

FACTORS ASSOCIATED WITH QUALITY OF LIFE AMONG POST CORONARY ARTERY BYPASS GRAFTING PATIENTS AT A CARDIOTHORACIC CENTRE IN MALAYSIA

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ABSTRACT

Background: Coronary artery bypass grafting (CABG) is the best treatment option for coronary heart disease. It improves survival and quality of life (QOL) for patients with multivessel coronary artery disease and those with more advanced coronary artery disease, left ventricular dysfunction, or diabetes. The purpose of this study is to measure the QOL among patients after CABG surgery and its associated factors.

Materials and Methods: A cross-sectional study was conducted in a cardiothoracic centre in Malaysia involving 184 respondents. A pretested, self-administered questionnaire which included the validated SF-36 Health Survey was filled by respondents who met the inclusion and exclusion criteria. Non parametric test was used to identify factors associated with QOL among the respondents. Significance level was set at 0.05.

Result: The total number of respondents was 184 with response rate of 100%. From the analysis, the mean(SD) score of the eight domains of SF-36 ranges between 58.8(25.4) and 82.7(23.5), where the lowest score was physical functioning domain while the highest score was bodily pain and social functioning domain. The mean(SD) age of respondents was 59.86(8.17). Majority of respondents were male (82.6%), Malay (43.5%), Muslims (45.1%), married (85.9%), received minimal primary education (96.7%) and retired/unemployed (48.9%). Age, gender, religion, educational level and employment status, showed to have significant association with at least one domain of QOL including physical component score (PCS) and mental component score (MCS) with statistical significant set at $P < 0.05$.

Conclusion: Quality of life scores showed to be higher compared to coronary artery disease patients. Several sociodemographic characteristics (employed, married, high education level) were associated with good quality of life domains among the respondents.

Keywords: Quality of life, QOL, Coronary artery bypass grafting, CABG, SF-36 health survey, Malaysia

1.0 Introduction

Cardiovascular disease (CVD) is the leading cause of mortality worldwide. In 2015, around 17.7 million deaths from cardiovascular diseases were reported. An estimated 7.4 million of total mortality from CVDs were due to coronary heart disease (Mendis, Puska, Norrving, 2011). Coronary heart disease (CHD) is a disorder caused by atherosclerosis that decreases the blood flow to the heart muscle via coronary vessel, resulting in chest pain or heart damage. It is also known as coronary artery disease (CAD). Amongst the developed countries, Ukraine noted to have higher death rate from CHD with 718 deaths per 100,000 population compared to South Korea which reported 36.5 deaths per 100,000 population (Choon & Kok, 2016). According to the disease burden of Malaysia in year 2000, CAD was the main cause of death with a total of 22,158 deaths or about one fifth of all deaths for that year (Choon & Kok, 2016).

Coronary artery bypass grafting (CABG) is a surgical procedure to improve coronary circulation to adequately deliver oxygen and nutrients to the myocardium (Diodato & Chedrawy, 2014). Thus far, it is the best treatment option for coronary heart disease (Alexander & Smith, 2016). According to the America Heart Association in 2012, CABG is the most common type of heart surgery performed with more than 800,000 being done globally every year (Grand View Research, 2017). In Malaysia, the first CABG was performed at the Kuala Lumpur Hospital in 1983; to date, it became one of most common cardiac surgery performed (Cardiothoracic Surgery Services Operational Policy, 2011; Ghani, 1991). It was performed for patients with multiple coronary artery stenosis, left main coronary artery stenosis, poor left ventricular ejection function and those with failed angioplasty procedure (Hillis et al., 2011; Alexander & Smith, 2016). The CABG offers significant improvement in survival and quality of life (QOL) for appropriately selected patients with multivessel coronary artery disease and those with more advanced coronary artery disease, left ventricular dysfunction, or diabetes.

The World Health Organization (WHO) defines QOL as an individual's perception of their position in life within the context of one's culture and value systems where they live and in relation to their goals, expectations, standards and concerns in life. The concept that encompasses QOL is broad ranging, and is affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment (WHO, 2004). Within the context of QOL, the CABG has shown to improve the quality of a person's life by being effective in preventing mortality, saving lives and reducing angina (V. M. Peric, Borzanovic, Stolic, Jovanovic, & Sovtic, 2006; Thomson, Niven, Peck, & Eaves, 2013). This is supported by several studies that reported post-CABG improvement of patients' quality of life (Taghipour et al., 2011; Thomson et al., 2013). For instance, Anderson & Buckhardt (1999) has shown that about 90% of post CABG patients experienced significant improvement of quality of life (QOL) in their research.

QOL can be measure either by disease specific or generic measurement. A disease-specific instrument is designed to collect patient's aspects of health which is caused by the specific disease. The disease specific instrument is designed as such to detect the smallest change in order to compare specific physical, mental, and social aspects of health caused by the disease. A generic instrument is designed to measure the general health including physical symptoms, function, and emotional dimensions of health relevant to all health states including healthy individuals. It is very useful for comparing health status across different diseases, different level of severity and the effectiveness of any intervention. The examples of generic instrument are

Short form 36 health survey (SF-36), Short form 12 health survey (SF-12), WHO quality of life health survey (WHOQOL-BER) and Nottingham health profile.

For this study the SF-36 health survey was used as an instrument to measure quality of life. It was a valid and reliable tool for assessing the QOL in patients with CAD and extensively used by others to study QOL in cardiac patients (Tofighi, Ahmad Kiadaliri, Sadeghifar, Raadabadi, & Mamikhani, 2012). Quality of life issues are very important to study and evaluate as it forecast the capability of person to individual capacity to cope with their disease for betterment of their health and well-being especially after underwent major surgery such as CABG. With the significant increase in number of cases every year in Malaysia, it becomes important to assess the QOL for better care and control of the disease and condition. The purpose of this study was to measure QOL among post CABG patients and their associated factors. It may help the health and service provider to optimize and distribute resources accordingly to what are the most important factors that may give a significant impact factor toward quality of life of the patients and country generally.

2.0 Materials and Methods

2.1 Study design

A cross-sectional study was conducted in one of the cardiothoracic centre in Klang Valley, Malaysia. The respondents were recruited from the cardiothoracic outpatient clinic. A total of 184 eligible respondents were recruited into this study. The inclusion criteria are minimum age of 35 years and having had CABG surgery in the past 2 to 24 month despite the number of procedures being done during operation the operation. Respondents who are mentally ill or warded during data collection were excluded from the study. A pretested, self-administered questionnaire was distributed among the respondents at the clinic while they were waiting for their turn to see the doctor and was collected at the same day. This study was approved by the Ethical Committee of the Ministry of Health, Malaysia (MREC) and the Ethics Committee for Research Involving Human Subjects, Universiti Putra Malaysia (JKEUPM).

2.2 Measurements

The quality of life of the post-CABG patients were assessed by SF-36, the medical outcome study short-form health survey instrument. The SF-36 health survey is a generic instrument to measure generic health concepts with 36 items covering eight domains of QOL. It covers physical functioning (PF) – 10 items, role limitations caused by physical problems (RP) – 4 items, bodily pain (BP) – 2 items, general health (GH) – 6 items, vitality (V) – 4 items, social functioning (SF) -2 items, role limitations caused by emotional problems (RE) – 3 items and general mental health (MH) – 5 items. For each of the 8 dimensions, the items are coded, aggregated and transformed to a scale ranging from 0 (the worst state of health for that dimension) to 100 which represent the best state of health (Dueñas, Salazar, Ojeda, & Failde, 2012). It also provides a summary of 2 components representing the physical and mental wellbeing which are the physical component score (PCS) and mental component score (MCS). The PCS consists of 4 sub components which include physical functioning (PF), role limitations caused by physical problems (RP), bodily pain (BP) and general health (GH) while mental

component score (MCS) includes vitality (V), social functioning (SF), role limitations caused by emotional problems (RE) and general mental health (MH) domains (Duenas et al., 2012).

2.3 Statistical analysis

The SF-36 QOL scores were analysed using Quality Metric Health Outcomes Scoring Software and further analysed using the IBM SPSS Statistics for Windows, Version 23.0. Descriptive statistics such as mean (SD), median (IQR) and percentage were computed. Bivariate analysis was done to analyse the association between QOL domains and its 2 components summary scores with sociodemographic factors using Mann Whitney Test and Kruskal Wallis test as the QOL domains data were not normally distributed.. Statistical significance level was set at $P < 0.05$.

3.0 Results

3.1 Sociodemographic Characteristics

A total of 184 respondents participated in this study with response rate of 100%. Majority of the respondents were 60-79 years old (53%), male gender (83%), Malay ethnicity (44%) and Muslim (45%). Among all the respondents, 86% of them are married and another 14% either single, divorced or widowed. About 97% of the respondents have educational background at least primary educational level until degree. Most of the respondents were working and only 49% of them either unemployed or pensioner. For those who are still working, Majority of them are self-employed (20%), 27(15%) work as a support group, 24(13%) semi-professional workers and 7(4%) work as professional. Summary of sociodemographic characteristics was showed in table 3.1.

Table 3.1: Sociodemographic characteristics of respondents (N=184)

Variables	Mean	Standard Deviation(SD)	n	Percentage (%)
Age, Year	59.86	8.17		
40-59			86	46.7
60-79			98	53.3
Gender				
Male			152	82.6
Female			32	17.4
Ethnicity				
Malay			80	43.5
Chinese			51	27.7
Indian			47	25.5
Others			6	3.3
Religion				
Islam			83	45.1
Buddha			44	23.9
Hindu			42	22.8

Christian	13	7.1
Others	2	1.1
Marital Status		
Single	15	8.2
Married	158	85.9
Divorced	3	1.6
Widowed	8	4.3
Education Level		
No education	6	3.3
Primary school	46	25.0
Secondary school	64	34.8
SPM/STPM/Diploma	48	26.1
First degree	20	10.9
Employment Status		
Professional	7	3.8
Semi professional	24	13.0
Supportive	27	14.7
Self-employed	36	19.6
Unemployed /Pensioner	90	48.9

3.2 Quality of Life

Table 3.2 summarizes the descriptive analysis of SF-36 quality of life domains. From the analysis, the mean (SD) score of the eight domains of SF-36 ranges between 58.8(25.4) to 82.7(23.5) where the lowest score was physical functioning while the highest score was bodily pain and social functioning. As a comparison, the QOL among post CABG patients showed a better score compared to patients with coronary artery disease (Anchah et al., 2017).

Table 3.2: Overall scores of SF-36 QOL of post CABG patients, coronary artery disease patients and normal general population.

	Physical Components				Mental Components			
	PF	RP	BP	GH	VT	SF	RE	MH
Post CABG Patients								
Mean	58.8	63.0	82.7	73.3	64.3	82.2	80.7	81.9
(SD)	(25.4)	(26.5)	(23.5)	(16.1)	(16.8)	(20.0)	(25.7)	(15.5)
*CAD Patients								
Mean	53.8	29.6	60.7	51.9	55.2	66.3	22.8	65.3
**General Population								
Mean	86.0	82.0	70.0	66.7	66.8	83.7	79.2	74.7
(SD)	(17.9)	(32.1)	(17.6)	(20.0)	(17.7)	(19.3)	(35.9)	(17.2)

Source: *Anchah et al.(2017), ** Azman et al. (2003)

CABG – coronary artery bypass grafting, CAD- coronary artery disease, PF-physical functioning, RP-role-physical, BP-bodily pain, GH-general health, VT-vitality, SF-social functioning, RE-role-emotional, MH-mental health

3.3 Factors associated with QOL

3.3.1 Age

A Mann-Whitney test was performed to analysed the association between age and QOL domains and the results are summarized in Table 3.3. There were significant relationship between the age and physical functioning (PF) domain ($P=0.001$), vitality (VT) domain ($P=0.026$) and mental component score (MCS) ($P=0.032$). It also showed respondents age range between 40-59 years old (median=70, IQR=50) had better QOL compared to age range 60-79 years old (median=50, IQR= 35) in physical functioning domain. It also showed similarities in GH, VT domains and MCS component. Otherwise there were no significant association with other domain of SF-36 including physical component score (PCS) ($P=0.387$) in QOL respondents.

Table 3.3: Association between Age of respondents with Quality of life (N=184)

SF-36 QOL Domains	Median(IQR)		Mann-Whitney U (Z score)	P value
	40-59 years (n=86)	60-79 years (n=98)		
Physical functioning (PF)	70 (50)	50 (35)	-3.215	0.01*
Role limitation due to physical condition (RP)	62.5 (44)	62.5 (38)	-0.479	0.63
Bodily pain (BP)	100 (38)	100 (28)	-0.053	0.96
General health (GH)	80 (25)	72 (19)	-1.321	0.19
Vitality (VT)	68.8 (13)	62.5 (20)	-2.226	0.03*
Social functioning (SF)	87.5 (28)	87.5 (28)	-0.158	0.87
Role limitation due to personal emotional problem (RE)	100 (33)	95.8 (25)	-0.091	0.93
General mental health (MH)	85 (25)	85 (11)	-0.624	0.53
Physical component score (PCS)	56.3 (11)	58 (10)	-0.866	0.39
Mental component score (MCS)	49.4 (13)	45.9 (11)	-2.149	0.03*

Note: significant $P<0.05^*$

3.3.2 Gender

The Mann-Whitney test was run to determine the association between gender and quality of life of the respondents. Results show that gender had significant association with QOL with male respondents (median= 65, IQR=39) had higher score compared to female respondents (median= 40, IQR= 39) ($P=0.001$). Apart from that, gender also had significant association with GH domain ($P=0.04$), VT domain ($P=0.015$), MH domain ($P=0.044$) and mental component score (MCS) ($P=0.018$).

There were no significant association of gender with QOL for RP domain ($P=0.215$), BP domain ($P=0.411$), SF domain ($P=0.912$) and RE domain ($P=0.495$). Beside that physical component score also not showed significant association with gender ($P=0.775$). The details of result are summarized in Table 3.4

Table 3.4: Association between gender of respondents with quality of life (N=184)

SF-36 QOL Domains	Median(IQR)		Mann-Whitney U (Z score)	P value
	Male (n=152)	Female (n=32)		
Physical functioning (PF)	65 (39)	40 (39)	-3.335	0.01*
Role limitation due to physical condition (RP)	62.5 (44)	53.1 (38)	-1.240	0.22
Bodily pain (BP)	100 (28)	92 (38)	-0.823	0.41
General health (GH)	77 (24)	72 (19)	-2.050	0.04*
Vitality (VT)	68.8 (19)	62.5 (23)	-2.421	0.02*
Social functioning (SF)	87.5 (25)	87.5 (34)	-0.111	0.91
Role limitation due to personal emotional problem (RE)	100 (25)	100 (50)	-0.682	0.50
General mental health (MH)	87.5 (20)	85 (24)	-2.010	0.04*
Physical component score (PCS)	57.1 (11)	57.9 (11)	-0.285	0.78
Mental component score (MCS)	48.4 (12)	44 (13)	-2.368	0.02*

Note: significant $P < 0.05^*$

3.3.3 Religion

There are 4 common religions among the respondents which are Islam, Buddha, Hindu and others (Christian and other). The Kruskal Wallis test was performed and showed significant association between Vitality domain (VT) with the religions ($P=0.025$). Post hoc Bonferroni adjustment showed (Islam and Buddha group), (Buddha with Hindu group) and (Buddha with Other group) were significantly different in vitality domain with $P=0.004$.

However there were no significant association between other SF-36 QOL domains including physical component score ($P=0.585$) and mental component score ($P=0.625$). The detail of report are summarized in Table 3.5.

Table 3.5: Association between religion of respondents with quality of life (N=184)

SF-36 QOL Domains	Median(IQR)				Kruskal Wallis (X ²)	P value
	Islam (n=83)	Buddha (n=44)	Hindu (n=42)	Others (n=15)		
Physical functioning (PF)	60 (50)	60 (37)	57.5 (38)	70 (35)	1.610	0.66
Role limitation due to physical condition (RP)	62.5 (50)	62.5 (31)	59.4 (38)	81.3 (56)	0.403	0.94
Bodily pain (BP)	100 (26)	92 (38)	100 (30)	100 (26)	1.175	0.76
General health (GH)	77 (18)	72 (28)	77 (26)	85 (20)	5.974	0.11
Vitality (VT)	68.8 (19)	65.6 (23)	62.5 (19)	75 (19)	9.386	0.03*
Social functioning (SF)	87.5 (38)	87.5 (25)	87.5 (38)	87.5 (25)	0.995	0.80
Role limitation due to personal emotional problem (RE)	100 (33)	100 (25)	91.7 (44)	91.7 (25)	1.308	0.73
General mental health (MH)	90 (15)	85 (19)	80 (20)	90 (20)	3.161	0.37
Physical component score (PCS)	57.9 (12)	58.2 (10)	56.1 (11)	55.7 (11)	1.940	0.59
Mental component score (MCS)	46.5 (15)	46.5 (10)	46.8 (11)	50.9 (13)	3.663	0.30

Note: significant $P < 0.05^*$

3.3.5 Marital status

Marital status of the respondents was classified into 2 groups; married and unmarried (single, divorced and widowed). A Mann-Whitney test was performed to determined association between marital status and SF-36 health domains and its components. There was no significant association between marital status with SF-36 health domains and its components; physical component score ($P=0.383$) and mental component score ($P=0.625$). Table 3.6 showed the details report of analysis.

Table 3.6: Association between marital status of respondents with quality of life (N=184)

SF-36 QOL Domains	Median(IQR)		Mann-Whitney U (Z score)	P value
	Married (n=158)	Unmarried (n=32)		
Physical functioning (PF)	55 (45)	67.5 (29)	-1.624	0.10
Role limitation due to physical condition (RP)	62.5 (39)	71.9 (39)	-0.410	0.68
Bodily pain (BP)	100 (38)	84 (27)	-0.503	0.62
General health (GH)	77 (25)	72 (18)	-0.575	0.57
Vitality (VT)	68.8 (19)	68.8 (19)	-0.758	0.45
Social functioning (SF)	87.5 (38)	93.8 (25)	-0.997	0.32
Role limitation due to personal emotional problem (RE)	100 (33)	100 (25)	-0.791	0.43
General mental health (MH)	85 (25)	90 (15)	-0.872	0.38
Physical component score (PCS)	57 (11)	57.9 (6)	-0.872	0.38
Mental component score (MCS)	46.4 (12)	50 (11)	-0.489	0.63

Note: significant $P<0.05^*$

3.3.6 Educational level

For educational level, the respondents were further divided into 3 groups; No education, lower education level (Primary education and secondary education) and higher education level (SPM/STPM/Diploma and first degree). Kruskal Wallis test was conducted to determine association between education level with quality of life of respondents. The result showed there were significant association between education level with general mental health domain ($P=0.006$) and physical component score ($P=0.015$). Post hoc Bonferroni adjustment showed that (Lower education group) and (Higher education group) were significant different in general mental health domain ($P=0.005$) and physical component score ($P=0.012$). For other Sf-36 health domains and mental component score there were no association with education level. The details of analysis showed in Table 3.7.

Table 3.7: Association between education level of respondents with quality of life (N=184)

SF-36 QOL Domains	Median(IQR)			Kruskal Wallis (X ²)	P value
	No education (n=6)	Lower education level (n=110)	Higher education level (n=68)		
Physical functioning (PF)	52.5 (65)	55 (36)	65 (50)	0.863	0.65
Role limitation due to physical condition (RP)	62.5 (34)	62.5 (34)	75 (56)	1.546	0.46
Bodily pain (BP)	100 (19)	100 (38)	100 (28)	1.370	0.50
General health (GH)	77 (15)	77 (19)	77 (25)	0.697	0.71
Vitality (VT)	71.9 (33)	62.5 (19)	68.8 (19)	0.722	0.70
Social functioning (SF)	93.8 (16)	87.5 (38)	93.8 (34)	2.918	0.23
Role limitation due to personal emotional problem (RE)	91.7 (31)	87.5 (42)	100 (25)	3.498	0.17
General mental health (MH)	90 (8)	82.5 (20)	90 (15)	10.351	0.01*
Physical component score (PCS)	59.6 (5)	56.0 (13)	58.5 (9)	8.408	0.02*
Mental component score (MCS)	47.1 (17)	46.6 (10)	49.6 (15)	0.169	0.92

Note: significant P<0.05*

3.3.7 Employment status

Employment status of respondent was analyze using Mann-Whitney test to find the association with SF-36 QOL domain and physical component score and mental component score. Table 3.8 showed that there were significant association between employment status with physical functioning (PF) (P=0.005), general health (GH) (P=0.002), vitality (VT) (P=0.001), mental health (MH) (P=0.043) and mental component score (P=0.025). There were no significant association found between employment status with role limitation due to physical problem (RP) (P=0.631), bodily pain (BP) (P=0.585), social functioning (SF) (P=0.352, Role limitation due to emotional problem (RE) (P=0.652) and physical component score (PCS) (P=0.308).

Table 3.8: Association between Employment Status of respondents with Quality of Life (N=184)

SF-36 QOL Domains	Median(IQR)		Mann-Whitney U (Z score)	P value
	Employed (n=94)	Unemployed (n=90)		
Physical functioning (PF)	65 (40)	50 (40)	-2.832	0.01*
Role limitation due to physical condition (RP)	62.5 (44)	62.5 (38)	-0.481	0.63
Bodily pain (BP)	100 (26)	100 (38)	-0.546	0.59
General health (GH)	82 (20)	72 (21)	-3.091	0.01*
Vitality (VT)	68.8 (14)	62.5 (19)	-3.420	0.01*
Social functioning (SF)	87.5 (25)	87.5 (38)	-0.931	0.35
Role limitation due to personal emotional problem (RE)	100 (33)	95.8 (33)	-0.451	0.65
General mental health (MH)	87.5 (20)	85 (20)	-2.021	0.04*
Physical component score (PCS)	57.8 (12)	56.7 (11)	-1.019	0.31
Mental component score (MCS)	48.9 (13)	45.9 (11)	-2.243	0.03*

Note: significant P<0.05*

4.0 Discussion

4.1 *Quality of life of respondents*

As compared to normal general population of Malaysia, even though some of the score for QOL domains in this study found to be low, it showed some significant improvement compared to QOL scores among coronary artery disease patients. Previous studies have demonstrated the improvement of quality of life among post CABG patients compared to their pre-operative condition (Jarvinen et al., 2003; Se et al., 2010 and Tofighi et al., 2012). This study revealed the mean(SD) score for SF-36 quality of life domains in post CABG patients ranging from 58.8(25.4) for physical functioning (PF) domain to 82.7(23.5) for bodily pain (BP) domain. Besides that, it seems that adaptation to physical component and mental component were well balanced among the respondents.

Furthermore, mean(SD) score in physical component summary (PCS) was 54.0(8.9). This is higher than the mental component summary which was 46.7(7.6). This finding is in contrast with other studies that showed the PCS score was usually lower than MCS score (Tofighi et al., 2012, Se et al., 2010, Jarvinen et al., 2003). This can be due to the difference in age range for previous studies which involved older age patients from 60 years and above compared to current study with respondents of younger age range of around 60 years and below. The difference response by young and elderly patients is explained by the fact that young patients mainly have better physical well-being, hence their ability to withstand the post-operative rehabilitation process after surgery. This enabled them to score higher in PCS compared to the elderly patients. Besides that, elderly patients were also reported to have slow recovery in physical component score (Jarvinen et al, 2013). Moreover, majority of the patients already discharged from hospital where the home environment were quite different compared to the hospital. As compared to hospital environment, patients were given 100% commitment by the nurses which lead to speedy recovery both physically and emotionally. Once they were discharged home, patients need to act independently without full support from spouses, family members or community. Hence, this will result making them helpless and possible towards mental breakdown. This factor also might be the reason why the MCS score is lower compare to PCS score.

4.2 *Association between sociodemographic factors and QOL domains*

Age showed to be significantly correlated with PF domain, VT domains and MCS for QOL. The findings are consistent with the results by Irfan et al. (2013) among 90 patients in Tehran showed a significant association between age and physical functioning domain of quality of life. The reason for similarity of this result with current study can be due to similar age range between respondents where the mean age were between 40-60 years. From the analysis of this current study, it showed that younger patients tend to have better quality of life after CABG compared to elderly patients. It showed that patient who diagnosed with CAD should proceed with CABG as early as possible to reduce risk of morbidity and mortality. Health education should be taught to patients and their family member especially regarding early treatment and important of CABG itself.

As for gender, it showed to have significant association with PF domain, GH domain, VT domain, MH domain and MCS of QOL. This result is consistent with the study by Se et al.

(2010) which described that male patients have significant improvement of quality of life after the surgery compared to female patients in physical functioning domain. However, there were no significant association reported in the GH, VT, MH and MCS domains in those study. These findings can be due to the difference in sample population of respondents where the study by Se et al. (2010) consisted of 69 respondents only. Based on the study by Peric et al. (2010), majority of female patients who underwent CABG were older than male. Besides that, compared to male patients, female patients showed to be seriously ill and have multiple co-morbidities such as diabetes, congestive heart failure and anaemia prior to CABG which cause low score of QOL compared to male gender after surgery (Peric V., Borzanovic M., Stolic R., Jovanovic A., Sovtic S., & Djikic D., 2010). As for study Tung et al. (2008) among 100 respondents in Taiwan, gender showed significant association with physical component score rather than mental component score. The difference in the results can be explained by the equal gender ratio in the Taiwan study (male=50, female=50) in contrary with the current study where the sample size for female was smaller than the male. Even though male showed to have significant improvement in QOL compared to female patients, a similar effort is needed for both genders for the betterment of QOL after surgery. Any intervention to reduce risk and disease prevalence among female patients should be done to allow improvement of QOL after surgery.

This study showed religion was significantly associated with VT domain of QOL. This result was opposite with the findings by Irfan et al. (2013) that revealed there was no association between religion and quality of life. It perhaps can be understandable as the majority of respondents that took place in the previous study were 95.6% Muslim and the rest were Hindu and others. The difference would be due to small sample size in the previous study. Besides that, Malaysia is a multi-religious country where their citizen is free to adopt any type of religion. There are 3 major religions in Malaysia which are Islam, Buddha, Hindu and others. It shows that religion actually play an important roles with regards of improvement of QOL after surgery. Psychological stress showed to influence the recovery process of wound healing after the surgery. It showed that, the recovery process can be halted up to 60% of normal speed in patients underwent the surgical procedures (Broadbent, Petrie, Alley, & Booth, 2003). By applying the religious activities as a routine after surgery, it will help patients to cope against their illness, strengthen their inner strength, reduce anxiety and stress level. It will help accelerate the healing process and reduce post-operative complications among patients. All religions practice should be encouraged as it not intervene with post-surgical complications.

Marital status showed to have no significant association with QOL domains. This study is similar with the study done by Se et al. (2010) among 69 respondents at National Heart Institute (IJN) where marital status did not show any significant association with QOL. Based on the study by Se et al. (2010), majority of the respondents were married (n=64) which may cause no significant association between marital status and QOL. Similar result was found in study by Irfan et al. (2013) among 90 respondents at the Military Hospital, Dhaka where there was no significant association between marital status and the QOL domains. The similarities of the result can be due to majority of the respondents are already married (97%) which are almost the same with the current study where majority of respondents are married (n=158) compare to unmarried (n=32) and the other study. A bigger sample size should be sought for better association of this factor with quality of life. Based on the result, it showed married couples not necessarily have good support by spouse. With the majority of respondents still in prime working age, there were possibilities that they were left alone at home or taken care without

full commitments by other family members or friends/community. This may cause slow improvement of QOL among post CABG patients.

The result of analysis showed education level to be significantly association with MH domain and PCS of QOL. From the analysis, respondents with higher educational level (Median =58.5, IQR=9) were noted to have better quality of life compare to lower education level (Median=56.0, IQR=13). The similarities of result also found in the study by Se et al. (2010) in PCS among 69 respondents. Based on study by Se et al. (2010), it showed respondents with higher education noted to have better quality of life in PCS compare to lower educational level. This study supported by Kaur et al. (2013) that showed significant association between educational level and quality of life among 60 respondents in Fortis Hospital, Punjab where good educational level was associated with good quality of life. Le Grande et al. (2006) also reported that educational level play a role for better quality of life after CABG surgery. The findings showed that educational level play an important role in the quality of life of patients after surgery. Patients' understanding regarding CABG itself, risks and complications should be investigated thoroughly to find association between education level as it may contribute for better quality of life.

As for employment status, this study showed that employed respondents had good quality of life after surgery compared to unemployed respondents. From the analysis, employment status showed to have significant association with PF, GH, VT, MH and MCS domains of QOL. Although some of other domain does not shows significant association with employment status but employed respondents tend to have better QOL score compare to unemployed respondents. This finding was supported by study done by Ezat et al. (2015) about the QOL among patients undergoing post CABG in Tehran, Iran. This study showed that employed patients have better quality of life after surgery compared to unemployed patients in PF domain. This is in agreement with the study by Irfan et al. (2013) among 90 respondents at Military Hospital Dhaka, Bangladesh that shown significant association between employment status with PH domain, GH domain and also PCS score. Study by Tung et al. (2008) also showed significant association between employment status with PCS score. It showed that, patients with good employment status tends to have better QOL compared to unemployed patients and it may be due to financial stability that they have. With strong financial support and possible good social supports, patients may able to recover faster after surgery and have better QOL.

5.0 Conclusion and recommendation

In conclusion, post CABG patients showed to have better scores of QOL compared to patients with coronary artery disease. Several sociodemographic characteristics (employed, married, high education level) were associated with good score of SF-36 QOL domains among the respondents. It is suggested that in the future, a better study design such as intervention study and cohort study should be carried out to identify the highest level of QOL after surgery and for improvement of QOL after surgery. Besides that, involvement of multiple cardiothoracic centers and collaboration between related agencies should be considered to solve the problem with generalization of study findings. Social support factors should be thoroughly assess as it play major role in rehabilitative phase and showed significant association with QOL patient

post operatively. This study was approved by Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (ID: KKM.NIHSEC.800-4/4/1 Jld.61(59)).

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Authors contribution

Author 1: Information gathering, preparation and editing of manuscript

Author 2: Review and editing final manuscript

Author 3: Review and editing final manuscript

Author 4: Review and editing final manuscript

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