy controls, both in short-term (up to 12 months) and in longer-term perspective (one to several years after MI) (Brink et al. 2005; Pettersen et al. 2008a; Schweikert et al. 2009). Simpson and Pilote (2003) observed that in a number of studies they have reviewed, the measurement tools might not have been sensitive enough to recognize the difference/change in HRQoL.

Results from HUNT Study, one of the world's largest population-based prospective health surveys and biobanks (the Nord-Trøndelag Health Study (HUNT) is a unique database of personal and family medical histories, collected among citizens of the Nord-Trøndelag county (Norway) aged 20 years and above, during three surveys: HUNT1 in 1984–1986 period, HUNT2 in 1995–1997, and HUNT3 in 2006–2008. A total of 77,212 people attended HUNT1 (97 % response and participation rate), 65,237 people attended HUNT2 (81 %), and 50,807 people participated in HUNT3 (71 %). Currently, it is a database with information about 106,446 adults (Krokstad et al. 2012)), are also inconclusive. The authors of this chapter analyzed differences in HRQoL between MI survivors and MI-free HUNT population. In one study, differences in HRQoL of male long-term MI survivors ($n = 64$) and MI-free participants ($n = 768$) were investigated on three measurements over a period of 20 years. The analyses included indicators of somatic HRQoL (everyday life impairment and self-rated health) and general life satisfaction. Somatic HRQoL of MI survivors was significantly diminished in comparison to somatic HRQoL of MI-free men at each of the three HUNT measurements, but MI survivors and MI-free persons did not differ significantly on the level of general life satisfaction. In another study in which MI survivors ($n = 780$) and MI-free participants ($n = 44820$) HRQoL were also analyzed, when demographics, health-related factors, lifestyle factors, and psychosocial resources were controlled, MI experience predicted poorer somatic HRQoL in a short-term but not long-term

(10 years) perspective, and it was not a significant predictor of cognitive HRQoL (general life satisfaction) or emotional HRQoL (anxiety, depression, and positive affect) (Lazarewicz et al. 2014, *unpublished thesis*). To sum up, the results differed depending on the investigated indicators of HRQoL and time perspective included in the analyses.

Changes over Time in HRQoL After MI

Results of the studies also show inconsistency as to whether and how HRQoL changes over time after MI. Minor fluctuations (Eriksson et al. 2012) to significant changes in its different dimensions were reported (Kristofferzon et al. 2005). Also, reports of both deterioration and improvement in HRQoL over time can be found in the literature. Simpson and Pilote (2003) concluded that physical HRQoL (physical capacity, symptoms, functional status, and general health perceptions) declined the most after MI. However, the majority of these HRQoL domains "improved to normal levels with time" (p. 507) (the studies reviewed by Simpson and Pilote followed the patients since an MI up to max. 5 years after it). Furthermore, a gain over time was reported in such dimensions as role fulfillment, pursuit of normal and social activities (Lacey and Walters 2003), physical functioning, vitality, or social functioning (Kristofferzon et al. 2005).

These results were also confirmed in the authors' studies based on the HUNT data (Lazarewicz et al. 2014, *unpublished thesis*). In the already quoted study where changes over a period of 20 years in male MI survivors and MI-free men HRQoL were analyzed, the somatic HRQoL decreased over time in both samples, while general life satisfaction increased over time. In the case of MI survivors, this increase was especially significant over the period of the first 10 years of the study and present but insignificant in the later period. This suggests that the experience of an MI may have a delayed negative effect on general life satisfaction, suppressing its increase after a longer (over 20 years) period since an MI (while such increase in general life satisfaction was observed in MI-free participants).

Summing up, the results of the reviewed and own studies suggest that the changes in HRQoL after MI are dynamic and their direction (increase or deterioration) depends on the time since an MI experience (Pettersen et al. 2008a; Simpson and Pilote 2003) and the investigated dimension of HRQoL.

Clinical and Sociodemographic Predictors of HRQoL After MI

Apart from time since MI, previous studies report several clinical and sociodemographic characteristics that influence HRQoL in MI survivors. Among the clinical factors, the following are often found to predict lower future HRQoL of MI survivors: previous (additional) MI (Pettersen et al. 2008a), higher left ventricular ejection fraction (Pettersen et al. 2008b), high number of atherosclerosis risk factors (hypertension, dyslipidemia, overweight, smoking) (Arendarczyk and Loboz-Grudzien 2000), type of intervention applied for MI treatment (Beck et al. 2001), readmission to hospital, manifestations of coronary heart disease other than MI, angina pectoris, additional comorbidity, and lower baseline HRQoL (Beck et al. 2001; Brink et al. 2005; Emery et al. 2004).

Sociodemographic characteristics were also often found to affect quality of life levels following MI; however, their role is not always clear. Higher education, higher socioeconomic status, and higher age usually predict higher HRQoL (Beck et al. 2001; Pettersen et al. 2008a; Simpson and Pilote 2003). However, in one of the recent studies, the quality of life scores declined with increasing age, but interestingly the decline was smaller in MI survivors than in the general population (Schweikert et al. 2009). The role of gender in predicting HRQoL after MI also remains unclear. Some studies report little differences or lack of gender differences in HRQoL (Kristofferzon et al. 2005; Lazarewicz et al. 2014, *unpublished thesis*), while others report female MI survivors having significantly lower HRQoL than male MI survivors (Brink et al. 2005; Emery et al. 2004; Pettersen et al. 2008a; Wrzesiewski and Wlodarczyk 2012). Another study reported that improvement in HRQoL (which took place after its initial deterioration) happened more slowly in female than in male MI survivors (Norris et al. 2004). Moreover, men and women were reported to have different determinants of HRQoL after MI (Pettersen et al. 2008a).

Pettersen et al. (2008b) suggest that the identified determinants of HRQoL vary between studies due to differences in patient selection, time interval between MI and HRQoL measurement, the potential predictors included, and the chosen measures of HRQoL. Notably, most of the reviewed studies have limitations regarding measurement of multidimensional QoL, the sample sizes (especially poor representation of women and of the elderly MI survivors), and, in case of the prospective studies, the lengths of a follow-up.

Positive Psychosocial Predictors of HRQoL

The majority of the studies reviewed above concentrate on a search for factors responsible for the deterioration of HRQoL. A search for factors that protect HRQoL from deterioration and stimulate its increase has only started recently but attract an increasing amount of attention. Rapidly growing interest in this area of health research reflects a growing popularity of salutogenic approach (Antonovsky 1987) and of positive psychology in general (e.g., Seligman and Csikszentmihalyi 2000; Snyder and Lopez 2005). An interest in HRQoL itself was a first step toward this more positive approach in health science. An interest in the HRQoL' positive determinants seems to be an important next step.

Investigation in the area of positive determinants of HRQoL and adaptation to chronic disease has mainly concentrated on psychological and social characteristics, often labeled as "psychosocial resources." Psychosocial resources are defined as "individual differences and social relationships that have beneficial effects on mental and physical health outcomes" (Taylor and Broffman 2011, p. 1), on health and quality of life.

Both psychological and social factors can impact the way in which people approach life circumstances (e.g., a stressful situation such as a somatic disease), what in turn can impact their well-being and HRQoL. Such approach stays in line with, broadly discussed in the literature, Lazarus and Folkman's (1984) cognitive and transactional model of stress, in which personal and social coping resources are conceptualized as elements of the theoretical model of stress. A number of positive psychological resources, e.g., self-esteem (Rosenberg 1965), self-efficacy (Bandura 1997), dispositional optimism (Scheier and Carver 1985), and sense of coherence (Antonovsky 1987), and a number of aspects of social resources experienced within family, friends, or broader community groups, conceptualized as, e.g., social cohesion, social support, or sense of community (Schwarzer and Leppin 1991), were suggested and investigated in the literature. Including such factors in the studies of MI survivors was indicated as being of a great importance (Wrzesniewski and Wlodarczyk 2012) and an increased number of studies concentrated on selected resources and HRQoL, also in the context of cardiac patients.

For example, higher self-esteem was associated with better physical and psychosocial recovery after CABG (Artinian et al. 1993). It was also a significant predictor of quality of life 1–2 years after such surgery (Dantas et al. 2002). In a study, that focused on older adults (over 60 years old) with CVD, higher self-esteem was significantly associated with subsequent maintenance or improvement of physical and psychosocial function over a 12-months period, especially among women (it was a stronger predictor of physical and psychosocial functioning than demographic and clinical factors) (Forthofer et al. 2001). In a cross-sectional study investigating a group of 96 female MI survivors, higher self-esteem significantly predicted higher multidimensional QoL (four dimensions were specified: health and functioning, socioeconomics, psychological and/or spiritual, and family life) (Wingate 1995).

Good social resources were also found to have a positive effect on various aspects of HRQoL in cardiac patients (Bennett et al. 2001; Emery et al. 2004). Lack of social support after a coronary event was found to be related to poorer physical and mental outcome both in men (Conn et al. 1991) and in women (Lett et al. 2005). However, the results are not fully consistent when gender and age differences are considered (e.g., Emery et al. 2004). The absence of a spouse, partner, or confidant was often associated with greater depression, and this relation was found particularly strong for men (e.g., Frasure-Smith et al. 1999). In other study (where other measures were used), lower social support was also associated with more depressive symptoms and worse health status over the first year of acute MI recovery, but it was particularly significant for women (Leifheit-Limson et al. 2010).

The authors' research on the already quoted HUNT population ($n = 55{,}253$) (Lazarewicz et al. 2014, *unpublished thesis*) confirms a significant predictive role of self-esteem (as an example of a psychological resource) and social cohesion (as an example of social resource) for somatic, cognitive, and emotional dimensions of MI survivors' HRQoL both in cross-sectional and 10-year perspective.

To sum up, studies investigating the association of psychosocial resources with cardiac patients' HRQoL have generally linked lower (limited) psychosocial resources to poorer HRQoL and higher (broader) psychosocial resources to better HRQoL, not only to its emotional or cognitive dimension but also to its somatic dimension. It is however worth noticing that these psychosocial predictors of HRQoL seem to be overlapping with psychological and social aspects of HRQoL and are conceptualized as such by some authors. It may be argued, for example, that social cohesion is not a predictor of HRQoL but rather its social aspect understood as "individuals' perception of the interpersonal relationships and social roles in their life" (WHO 1995, p. 1405). Self-esteem is also sometimes incorporated in the QoL construct as its "specific aspect" (Fayers and Machin 2007). This problem seems to mainly reflect the great complexity of the quality of life construct.

Clinical Implications

In order to accurately address MI survivors' long-term HRQoL, cardiac rehabilitation practice should support development of psychosocial resources, e.g., growth or at least prevention from deterioration of self-esteem and development or redefinition of the social context of life. These resources are challenging to act upon, but possible to be addressed by healthcare professionals. For instance, on the daily communication level, self-esteem may be supported by accurate (not infantilizing) use of positive reinforcements (praising during rehabilitation and treatment, e.g., "I am really impressed with how well you are coping." "Following all these recommendation may be challenging. You are doing great."). Selective optimization with compensation processes (Freund and Baltes 1998), selecting important areas of functioning, learning new skills to optimize performance and compensate for these deficits, should also be supported and reinforced. This may prevent the patient from concentrating solely on experienced losses (e.g., deterioration in physical fitness, need to give up old habits) and help with redefining or defining new areas of life which may serve as bases for building specific self-esteem. Awareness of the healthcare professionals of MI survivors' level of social resources (e.g., social cohesion) is also vital. Creating an optimal social environment in the medical or social welfare setting may contribute to better HRQoL including lower everyday life impairment.

Generally, results of the reviewed studies on HRQoL in MI survivors and other CVD patients support a need for a comprehensive, holistic, interdisciplinary, and patient-centered medical practice, transcending the examination room and including changes and interventions on the community level.

Conclusion

The concept of quality of life is wildly used in the literature but lacks agreed formal definition. However, most of its recent operationalizations stay in line with the WHO QoL Assessment Group's definition of QoL, which states that it is "an individual's perception of their position in life in context of the culture and value system in which they live and in relation to their goals, expectations, standards, and concerns" (1995, p. 1405). It is complex and multidimensional dynamic construct, which should be assessed on the basis of positive and negative subjective indicators. The term health-related quality of life is often used to clarify the health-disease context of the analyzed QoL.

Prior research has documented profound negative effects of poor HRQoL on morbidity and mortality in general population and in cardiac patients, and numerous studies indicate that in many groups of cardiac patients, HRQoL is significantly diminished. However, it is unclear in the case of MI survivors. Some studies show HRQoL as being only minimally affected by an experience of MI, while others indicate major reduction in at least some of its dimensions both in short- and longer-term perspective. Results of the studies also show inconsistencies as to whether and how HRQoL changes over time after MI: minor fluctuations to significant changes in its different dimensions were reported. The dynamic of these changes probably varies depending on the period since an MI (after initial deterioration, there is an improvement) and between different dimensions of HRQoL.

A number of clinical and sociodemographic characteristics are recognized as predictors of HRQoL in MI survivors. Among sociodemographic characteristics, age, gender, and education are of a special interest with higher education predicting better HRQoL, but age and gender's role being unclear. However, in most studies, higher age and male gender predict better HRQoL, and a gradual improvement in HRQoL (often observed after its initial deterioration after MI) seems to happen more slowly in female than in male MI survivors.

A growing interest in the importance of psychosocial resources for HRQoL in general population and in MI survivors is also observed. Among others, self-esteem and various social resources were recognized as strong predictors of HRQoL (often stronger than clinical and demographic factors), with higher levels of psychosocial resources predicting better health and quality of life outcomes.

However, more work still needs to be performed to fully understand the dynamics and complexity of quality of life in the context of myocardial infarction and CVD in general. Due to a prior concentration mainly on pathology and prevention of loss, especially little is known about the positive correlates and determinants of health-related quality of life. Moreover, results of many studies should be interpreted or generalized with caution, because they often had some methodological limitations. They were mainly cross-sectional. Prospective studies often covered only a short period of time (usually a couple of month up to a year after an MI). Moreover, most of the reviewed studies concentrate predominantly on middle age male populations, with female and elderly MI patients often not being included or being underrepresented. The studies recognizing a need for investigation of HRQoL in female and elderly MI survivors often studied only women (or older patients), making gender and age comparisons impossible. Only some studies had a control group which allowed to check if recognized relations or differences were indeed specific for MI survivors. Furthermore, in many of the reviewed studies, QoL or HRQoL was not clearly defined, or a construct similar but not identical to HRQoL (e.g., self-rated psychosocial adaptation or function) was measured as an outcome. Thus, to fully understand the dynamics of change in HRQoL after MI and the relations between psychosocial resources and HRQoL in both sexes and different age groups, more research is still needed, especially work balancing pathogenic and salutogenic orientations in reasonable-sized samples of women and oldest old of both sexes.

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