Original Article

# Health-Related Quality of Life in Patients with Acute Myocardial Infarction during Admission and six months after Admission

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**Abstract**

**OBJECTIVES:** This retrospective study aimed to evaluate and compare the Health-Related Quality of Life (HRQoL) from admission to six months after admission of patients with Acute Myocardial Infarction (AMI) who participated in the AMI Programme.

**MATERIALS AND METHODS:** From 220 patients diagnosed with AMI from January 1, 2018 to December 31, 2020, a total of 77 patients fulfilled the inclusion criteria and agreed to participate in the AMI programme at BHT. Data were collected using a demographics and HRQoL questionnaire. Data were analyzed using descriptive statistics, and Paired t -test.

**RESULTS:** Both HRQoL mean and Visual Analogue Scale (VAS) of AMI patients at six months after discharge from the hospital had significantly higher mean score than at the time of admission to hospital ($p < 0.01$, $p < 0.001$ respectively)

**CONCLUSION:** The AMI Programme is useful for developing tools and new performance indicators to assist nurses in monitoring and caring for AMI patients. The EuroQoL Group's 5-dimension, 5-level (EQ-5D-5L) questionnaire used to assess HRQoL and VAS is one of the tools applied to the programme in order to enhance nursing care for these patients.

**Keywords:** acute myocardial infarction programme, acute myocardial infarction, health-related quality of life, EQ-5D-5L, Hospital

The Bangkok Heart Hospital (BHT) of Bangkok Hospital Medical Center (BMC) opened in 2005 and was the first private hospital in Thailand to provide cardiac care for patients. The average counter visit per year is around 150,000 visits and in-patient utilization is more than 3,000 patient admissions per year. Heart Failure (HF) is the most common diagnosis for hospital admission followed by AMI and cardiac arrhythmia.

BHT received the Joint Commission International (JCI) accreditation to develop safety and quality of care including health education processes, publications, counseling services, and evaluation. In 2007, moreover, BHT was approved by the JCI Clinical Care Programme Certification (CCPC) for Disease Specific Care for the Acute Coronary Syndrome (ACS) Programme and Disease Specific Care for HF Programme.

The Disease Specific Care for the ACS programme follows standard guidelines and evidence- based practice. The programme was developed in 2011 and changed its name to Disease Specific Care for AMI Programme. JCI is going to evaluate the programme and will assess all indicators, to determine if the programme will be re-accredited with a thorough review of patient safety and quality of care.

An AMI patient needs continuing care after discharge as the disease affects long term QoL. The nurse coordinator is responsible to set up nursing care plans and nursing activities to manage this chronic illness.[1]

BMC always develops and maintains the quality of medical care. Many specialties in BMC have undertaken medical research, routine to research (R2R) to improve their practice and the quality of patient care. Many

specialties have been joined to international and national standard quality programmes. Data collection processes and reporting outcomes indicates the programme performance and aims to improve the quality of care to patients. HRQoL is increasingly being used as an outcome measure in clinical trials and observational studies to evaluate the quality of care for patients with AMI. Some studies[8] did not find that treatments at admission improved QoL. Therefore, it may be important to routinely measure QoL and level of depression at the time of admission for AMI to target treatment intervention that can improve QoL for patients with the lowest scores on admission.

Health status and HRQoL assessments are used in various studies including in cardiovascular disease. The EuroQoL Group's 5-dimension (EQ-5D) is a self-administered instrument to evaluate HRQoL comprising two components: a descriptive profile and a single-index Visual Analogue Scale (VAS). EQ-5D is a standardized measure of health status developed by the EuroQol Group in order to provide a simple, generic measure of health for clinical and economic appraisal. The descriptive profile assesses health status on 5 dimensions of mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Another part is the self- assessment of health status or VAS with scores ranging from 0 to 100, with 0 representing the worst health status and 100 representing the best health state.[2] Some studies were used the EQ-5D to estimate the HRQoL and found that the EQ-5D is applicable to measure the HRQoL any complications had significant effects on HRQoL.[3] EQ-5D can be a useful tool in terms of evaluating the impacts of cardiovascular disease on patients.[4] Many studies use the EQ-5D in patients after myocardial infarction (MI)[2,5] comparing with other questionnaires and concluded that the EQ-5D provided a valid general HRQoL measurement post-MI. As a result, the caregiver in acute MI programme agreed to use the EQ-5D to measure the HRQoL in AMI patients. Moreover, some research reports the use of EQ-5D to evaluate the QoL score in other patients such as colon cancer and rectal cancer.[6]

In recent years, there has been an increasing interest in quality of life assessments in health medical research. HRQoL seems to be useful to define health status. Evaluating the HRQoL is important to measure the effects of disease, treatment outcomes and other factors that affect patient HRQoL.[7]

For the AMI programme, evaluating HRQoL in AMI patients is an important indicator to evaluate the quality of this programme. Programme indicators were collected from 2016 using English and Thai EQ-5D (Registration ID: 44730) to evaluate patient QoL at three time points, (1) at admission, (2) 30 days after discharge and, (3) 180 days after discharge.

When an AMI patient is admitted to the Critical Care Unit BHT, the patient will receive standard treatment for AMI patients. The nurse coordinator will invite the patient to participate in the AMI programme. Under the programme, the patient will receive the standard treatment and their medical data will be collected to analyze and develop the programme quality. The nurse coordinator will coordinate and take care of the patient to monitor vital signs and symptoms. The patients self-evaluate using the QoL and VAS tools at admission and at the two follow up periods after being discharged.

ACS and AMI patients are at increased risk for sudden death and cardiogenic shock.[4] The research study of the health status of patients who have survived Intensive Care Unit (ICU) using the EQ-5D found that the critical illness affected their quality of life at admission and after being discharged from the hospital. The ability to do their job, the weakness, and poor sleep quality are some of the factors related to QOL of patients who have survived critical care.[5]

BHT cardiac care givers evaluated and collected data for QoL in AMI patients who participated in Disease Specific Care for AMI Programme at admission, 30 days and 180 days after being discharged from hospital. The research team was interested to evaluate and compare the HRQoL from admission to six months after admission of patients with Acute Myocardial Infarction (AMI) who participated in the AMI Programme.

## Materials and Methods

A retrospective descriptive study design was used for this study. Eligible subjects were AMI patients receiving treatment at BHT during the period of three years from January 2017 to December 2019. The study protocol was approved by the Institutional Review Board of Bangkok Dusit Medical Services (BDMS) (Protocol ID: BMC-IRB 2019-12-048, COA: dated 02 March 2021). Permission to use data and to waive consent was granted by BHT Director. Patients were informed before they participated in the AMI programme. Patient confidentiality was maintained, and medical records were reviewed of the patients who met the inclusion and exclusion criteria as detailed below, and these were included in the study.

*Inclusion criteria:*

1. Thai patients older than 18 years.
2. Diagnosed and admitted with AMI between 01 January 2017 to 31 December 2019.
3. Willing to participate in Disease Specific Care for AMI Programme.

*Exclusion criteria:*

1. Patients who refused to share their medical history.
2. Patients who were referred to another health care provider during their treatment.
3. Patients who had incomplete information in their medical records.

EQ-5D data were collected during admission "after critical stage" of subjects.

A total of 220 AMI patients were treated at Bangkok Heart Hospital from January 2017 to December 2019. All of them met the inclusion criteria and none met the exclusion criteria. As a result, they were enrolled in the study. Among these, 77 patients had completed EQ-5D-5L questionnaires both at admission and at six months follow up (Group A) while 143 patients completed the questionnaires only at admission or did not finish completing HRQoL data at the six months follow up (Group B).

Outcome measurement was HRQoL. Patient HRQoL was evaluated on completion of the Thai version of EQ-5D-5L questionnaire. Clinical and HRQoL data were extracted from the health information system, edited and locked for analysis.

To assess whether the subjects in this study had similar characteristics and QoL scores at admission as the non-study group, we collected data on age, sex, length of stay (LOS) and EQ 5D-5L at admission of both groups for a baseline comparison.

### *Instruments*

A Case Report Form (CRF) was created by the research team. The CRF records demographics data, risk factors assessment and EQ-5D-5L. The EQ-5D-5L consists of two parts; the EQ-5D-5L descriptive system and the EQ VAS.

The EQ-5D-5L descriptive system comprises five dimensions of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.[6] Each dimension has 5 levels:

- Level 1 is coded as 1; no problems
- Level 2 is coded as 2; slight problems
- Level 3 is coded as 3; moderate problems
- Level 4 is coded as 4; severe problems
- Level 5 is coded as 5; extreme problems.

Higher levels indicate more severe health problems. Subjects were asked to indicate their health state by ticking the box against the most appropriate statement in each of the 5 dimensions.

To record current self-assessed HRQoL using VAS, subjects were asked to mark an "x" on a 20 cm vertical scale with the upper-most endpoints labelled "the best health you can imagine" and 'the lower-most endpoint labelled as "the worst health you can imagine". Location of the "x" was translated and recorded as a numeric value.

After the CRF was collected from patients, the nurse coordinator checked the data completeness and accuracy. The nurse coordinator enters the data to the SPSS programme and this is re-checked by a biostatistician. The EQ-5D-5L data were used to calculated utility score, which reflected subject satisfaction with regards to health. The score was calculated from the best health minus by the coefficient of each of the five dimensions. The score ranges from -1 to 1 where 1 reflects the best health and 0 represents the worst health and -1 means worse than dead.[3]

### *Data analysis*

Data were analyzed using Statistics Package for Social Sciences (SPSS) PC version 23 (IBM SPSS Statistics 23). Continuous variables were presented as mean and standard deviation (SD). Categorical variables were presented as frequency and percentage. Comparisons of continuous data were conducted using paired t-test while comparisons of categorical data were conducted using Chi-square. The significant level of statistical test was set at $\alpha = 0.05$.

## Results

Subjects in Group A and Group B were similar in terms of sex and age distribution but not LOS. The majority of them were male (Group A: 59/77, 76.6% and Group B: 121/143, 84.6%, $p = 0.143$). Mean age of Group A was 63.8 ± 12.9 and of Group B was 63.0±12.5 years old, $p = 0.632$. While one third (27/77, 35.1%) of Group A had LOS of less than 3 days, only one fifth (27/143, 18.9%) of Group B were in this category ($p = 0.008$).

### *HRQoL*

Both groups had high HRQoL scores during admission. The majority (>90%) of them reported Level 1 and 2 of EQ-5D-5L Comparison between the two groups revealed no significant difference in all five domains of Mobility, Self-care, Usual activities, Pain/Discomfort and Anxiety/Depression (Table 2)

**Table 1:** Subject characteristics (n = 220)

| Characteristics | Group A n(%) | Group B n(%) | *Chi-Square* | *Sig* |
|---|---|---|---|---|
| n | 77 | 143 | | |
| Sex | | | | |
| Male | 59 (76.6) | 121 (84.6) | 2.14 | 0.199 |
| Female | 18 (23.4) | 22 (15.4) | | |
| Age (years) | | | | |
| Mean ± SD | 63.8±12.9 | 63.0±12.5 | | 0.632 |
| Age group (years) | | | | |
| 30-39 | 2 (2.6) | 6 (4.2) | 1.11 | 0.891 |
| 40-49 | 9 (11.7) | 12 (8.4) | | |
| 50-59 | 21 (27.3) | 40 (28.0) | | |
| 60-69 | 21 (27.3) | 43 (30.1) | | |
| 70+ | 24 (31.2) | 42 (29.4) | | |
| Length of Stay (days) | | | | |
| Mean ± SD | 6.69 ± 14.0 | 6.29 ± 3.7 | | 0.752 |
| ≤3 days | 27 (35.1) | 27 (18.9) | 7.07 | 0 .008* |
| >3 days | 50 (64.9) | 116 (81.1) | | |


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**Table 2:** Distribution of EQ-5D-5L scores of Group A and Group B during admission

| EQ-5D Dimensions | n | Level 1 n (%) | Level 2 n (%) | Level 3-5 n (%) | *Chi-Square* | *Sig* |
|---|---|---|---|---|---|---|
| Mobility | | | | | | |
| Group A | 77 | 62 (80.5) | 12 (15.6) | 3 (3.9) | 0.01 | 0.994 |
| Group B | 143 | 115 (80.4) | 22 (15.4) | 6 (4.2) | | |
| Self-care | | | | | | |
| Group A | 77 | 70 (90.9) | 6 (7.8) | 1 (1.3) | 0.65 | 0.833 |
| Group B | 143 | 132 (92.3) | 8 (5.6) | 3 (2.1) | | |
| Usual activity | | | | | | |
| Group A | 77 | 68 (88.3) | 7 (9.1%) | 2 (2.6) | 0.18 | 0.939 |
| Group B | 143 | 124 (86.7) | 15 (10.5) | 4 (2.8) | | |
| Pain/Discomfort | | | | | | |
| Group A | 77 | 55 (71.4) | 21 (27.3) | 1 (1.3) | 3.33 | 0.184 |
| Group B | 143 | 113 (79.0) | 25 (17.5) | 3 (3.5) | | |
| Anxiety/Depression | | | | | | |
| Group A | 77 | 56 (72.7) | 16 (20.8) | 5 (6.5) | 2.90 | 0.247 |
| Group B | 143 | 118 (82.5) | 19 (13.3) | 6 (4.2) | | |

**Note:** (*) Chi-square

*Comparing HRQoL at admission and at six months follow up*

Among 77 patients of Group A, overall and dimension specific EQ-5D-5L scores at admission and at six months after being discharged were compared. Overall HRQoL is presented as Utility Score and VAS.

Mean utility score at six months was significantly higher than at admission (0.978 vs. 0.952, $p < 0.01$). Mean scores of VAS was also significantly higher at six months than at admission (86.35 vs. 72.90, $p < 0.001$), (Table 3).

Looking at each health dimension of all subjects in Group A, we found significant difference in Usual Activity, Pain/Discomfort and Anxiety/Depression (t = 2.297; $p = 0.024$, t=2.978; $p = 0.004$, t = 2.909; $p = 0.005$, respectively). Mobility and Usual Activity scores showed non-significant improvement (t = 0.728, $p = 0.469$ and t = 0.686, $p = 0.495$ respectively), (Table 4).

Dimension specific of HRQoL stratified by gender, age and LOS had different appearance. Among male subjects, significant difference was identified on Pain/Discomfort and Anxiety/Depression while among female subjects, significant difference was found on Usual Activity.

Stratified by age group, we found significant improvement of QoL at six months compared with during admission in the dimension of Pain/Discomfort and Anxiety/Depression only among those younger than 60 years old while those 60-70 years old age group showed significant improvement only for Anxiety/Depression (Table 4).

**Table 3:** Comparison of the mean utility score and mean VAS at admission and at six months after being discharged (n = 77).

| Quality of Life (QOL) | Mean | SD | Min | Max | *p* |
|---|---|---|---|---|---|
| Utility Score | | | | | |
| During admission | 0.952 | 0.079 | 0.43 | 1.00 | < 0.01* |
| Six Months after discharge | 0.978 | 0.046 | 0.82 | 1.00 | |
| Visual Analog Scale (VAS) | | | | | < 0.001* |
| During admission | 72.90 | 16.00 | 30.0 | 100.0 | |
| Six Months after discharge | 86.35 | 10.80 | 40.0 | 100.0 | |

**Table 4:** Subject characteristics (n = 220)

| Dimension | Mean scores During admission (n = 77) | Mean scores 6-month after discharge (n = 77) | Mean difference | t | *p* |
|---|---|---|---|---|---|
| **Mobility** | | | | | |
| Gender | | | | | |
| Male | 1.186 | 1.186 | 0.000 | 0.00 | 1.000 |
| Female | 1.444 | 1.222 | 0.222 | 1.28 | 0.215 |
| Age group (years) | | | | | |
| ≤60 | 1.242 | 1.152 | 0.090 | 1.00 | 0.325 |
| 60-70 | 1.143 | 1.048 | 0.095 | 1.00 | 0.329 |
| >70 | 1.348 | 1.391 | -0.043 | -0.23 | 0.814 |
| Length of stay (days) | | | | | |
| ≤3 | 1.259 | 1.185 | 0.074 | 0.57 | 0.574 |
| >3 | 1.240 | 1.200 | 0.040 | 0.46 | 0.642 |
| Overall | 1.247 | 1.195 | 0.052 | 0.72 | 0.469 |
| **Self-care** | | | | | |
| Gender | | | | | |
| Male | 1.085 | 1.034 | 0.051 | 1.76 | 0.083 |
| Female | 1.167 | 1.056 | 0.111 | 1.45 | 0.163 |
| Age group (years) | | | | | |
| ≤60 | 1.121 | 1.030 | 0.091 | 1.78 | 0.083 |
| 60-70 | 1.048 | 1.000 | 0.048 | 1.00 | 0.329 |
| >70 | 1.130 | 1.087 | 0.043 | 1.00 | 0.328 |
| Length of stay (days) | | | | | |
| ≤3 | 1.074 | 1.000 | 0.074 | 1.44 | 0.161 |
| >3 | 1.120 | 1.060 | 0.060 | 1.76 | 0.083 |
| Overall | 1.104 | 1.039 | 0.065 | 2.29 | 0.024* |
| **Usual activity** | | | | | |
| Gender | | | | | |
| Male | 1.119 | 1.136 | -0.017 | -0.25 | 0.799 |
| Female | 1.222 | 1.000 | 0.222 | 2.20 | 0.042* |
| Age group (years) | | | | | |
| ≤60 | 1.182 | 1.152 | 0.030 | 0.29 | 0.768 |
| 60-70 | 1.095 | 1.000 | 0.095 | 1.45 | 0.162 |
| >70 | 1.130 | 1.130 | 0.000 | 0.00 | 1.000 |
| LOS (days) | | | | | |
| ≤3 | 1.074 | 1.037 | 0.037 | 0.57 | 0.574 |
| >3 | 1.180 | 1.140 | 0.040 | 0.49 | 0.622 |
| Overall | 1.143 | 1.104 | 0.029 | 0.68 | 0.495 |
| **Pain/Discomfort** | | | | | |
| Gender | | | | | |
| Male | 1.271 | 1.085 | 0.186 | 3.03 | 0.004* |
| Female | 1.389 | 1.278 | 0.111 | 0.80 | 0.430 |
| Age group (years) | | | | | |
| ≤60 | 1.303 | 1.091 | 0.212 | 2.93 | 0.006* |
| 60-70 | 1.190 | 1.095 | 0.095 | 0.81 | 0.428 |
| >70 | 1.391 | 1.217 | 0.104 | 1.44 | 0.162 |
| Length of stay (days) | | | | | |
| ≤3 | 1.222 | 1.111 | 0.111 | 1.36 | 0.185 |
| >3 | 1.340 | 1.140 | 0.200 | 2.64 | 0.011* |
| Overall | 1.299 | 1.130 | 0.169 | 2.97 | 0.004* |
| **Anxiety / Depression** | | | | | |
| Gender | | | | | |
| Male | 1.407 | 1.068 | 0.339 | 3.80 | 0.001* |
| Female | 1.167 | 1.278 | -0.111 | -0.69 | 0.495 |
| Age group (years) | | | | | |
| ≤60 | 1.394 | 1.030 | 0.364 | 2.98 | 0.005* |
| 60-70 | 1.524 | 1.048 | 0.486 | 3.21 | 0.004* |
| >70 | 1.130 | 1.304 | -0.174 | -1.44 | 0.162 |
| LOS (days) | | | | | |
| ≤3 | 1.222 | 1.185 | 0.037 | 0.44 | 0.663 |
| >3 | 1.420 | 1.080 | 0.340 | 3.01 | 0.004* |
| Overall | 1.351 | 1.117 | 0.234 | 2.90 | 0.005* |

*= *p* by paired t*test


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## Discussion

Our findings reveal that the EQ-5D-5L is a useful tool to measure the HRQoL in patients with AMI. We found that the utility score of AMI patients during admission was very high comparable to previous studies.[5] In addition, we found no difference between AMI patients who had not participated in the programme and the study group patients in all health dimensions. Both groups of AMI patients were in a critical condition at admission, so the health dimension score may be equal. The utility score at six months after discharge is significantly higher compared to that at admission, indicating their health improvement and represented the quality of care during their stay in the hospital and after being discharged. However, in group A, Patients aged more than 70 years old had the utility score in the dimension of Mobility and Anxiety/Depression at six months after being discharge registering higher than at admission. This result may be from the comorbidity diseases that made them uncomfortable. We found that only the length of stay was associated with the utility score at admission. This is in contrast to a previous study that showed that sex and age were important factors to HRQoL of Korean type 2 diabetes patients.[2]

This study suffered from selection bias. We selected and assessed their HRQoL only in fully conscious patients. This bias lead to a high score of HRQoL both at admission and six months thereafter.

This tool can guide the nurses at the clinic to assess and observe AMI patients' symptoms closely. The nurses were able to assess their ability to do activities and to get the data to write the nursing care plan for the next visit.

This research is the first time HRQoL in AMI patients has been studied. The research design is a retrospective study. The limitation is the incompleteness of the data. Further research may need to employ cohort study design comparing to other groups of patients such as Non-ST elevation MI, and Unstable Angina.

## Conflict of Interest

The authors declare on conflict of interest.

## Conclusion

The utility score and VAS in AMI patients was high and significantly different between admission and six months after being discharged. The next research should compare the HRQoL at six months between a study group and control group may be important to prove the programme quality. The LOS was associated with utility score for this study. The EQ-5D-5L questionnaire and VAS should be applied to AMI patients in order to enhance nursing care for these patients. Further research should be conducted to follow up among more patients or at one year after discharge.

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## References

1. Thangkratok P. The role of the nurse in the chronic disease management. *Songklana J Nurs* 2017;37(2): 154-9.
2. Lee WJ, Song KH, Noh JH, et al. Health-related quality of life using the EuroQol 5D questionnaire in Korean patients with type 2 diabetes. *J Korean Med Sci* 2012;27(3):255-60. doi: 10.3346/jkms.2012.27.3.255.
3. Pattanaphesaj J. Health-related quality of life measure (EQ-5D-5L): measurement property testing and its preference-based score in Thai population: Mahidol University, Thailand, 2014.
4. Hengrussamee K. Standard treatment in acute myocardial infarction patients 2017. 4th revised edition. Central chest institute of Thailand, department of medical service, Ministry of Public Health; 2017.
5. Arayalet W. Selected factors associated with health-related quality of life in critical illness survivors: Chulalongkorn University; Thailand, 2015.
6. Yindee N, Waleekhachonloet O. Utility assessment in patients with metastatic colorectal cancer at Surin Hospital. *Thai J Pharm Practice* 2019;11(1):137-45.
7. Brink E, Grankvist G, Karlson BW, et al. Health-related quality of life in women and men one year after acute myocardial infarction. *Qual Life Res*. 2005;14(3):749-57. doi: 10.1007/s11136-004-0785-z.
8. Beck CA, Joseph L, Belisle P, et al. Predictors of quality of life 6 months and 1 year after acute myocardial infarction. *Am Heart J*. 2001;142(2):271-9. doi: 10.1067/mhj.2001.116758.