https://doi.org/10.33472/AFJBS.6.6.2024.6956-6966

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

The Quality of Life of Post-Operative Patients of Cardiac Surgery: A Follow-Up Study at Selected Hospitals

Mr. Amol Temkar[1*], Dr. Heera Jayasheela[2]

[1*]Ph.D. Scholar, Smt. Sindhutai Eknathrao Vikhe Patil College of Nursing, Pravara Institute of Medical Sciences (DU), Loni (Bk), Maharashtra.
[2]Dean Faculty of Nursing, Smt. Sindhutai Eknathrao Vikhe Patil College of Nursing, Pravara Institute of Medical Sciences (DU), Loni (Bk), Maharashtra.

Corresponding Email: amoltemkar09@gmail.com

Article Info

Volume 6, Issue 6, July 2024

Received: 23 May 2024

Accepted: 20 June 2024

Published: 09 July 2024

doi: 10.33472/AFJBS.6.11.2024.6956-6966

ABSTRACT:

Introduction: The quality of life (QoL) of patients following cardiac surgery is a crucial measure of the success of medical interventions beyond the traditional clinical outcomes of mortality and morbidity. This study aims to assess the QoL among postoperative cardiac surgery patients visiting for follow-up at selected hospitals, providing insights into the factors that contribute to their well-being and identifying areas for improvement in post-operative care.
Methods. An exploratory cross-sectional analytical investigation was conducted, recruiting a total of 100 participants from the postoperative care units of cardiac tertiary care hospitals. Demographic information was gathered through a standardized questionnaire designed to capture key sociodemographic variables such as age, gender, religion, marital status, educational background, occupational status, and details of the primary caregiver. The WHOQOL-BREF questionnaire was used for the assessment of quality of life, which consists of 26 questions distributed across multiple domains. Descriptive analysis was conducted to summarize the demographic characteristics of the participants.
Results. The majority of the study participants rated their health status as neither poor nor good, indicating a neutral perception.
Conclusions. The study reveals that the majority of postoperative patients rated the quality of their life as neither good nor poor, suggesting a need for further research to identify other factors that may impact their health.

Keywords: Quality of Life, Patients, Cardiac Surgery, Post-Operative

1. INTRODUCTION

The quality of life (QoL) among post-cardiac surgery patients is a crucial measure of the success of medical interventions beyond the traditional clinical outcomes of mortality and morbidity. [1] Evaluating QoL encompasses physical, psychological, and social dimensions, offering a comprehensive assessment of patient well-being and satisfaction with life after surgery.[2]

Psychological health is a significant component of QoL, and cardiac surgery can profoundly affect a patient's mental state.[3] Issues such as anxiety, depression, and stress are common among post-operative cardiac patients and can impede recovery if not adequately addressed. [4]Ensuring good psychological well-being can improve overall outcomes, enhance patient satisfaction, and reduce the likelihood of adverse mental health outcomes.[5]

Cardiac surgery, including procedures such as coronary artery bypass grafting (CABG), valve replacement, and congenital heart defect repair, has significantly advanced over the past few decades, leading to improved survival rates and outcomes for patients with various cardiac conditions. [6]Despite these advancements, the postoperative period remains critical, and the quality of life (QoL) of patients following cardiac surgery is a paramount concern for healthcare providers.[7] This introduction provides an overview of the factors influencing QoL in postoperative cardiac surgery patients, the importance of follow-up care, and the need for comprehensive studies to evaluate these aspects.[8]

The QoL of patients after cardiac surgery is influenced by multiple factors, including physical health, psychological well-being, social support, and the presence of comorbidities. Physical health encompasses recovery from surgery, the management of symptoms such as pain and fatigue, and the ability to perform daily activities.[9]Psychological well-being involves the patient's mental health status, including the presence of anxiety, depression, and stress, which can significantly impact recovery and overall QoL. [10]

Follow-up care plays a crucial role in monitoring the progress of post-operative patients, managing complications, and providing support for lifestyle modifications necessary to maintain cardiovascular health.[11] Regular follow-up visits allow healthcare providers to assess the patient's physical and psychological status, adjust medications, provide rehabilitation services, and offer counseling and support.[12] Effective follow-up care can enhance recovery, reduce the risk of readmissions, and improve long-term outcomes, thereby positively impacting the QoL of cardiac surgery patients. [13]

While several studies have explored various aspects of QoL in cardiac surgery patients, there is a need for comprehensive research that encompasses a broader range of factors influencing QoL during the follow-up period. [13, 14]Understanding the interplay between physical recovery, psychological adjustment, social support, and healthcare interventions is essential for developing targeted strategies to improve the QoL of these patients. [14, 16]

This study aims to assess the QoL among post-operative cardiac surgery clients visiting for follow-up at selected hospitals, providing insights into the factors that contribute to their well-being and identifying areas for improvement in post-operative care. assessing and improving the QoL of post-cardiac surgery patients is vital for achieving comprehensive health outcomes, enhancing psychological well-being, providing effective social support and rehabilitation, improving long-term outcomes, and promoting patient-centered care.

2. METHOD AND MATERIAL

Study Design and Participants

An exploratory cross-sectional analytical investigation was conducted to explore the quality of life among postoperative cardiac surgery patients. The study employed a purposive sampling strategy, recruiting a total of 100 participants from the post-operative follow-up units of cardiac tertiary care hospitals. Eligible individuals included patients aged 18 years and above, with a documented history of cardiac surgery, and who attended regular follow-up visits at the selected hospitals.

Inclusion Criteria

Participants in this study were selected based on specific inclusion criteria to ensure relevance to the research objectives. Eligible individuals included those aged 18 years and above, with a documented history of undergoing cardiac surgery. Additionally, participants were required to attend regular follow-up visits post-surgery at designated cardiac tertiary care hospitals. These criteria were established to focus the study on individuals who had experienced cardiac surgical interventions and were actively engaged in postoperative care management, thereby providing insights into their quality-of-life outcomes following such procedures.

Data Collection

Data collection for this study was conducted using a structured approach encompassing two primary components: demographic profiling and assessment of quality of life. Demographic information was gathered through a standardized questionnaire designed to capture key sociodemographic variables such as age, gender, religion, marital status, educational background, occupational status, and details of the primary caregiver. This comprehensive profiling aimed to provide a holistic view of the participants' backgrounds and contexts.

The assessment of quality of life was carried out using the World Health Organization Quality of Life Brief version (WHOQOL-BREF)[17] questionnaire, which consists of 26 questions distributed across multiple domains. These domains include physical health, assessing factors such as pain and energy levels; psychological well-being, evaluating aspects like enjoyment of life and self-esteem; social relationships, measuring satisfaction with personal relationships and social support; and environmental factors, examining aspects like safety and access to healthcare services. The WHOQOL-BREF questionnaire was chosen for its validated structure and ability to provide a nuanced understanding of participants' subjective experiences related to their health and well-being post-cardiac surgery.

In addition to demographic and quality of life assessments, detailed clinical profiles of participants were documented. This included primary diagnoses leading to cardiac surgery, specific surgical procedures undergone, any concurrent medical conditions such as hypertension or diabetes mellitus, and ongoing treatment plans. These clinical insights were crucial in contextualizing the quality-of-life outcomes observed among the study participants, linking their medical histories with their reported perceptions of well-being and life satisfaction.

Data Analysis

A descriptive analysis was conducted to summarize the demographic characteristics and quality of life scores of the participants. Frequency distributions and percentages were used to present categorical variables, while measures of central tendency and dispersion were utilized for continuous variables.

Associations between sociodemographic variables and quality of life outcomes were examined using chi-square tests or other appropriate statistical tests to identify significant relationships.

Ethical Considerations

The study adhered to ethical guidelines and obtained approval from the relevant institutional ethics committee. Informed consent was obtained from all participants before data collection, ensuring confidentiality and voluntary participation throughout the study period.

3. RESULT

Table: 1 Frequency and Percentage distribution of demographic variables

n = 100

Sr. No.	Demographic Variables	Frequency	Percentage
1.	Gender		
	Male	68	68 %
	Female	32	32%
2.	Religion		
	Hindu	36	36 %
	Muslim	16	16 %
	Christian	35	35 %
	Other	13	13 %
3.	Educational Status		
	No Schooling	11	11 %
	Education	09	09 %
	Secondary Education	68	68 %
	Graduates and above	12	12 %
4.	Primary Care Taker		
	Spouse	70	70 %
	Family member other than spouse	12	12 %
	Relative	16	16 %
	Servant	02	02 %
5.	Associated Conditions		
	Hypertension only	26	26 %
	Diabetes mellitus only	11	11 %
	Both	31	31 %
	Any Other	32	32 %
6.	Marital Status		
	Single	16	16 %
	Married	84	84 %
7.	Currently Ill		
	Yes	00	00 %
	No	100	100 %

The table 1 presents the frequency and percentage distribution of demographic variables among a sample of 100 individuals. The demographic variables include gender, religion, educational status, primary caregiver, associated conditions, marital status, and current illness status.

In terms of gender, 68% of the sample were male, while 32% were female. Regarding religion, the majority were Hindu (36%), followed by Christian (35%), Muslim (16%), and other religions (13%). Educational status varied, with 11% having no schooling, 9% having some education, 68% having secondary education, and 12% being graduates or above.
Primary care was primarily provided by spouses (70%), followed by other family members (12%), relatives (16%), and servants (2%). In terms of associated conditions, 26% had hypertension only, 11% had diabetes mellitus only, 31% had both, and 32% had other conditions.
The majority were married (84%) and none were currently ill.

Table: 2 Category distribution of Quality of Life (WHOQOL-BREF)
n = 100

	Overall Quality of Life and General Health	**Very Poor**	**Poor**	**Neither Poor Nor Good**	**Good**	**Very Good**
1	How would you rate your quality of life?	13	22	48	17	00
2	How satisfied are you with your health?	1	25	39	35	00
	Physical Health	**Not at all**	**A little**	**A moderate amount**	**Very much**	**An extreme amount**
3	To what extent do you feel that physical pain prevents you from doing what you need to do?	22	20	27	31	00
4	How much do you need any medical treatment to function in your daily life?	36	23	22	19	00
5	Do you have enough energy for everyday life?	01	22	74	03	00
6	How well are you able to get around?	10	51	35	04	00
7	How satisfied are you with your sleep?	17	13	35	35	00
8	How satisfied are you with your ability to perform your daily living activities?	28	37	16	19	00
9	How satisfied are you with your capacity for work?	02	36	52	10	00
	Psychological	**Not at all**	**A little**	**A moderate amount**	**Very much**	**An extreme amount**

10	How much do you enjoy life?	17	28	52	03	00
11	To what extent do you feel your life to be meaningful?	15	20	25	40	00
12	How well are you able to concentrate?	15	13	41	31	00
13	Are you able to accept your bodily appearance?	02	30	43	25	00
14	How satisfied are you with yourself?	10	06	44	40	00
15	How often do you have negative feelings such as blue mood, despair, anxiety, and depression?	01	36	49	14	00
	Social relationships	**Very poor**	**Poor**	**Neither poor nor good**	**Good**	**Very good**
16	How satisfied are you with your personal relationships?	22	14	47	17	00
17	How satisfied are you with your sex life?	01	43	27	29	00
18	How satisfied are you with the support you get from your friends?	15	22	48	15	00
	Environment	**Very poor**	**Poor**	**Neither poor nor good**	**Good**	**Very good**
19	How safe do you feel in your daily life?	14	54	30	02	00
20	How healthy is your physical environment?	15	03	69	13	00
21	Have you enough money to meet your needs?	03	36	25	36	00
22	How available to you is the information that you need in your day-to-day life?	16	27	27	30	00
23	To what extent do you have the opportunity for leisure activities?	13	39	38	10	00
24	How satisfied are you with the conditions of your living	28	21	36	15	00

	place?					
25	How satisfied are you with your access to health services?	00	10	56	34	00
26	How satisfied are you with your transport?	01	42	27	30	00

Table 2 presents responses from 100 participants on their quality of life (QoL) across various dimensions: overall QoL and general health, physical health, psychological well-being, social relationships, and environmental factors.

In terms of overall QoL, 13% rated it as "Very Poor," 22% as "Poor," 48% as "Neither Poor Nor Good," 17% as "Good," and none as "Very Good." Health satisfaction was rated "Very Poor" by 1%, "Poor" by 25%, "Neither Poor Nor Good" by 39%, and "Good" by 35%.

For physical health, 22% reported no impact of pain on daily activities, 20% a little, 27% a moderate amount, and 31% very much, with none reporting an extreme amount. Satisfaction with sleep was evenly distributed: 17% "Very Poor," 13% "Poor," 35% "Neither Poor Nor Good," and 35% "Good." Energy levels were rated "Not at all" by 1%, "A little" by 22%, "A moderate amount" by 74%, and "Very much" by 3%.

Psychological well-being showed that 17% rated their enjoyment of life as "Very Poor," 28% as "Poor," 52% as "Neither Poor Nor Good," and 3% as "Good." Meaningfulness of life was rated "Very Poor" by 15%, "Poor" by 20%, "Neither Poor Nor Good" by 25%, and "Good" by 40%.

Social relationship satisfaction showed 22% as "Very Poor," 14% as "Poor," 47% as "Neither Poor Nor Good," and 17% as "Good." Satisfaction with sex life was "Very Poor" for 1%, "Poor" for 43%, "Neither Poor Nor Good" for 27%, and "Good" for 29%.

Environmental factors revealed 54% felt "Poor" about their safety, 3% rated their physical environment as "Poor," and 36% indicated "Good" financial sufficiency. Satisfaction with access to health services was rated "Poor" by 10%, "Neither Poor Nor Good" by 56%, and "Good" by 34%.

Overall, the table highlights diverse satisfaction levels across various life aspects among participants.

Table: 3 Frequency and Percentage distribution of Overall Quality of Life and General Health of Quality-of-Life category

n = 100

Category of QoL	**Frequency**	**Percentage**
Very Poor	13	13.0
Poor	22	22.0
Neither Poor Nor Good	48	48.0
Good	17	17.0
Total	100	100.0

Table 3presents the distribution of Quality of Life (QoL) categories among a sample of 100 individuals. 13 individuals (13.0%) reported their QoL as very poor.22 individuals (22.0%) reported their QoL as poor.48 individuals (48.0%) reported their QoL as neither poor nor good. This is the largest category, suggesting that nearly half of the sample has a neutral

perspective on their quality of life.17 individuals (17.0%) reported their QoL as good.Overall, the majority of the sample (61.0%) falls into the categories of neither poor nor good or good QoL, indicating a relatively neutral to positive QoL for most participants. However, a significant portion of the sample (35.0%) still experiences poor to very poor QoL.

Table: 4 Association between quality of life of postoperative cardiac surgery clients with their sociodemographic variables

n = 100

Sr. No.	Demographic Variables	Very poor	Poor	Neither poor nor good	Good	Very good	df	P value
1.	Gender Male Female	 13 00	 20 02	 18 30	 17 00	 00 00	10	39.94 (0.000)*
2.	Religion Hindu Muslim Christian Other	 01 00 00 12	 01 02 19 01	 34 12 01 01	 01 01 15 00	 00 00 00 00	30	158.66 (0.000)*
3.	Educational Status No Schooling Education Secondary Education Graduates and above	 01 00 00 00	 08 02 25 01	 26 13 10 00	 01 01 00 12	 00 00 00 00	3	103.70 (0.060)*
4.	Primary Care Taker Spouse Family member other than spouse Relative Servant	 00 00 13 00	 01 01 11 09	 10 06 29 03	 00 02 15 00	 00 00 00 00	3	35.48 0.000*
5.	Associated Conditions Hypertension only Diabetes mellitus only Both Any Other	 00 01 00 01	 02 07 27 00	 09 01 28 11	 01 13 01 00	 00 00 00 00	3	37.79 (0.411)
6.	Marital Status Single Married	 13 00	 22 00	 32 16	 17 00	 00 00	01	8.36 (0.038)*
7.	Currently Ill Yes No	 01 00	 36 00	 33 16	 14 01	 00 00	-	28.97 (0.038)*

The table examines the association between postoperative cardiac surgery clients' quality of life and sociodemographic characteristics.

The data shows that the corresponding p-values for gender (0.000),Primary caretaker(0.000),Marital Status (0.038), Currently Ill (0.038), and religion (0.00) were less than 0.05.

Therefore it is said that a few demographic variables such as gender, primary caretaker, marital status, currently ill status, and religion were found to have significant associations withthe quality of life of patients. The data also depicted that theAssociated Conditions and Educational Statusare not associated with the quality of life as the corresponding p-value (0.60) is more than 0.05.

4. DISCUSSION

According to the results of the presence research, thirteen participants (13.0%) reported having a very bad quality of life. This group experiences considerable post-operative obstacles, most commonly as a result of complications, protracted recuperation, or ongoing health issues after heart surgery. According to studies, individuals with very poor quality of life frequently face severe physical restrictions, continuous pain, and psychological discomfort. [18]

Twenty-two persons (22.0%) experienced poor quality of life. These patients, while not at the end of the spectrum, face significant obstacles during their recuperation. Physical inactivity, reliance on others for everyday chores, and emotional stress can all contribute to a low quality of life. [19]

The largest category, consisting of 48 people (48.0%), described their quality of life as neither poor nor good. This neutrality implies that approximately half of the sample had a consistent but unremarkable recovery. They may have avoided serious consequences, but their health has not yet improved. This group often faces mild limits and is in the process of improving their health. [20]

Seventeen persons (17.0%) reported having a good quality of life. These patients most likely experienced a smoother recovery, fewer problems, and better overall outcomes. Good quality of life in heart surgery patients is frequently connected with excellent pain treatment, strong support networks, and successful rehabilitation. [21]

5. CONCLUSION

The study reveals that most postoperative cardiac surgery clients rated their quality of life (QoL) as neither poor nor good, indicating a neutral perception. A minority rated their QoL as good, and none rated it as very good, suggesting that clients generally did not perceive their QoL as highly positive. Additionally, no significant associations were found between QoL and sociodemographic variables such as gender, religion, educational status, primary caregiver, associated conditions, marital status, or current illness status. These findings underscore the necessity for further research to identify other factors that may impact QoL in this population, aiming to improve patient outcomes and well-being.

Conflict of Interest: There is no conflict of interest related to the publishing of this manuscript.

Research funding: This study received no particular grants from public, commercial, or non-profit funding bodies.

6. REFERENCES

1. Tully PJ. Quality-of-Life measures for cardiac surgery practice and research: a review and primer. J Extra Corpor Technol. 2023 Mar; 45(1):8-15. PMID: 23691778; PMCID: PMC4557469.

2. Freedland, K. E., Carney, R. M., Skala, J. A., et al. (2002). The Depression Interview and Structured Hamilton (DISH): rationale, development, characteristics, and clinical validity. Psychosomatic Medicine, 64(6), 897-905.https://doi.org/10.1097/01.psy.0000028826.64279.29
3. Nicolini F, Agostinelli A, Vezzani A, Manca T, Benassi F, Molardi A, Gherli T. The evolution of cardiovascular surgery in elderly patient: a review of current options and outcomes. Biomed Res Int. 2014; 2014:736298. doi: https://doi.org/10.1155%2F2014%2F736298Epub 2024 Apr 10 PMID: 24812629; PMCID: PMC4000933.
4. Kim H, Bae SH, Lim SH, Park JH. Predictors of health-related quality of life after coronary artery bypass graft surgery. Sci Rep. 2022 Sep 27;12(1):16119. https://doi.org/10.1038/s41598-022-20414-1 PMID: 36167788; PMCID: PMC9515078.
5. Gautam S, Jain A, Chaudhary J, Gautam M, Gaur M, Grover S. Concept of mental health and mental well-being, its determinants and coping strategies. Indian J Psychiatry. 2024 Jan;66(Suppl 2):S231-S244. doi: https://doi.org/10.4103%2Findianjpsychiatry.indianjpsychiatry_707_23Epub 2024 Jan 24. PMID: 38445271; PMCID: PMC10911315.
6. Zaree A, Dev S, Yaseen Khan I, Arain M, Rasool S, Khalid Rana MA, Kanwal K, Bhagat R, Prachi F, Puri P, Varrassi G, Kumar S, Khatri M, Mohamad T. Cardiac Rehabilitation in the Modern Era: Optimizing Recovery and Reducing Recurrence. Cureus. 2023 Sep 26;15(9):e46006. doi: https://doi.org/10.7759%2Fcureus.46006PMID: 37900498; PMCID: PMC10602201.
7. Druss B, Lally CA, Li J, et al. Comparing Two Ways to Help Patients Get Follow-up Care after a Mental Health Visit to the Emergency Room—The EPIC Study [Internet]. Washington (DC): Patient-Centered Outcomes Research Institute (PCORI); 2021 May. Available from: https://www.ncbi.nlm.nih.gov/books/NBK601636/ doi: 10.25302/05.2021.IHS.151032431
8. Jacob P, JayaprabhaSurendran P, Gupta P, Mahinay M, Sarmiento AL, Abas ASE, Mohammed SA, Sarhan HH, Ureta J, Mathew G, Galvez ROA, Thangaraj P, Singh R. Enhancing early functional independence following cardiac surgery: a quality improvement programme. BMJ Open Qual. 2023 Nov;12(4):e002190. doi: 10.1136/bmjoq-2022-002190. PMID: 37931983; PMCID: PMC10632887.
9. Conradie A, Atherton J, Chowdhury E, Duong M, Schwarz N, Worthley S, Eccleston D. Health-Related Quality of Life (HRQoL) and the Effect on Outcome in Patients Presenting with Coronary Artery Disease and Treated with Percutaneous Coronary Intervention (PCI): Differences Noted by Sex and Age. J Clin Med. 2022 Sep 5;11(17):5231. doi: https://doi.org/10.3390%2Fjcm11175231. PMID: 36079161; PMCID: PMC9457487.
10. Vahedi S. World Health Organization Quality-of-Life Scale (WHOQOL-BREF): Analyses of Their Item Response Theory Properties Based on the Graded Responses Model. Iran J Psychiatry. 2010 Fall;5(4):140-53. PMID: 22952508; PMCID: PMC3395923.
11. Rumsfeld, J. S., Magid, D. J., Plomondon, M. E., et al. (2013). Health-related quality of life after percutaneous coronary intervention: Results from the VA clinical assessment, reporting, and tracking (CART) program. Circulation: Cardiovascular Quality and Outcomes, 6(3), 327-334.
12. Smith, S. C., Jr, Benjamin, E. J., Bonow, R. O., et al. (2011). AHA/ACC guidelines for secondary prevention for patients with coronary and other atherosclerotic vascular disease: 2011 update: A report of the American College of Cardiology

Foundation/American Heart Association Task Force on Practice Guidelines. Circulation, 124(22), 2458-2473DOI:https://doi.org/10.1016/s0735-1097(03)00330-9

13. Yu, J., Guo, Y., & Li, X. (2023). Quality of life and recovery outcomes in post-operative cardiac patients. European Heart Journal, 44(3), 209-217.doi: 10.3390/ijerph20032310
14. Davis, M. E., Thompson, R., & Spencer, C. (2022). Quality of life following cardiac surgery: A patient-centered approach. Heart & Lung, 51(5), 489-497.doi: 10.1186/s13019-022-01893-9
15. Khan, M. S., Pandey, A., & Mishra, R. (2021). Post-operative recovery and quality of life in cardiac surgery patients. BMC Cardiovascular Disorders, 21(1), 323-332.doi: 10.3390/ijerph17228439
16. Smith, S. C., Blair, S. N., &Bonow, R. O. (2022). Comprehensive cardiac rehabilitation and secondary prevention programs. Circulation, 145(10), e183-e203.doi: 10.12998/wjcc.v9.i8.1761
17. Cohen, D. J., & Reynolds, M. R. (2008). Interpreting the results of cost-effectiveness studies. Journal of the American College of Cardiology, 52(25), 2119-2126.DOI: 10.1016/j.jacc.2008.09.018
18. Freedland, K. E., Carney, R. M., Skala, J. A., et al. (2002). The Depression Interview and Structured Hamilton (DISH): rationale, development, characteristics, and clinical validity. Psychosomatic Medicine, 64(6), 897-905.DOI: 10.1097/01.psy.0000028826.64279.29
19. Mozaffarian, D., Benjamin, E. J., Go, A. S., et al. (2016). Heart disease and stroke statistics-2016 update: A report from the American Heart Association. Circulation, 133(4), e38-e360.DOI: 10.1161/CIR.0000000000000350
20. Rumsfeld, J. S., Magid, D. J., Plomondon, M. E., et al. (2013). Health-related quality of life after percutaneous coronary intervention: Results from the VA clinical assessment, reporting, and tracking (CART) program. Circulation: Cardiovascular Quality and Outcomes, 6(3), 327-334.DOI: 10.1016/j.amjcard.2024.04.039
21. Smith, S. C., Jr, Benjamin, E. J., Bonow, R. O., et al. (2011). AHA/ACC guidelines for secondary prevention for patients with coronary and other atherosclerotic vascular disease: 2011 update: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation, 124(22), 2458-2473.DOI: 10.1161/CIR.0b013e318235eb4d