

# Predictors of Sexual Quality of Life Among Postoperative Coronary Artery Bypass Graft Patients

Arthit Oeychanai<sup>1\*</sup>, Napaporn Wanitkun<sup>2</sup>,

Thitipong Tankumpuan<sup>3</sup> and Teerapong Tocharoenchok<sup>4</sup>

<sup>1</sup>Master Thesis, Master of Nursing Science Program, Adult and Gerontological Nursing, Faculty of Nursing and Faculty of Graduate Studies, Mahidol University, Bangkok, Thailand.

\*Corresponding Author Email: arthit5543@gmail.com

<sup>2</sup>PhD (Gerontological Nursing), M.Sc. (Medical Physiology), BNS, RN, Assistant Professor, Faculty of Nursing, Department of Surgical Nursing, Mahidol University, Bangkok, Thailand.

<sup>3</sup>PhD (Nursing), MNS, BNS, RN, Assistant Professor, Faculty of Nursing, Department of Surgical Nursing, Mahidol University, Bangkok, Thailand.

<sup>4</sup>MD, Assistant Professor, Faculty of Medicine Siriraj Hospital, Division of Cardiothoracic Surgery, Department of Surgery, Mahidol University, Bangkok, Thailand.

## Abstract

**Background:** After 6-8 weeks of coronary artery bypass grafting surgery, patients can have sexual activity. However, patients do not get information from health officers such as how to have safe sex as much as it should before returning home. **Aim:** The study aimed to examine the predictors of sexual quality of life including metabolic syndrome, sexual knowledge, sexual communication, sexual response and function capacity in postoperative coronary artery bypass graft patients. **Method:** This descriptive cross-sectional study was conducted with 132 post-coronary artery bypass grafting patients at least 3 months without cognitive impairment. The random selection was applied from one university hospital. The data were collected with questionnaires consisting of demographic data, metabolic syndrome, sexual knowledge, sexual communication, sexual response, function capacity, and sexual quality of life. The data were analyzed using hierarchical multiple regression statistics with stepwise method. **Results:** The findings indicated that the sexual quality of life score was  $44.94 \pm 21.85$ . Regression analysis showed that estimated glomerular filtration rate (eGFR), sexual knowledge and sexual response were statistically significant to predict the sexual quality of life at 19%. The variable of best prediction was sexual response ( $\beta = .342, p < .001$ ). **Conclusion:** The study showed that patients did not have sufficient information about sexual quality after coronary artery bypass grafting surgery. Therefore, the patients had sexual problems including decreasing in sexual knowledge and sexual response after having surgery.

**Keywords:** Metabolic Syndrome, Sexual Knowledge, Sexual Communication, Sexual Response, Function Capacity, Sexual Quality of Life.

## INTRODUCTION

Coronary Artery Bypass Grafting surgery (CABG) is one of good ways of treating patients to have a better quality of life (Pacaric et al., 2020) Sexual activity is a part of recovery process so the patients who have operation after 6-8 weeks of coronary artery bypass surgery can have sexual activity and the chest wound is healed (Hudec, Spacek, Hutyra, Moravec, & Taborsky, 2018) Nevertheless, patients do not have sufficient information such as how to avoid unsafe sex from health workers before returning home. In other words, sexual recovery is more important than any other recovery case about which the patients should know. (Steinke et al., 2013)

Sexual quality of life is an individual's perception of life in the context of culture and value system in which they live. Sexual intercourse is a pleasure that arises from the intimacy of a person that is expressed over a certain period of time as well as the satisfaction with both physiological and psychological aspects. (Greenberg, Smith, Kim, Naghdechi, & IsHak, 2017) The use of an artificial Cardiopulmonary bypass (CPB) in patients after coronary artery bypass graft (CABG) surgery can worsen sexual function and Nitric oxide, (Lanzarone et al., 2010) resulting in delayed ejaculation premature ejaculation, maintain erection and desire wife sexual dissatisfaction (Mourad, Ghanam, Mostafa, Sabry, & Bastawy, 2017; Reese, Shelby, & Taylor, 2012)

In this study, the researcher used the Transition Theory concept framework, Meleis et al. (Meleis, Sawyer, Im, Messias, & Schumacher, 2010) as an intermediate theory to explain the process of transformation from one state to another. It consists of four concepts: Nature of Transition, Transition Condition, Pattern of Response and Nursing Therapeutics. In addition, the researcher used the transition condition autonomy as a predictor of sexual quality of life in patients after 3 months of CABG surgery. It has been found that there are the critical points and events in transitional nature. The study was received the transition conditions in the personal consist of individual aspects as metabolic syndrome, sexual knowledge and patient function capacity. Social and community aspects are dyadic sexual communication with partner and sexual response. It leads to a responsive pattern that is the sexual quality of life. Therefore, nurses are required to take care of transforming individuals with a focus on promoting the individual while making the transition and prevent defective transitions from occurring.

According to all the above studies, there are a variety of factors affecting of sexual function. However, it is not sufficient for the elements in the sexual dimension, perception of good feelings and individual satisfaction are important factors affecting the complete quality of life. excluding sexual function. Which after 3 months CABG surgery is the suite time to return to have sex there are few studies. (Dávolos, Naya, & Marcilla, 2020) The researcher is interested in studying various predictive factors for the sexual quality of life after surgery. Therefore, the researcher realizes the importance of factors for Metabolic syndrome, Sexual knowledge, dyadic sexual communication, Sexual response and physical capacity. In predicting the transition, it occurs from both the patient and community to sexual quality of life after CABG 3 months surgery as a basic concept in nursing planning and counseling for CABG patients.

## METHOD

### *Participants and Procedures*

The researcher calculated the sample size by power analysis using G \* Power version 3.1 program using 5 predictive factors. Linear Multiple Regression was used from the literature review. There were studies related to sexual quality of life in postoperative patients. By making a coronary bypass, the prediction variable was similar to that of this study, which was sexual quality of life and sexual knowledge, effect size of .113, test power of .80, and the confidence level at alpha ( $\alpha$ ) was .05 (Lai, Hsieh, Ho, & Chiou, 2011) 120 subjects were obtained and 10% of the sample was added to prevent incomplete questionnaires. And could not be analyzed (Fox, Hunn, & Mathers, 2009)

The participants in this cross-sectional descriptive study were 132 patients with post coronary artery bypass grafting patients at least 3 months without cognitive impairment. In addition, they had experienced in sexual intercourse and were able to perform a six-minute walk test was recruited. The random selection was applied from one university hospital. Data were analyzed using hierarchical multiple regression statistics with stepwise method. consented to be in the study completed surveys (approximately 30-45 minutes in length). Patients interviews were completed separately. Data

collection took place between December 2020 to February 2021. The study was approved to certify that Siriraj Institutional Review Board is in full compliance (COA no. Si 960/2020)

### **Measures**

Part 1 Dementia Screening Assessment (Mini-Cognitive assessment instrument: Mini-Cog) developed by Borson et al. (2000)(Borson, Scanlan, Brush, Vitalian, & Dokmak, 2000) and translated into Thai version by Trongsakul et al. (2015)(Trongsakul, Lambert, Clark, Wongpakaran, & Cross, 2015) To screen patients without cognitive disorders into research.

Part 2 Metabolic syndrome questionnaire from The American Heart Association and National Heart, Lung, and Blood Institute, Updated ATP III Classification, (2005)(Zimmet, Alberti, & Serrano Ríos, 2005). If 3 out of 5 symptoms are found, it is considered that metabolic syndrome.

Part 3 Sexual knowledge Scale: a 20-item scale developed by Chung and Chin for cardiac patients. This scale consisted of 20 questions to evaluate sexual knowledge related to CABG patients by Lai et al. (2011).(Lai et al., 2011) Total possible scores ranged from 0 to 20, with higher scores indicating greater sexual knowledge.

Part 4 Dyadic Sexual Communication Scale a 13-item scale developed by Catania (2003)(Catania, 1998) For each item, scores for degree of communication ranged from 1 to 6, Explain the meaning of the answer as follows: Strongly disagree. 1 2 3 4 5 6 Strongly agree, respectively with higher scores indicating greater sexual communication

Part 5 Sexual Modes Questionnaire a 30-item scale for Male and 33-item scale for Female developed by Nobre and Pinto (2003).(Nobre & Pinto-Gouveia, 2003) The assessment was divided into 3 areas: cognitive, emotional, and sexual response. In this study, sexual response was used. For each item, Likert scale 1 to 5, Explain the meaning of the answer as follows sexual response: very low 1 2 3 4 5 very high of sexual response, respectively. The result of total points scored divided by 100 multiplied by the total score will be. Which the score will be between 0-100 scores. The higher scores indicating greater sexual response.

Part 6 Six-Minute walk test: 6MWT developed by American Thoracic Society (2002). (American Thoracic Society, 2002)

Part 7 Sexual quality of life a 11-item scale for Male developed by Abraham, Symonds and Morris (2008)(Abraham, Symonds, & Morris, 2008) and 18-item scale for Female developed by Symonds and Quirk (2005)(Symonds, Boolell, & Quirk, 2005) Likert scale 1 to 6 Explain the meaning of the answer as follows: agree 1 2 3 4 5 6 disagree, The result of total points scored divided by 100 multiplied by the total score will be. Which the score will be between 0-100 scores. The higher scores indicating greater sexual quality of life.

In this study, Questionnaire on sexual knowledge scale, Dyadic Sexual Communication Scale, Sexual Modes Questionnaire and Sexual Quality of life. In translation English language to Thai language by researchers with a reverse translation process (Jones, Lee, Phillips, Zhang, & Jaceldo, 2001) and reviewed by language experts.

The validity of the content was then established through a review committee consisting of 1 cardiologist, 3 sexologists, 2 cardiovascular nursing specialists, and 1 cardiovascular specialist teacher in the questionnaire, which specifies the Content Compliance Index Questionnaire on sexual knowledge scale (CVI) of 0.93 and Cronbach's alphas in this study were 0.76, Dyadic Sexual Communication Scale (CVI) of 0.96 and Cronbach's alphas in this study were 0.76, Sexual Modes Questionnaire-Female (CVI) of 0.81 and Cronbach's alphas in this study were 0.99, Sexual Modes Questionnaire-Male (CVI) of 0.83 and Cronbach's alphas in this study were 0.99, Sexual Quality of

life-Female (CVI) of 0.98 and Cronbach's alphas in the current sample were 0.89 and Sexual Quality of life-Male (CVI) of 0.97 and Cronbach's alphas in this study were 0.94.

### Analysis plan

This study used a descriptive design to investigate changes in sexual quality of life in patients, test normal distribution of variables and predictor power of sexual quality of life by hierarchical multiple regression statistics with stepwise method. All data were analysed using IBMSPSS Statistics version 25 software package. A P-value < .05 was considered statistically significant.

## RESULTS

**Nature of Transition:** In this study, a total of 132 patients found that the majority of the sample were 81.8% male, mean age  $66 \pm 9.1$  years old and 79.5% of the elderly (over 60 years old). The sample group did not work at 59.1% and had an average monthly income of 19,636 baht, but compared with the average income per capita of Thailand (19,276.9 baht). Most of the respondents had 61.4% lower than their average income. Most of the sample did not receive the sex data after 90.9% had surgery. 41.7% of physicians received information from doctors and 41.7% of online books and books, as well as the sample group demanded information on sexual readiness. Knowledge of sex 100 percent sexual practice advice and avoidance statements. (Table 1).

**Table 1: Descriptive characteristics of the patients (n=132)**

|   | Mean $\pm$ SD or n (%) | Min - Max    |
|---|------------------------|--------------|
| Gender                                      |                        |              |
| Male  | 108(80)                |              |
| Female                                      | 24(20)                 |              |
| Age (years)                                 | $66 \pm 9.08$          | 42 - 89      |
| Education                                   |                        |              |
| Elementary school or lower                  | 45(34.1)               |              |
| High School                                 | 53(40.2)               |              |
| Bachelor's degree or higher                 | 34(25.8)               |              |
| Occupation                                  |                        |              |
| Unemployed                                  | 78(59.1)               |              |
| Still working                               | 52(40.9)               |              |
| Advice sexual information                   |                        |              |
| No  | 120(90.9)              |              |
| Yes   | 12(9.1)                |              |
| Doctor                                      | 5(41.7)                |              |
| Book or Online media                        | 5(41.7)                |              |
| Nurse                                       | 2(17.6)                |              |
| Patients need for sexual advice             | 111(84.1)              |              |
| Type of CABG                                |                        |              |
| CABG  | 102(78)                |              |
| CABG + Valve                                | 30(22)                 |              |
| Cardiopulmonary bypass Time (CPB) (minute)  | $143.2 \pm 63.3$       | 40 - 401     |
| Time Follow up (Months)                     | $37 \pm 33$            | 3 - 128      |
| Euro SCORE II (%)                           | $3.67 \pm 5.63$        | 0.6 - 36.6   |
| Body mass index ( $\text{kg}/\text{m}^2$ )  | $25.6 \pm 4.6$         | 16.1 - 40.4  |
| estimated glomerular filtration rate (eGFR) | $64.2 \pm 23.3$        | 4.01 - 115.7 |
| Current chronic diseases                    |                        |              |
| Hypertension                                | 125(94.7)              |              |
| Hyperlipidemia                              | 108(81.8)              |              |
| Diabetes mellitus                           | 83(62.9)               |              |
| Chronic kidney disease                      | 21(17.2)               |              |

|   |                |               |
|---|----------------|---------------|
| Metabolic syndrome                              | 102(77.3)      | 135 – 600     |
| Function capacity (6 Minute walk test) (Meters) | 408.63 ± 91.32 | 1.64 – 3.86   |
| Metabolic equivalent of task (METs)             | 2.95 ± 0.44    | 5 - 80        |
| Sexual knowledge                                | 41.17 ± 15.46  | 5 - 80        |
| Sexual communication                            | 52.36 ± 12.95  | 26.92 – 89.74 |
| Sexual response                                 | 39.25 ± 21.59  | 20 - 100      |
| Sexual quality of life                          | 44.94 ± 21.85  | 16.66 - 100   |

Data were analyzed using hierarchical multiple regression statistics with stepwise method. (Table 2,3).

**Model 1:** From the study of natural fundamentals changed according to the theory of the transition: age, sex, average monthly income Glomerular filtration rate Analyzed by Stepwise Regression, it was found that estimated glomerular filtration rate (eGFR) could predict the sexual quality of life. It was found that the eGFR of 4.3% was statistically significant,  $F_{(1,124)} = 5.583$ ,  $p < .05$

**Model 2:** Add the factors studied in the transitional conditions (personal) according to the transitional theory concept, In study is metabolic syndrome, function capacity (6 minutes walking distance) and sexual knowledge and eGFR can predict sexual quality of life. It was found that the sexual knowledge and eGFR of 6.5 % was statistically significant,  $F_{(2,123)} = 5.329$ ,  $p < .01$

**Model 3:** Add the factors studied in the social transition conditions (community) according to the transitional theory concept, In study is sexual response and sexual communication with your partner The participants made a prediction from analysis with Stepwise Regression that found that sexual response, sexual knowledge and eGFR of 19 % was statistically significant  $F_{(3,122)} = 9.656$ ,  $p < .001$

**Table 2: The predictor power of sexual quality of life by hierarchical multiple regression statistics with stepwise method. (n=126)**

| Factor  | R    | R <sup>2</sup> | F     | p-value | R <sup>2</sup> Change | F Change | Sig. F Change |
|---|------|----------------|-------|---------|-----------------------|----------|---------------|
| Model 1: Nature of Transition (Basic factor) <sup>1</sup>         | .208 | .043           | 5.583 | .020    | .043                  | 5.583    | .020          |
| Model 2: Transition condition (personal conditions) <sup>2</sup>  | .080 | .065           | 5.329 | .006    | .037                  | 4.900    | .029          |
| Model 3: Transition condition (community conditions) <sup>3</sup> | .436 | .190           | 9.565 | .000    | .111                  | 16.676   | .000          |

<sup>1</sup> Predictors: (Constant): Estimated Glomerular Filtration Rate (eGFR)

<sup>2</sup> Predictors: (Constant): Estimated Glomerular Filtration Rate (eGFR) and Sexual knowledge

<sup>3</sup> Predictors: (Constant): Estimated Glomerular Filtration Rate (eGFR), Sexual knowledge and Sexual response

**Table 3: The predictive factor of sexual quality of life by hierarchical multiple regression statistics with stepwise method. (n=126)**

| Factor                                      | B    | SEB  | β    | t-value | p-value |
|---|------|------|------|---------|---------|
| estimated Glomerular Filtration Rate (eGFR) | .079 | .073 | .093 | 1.088   | .279    |
| sexual knowledge                            | .219 | .105 | .174 | 2.080   | < .05   |
| sexual response                             | .352 | .086 | .342 | 4.084   | < .001  |



## DISCUSSION

This research aimed to investigate the sexual quality of life in Thai patients with over 3 months of CABG surgery including 81.8% male and 79.5% were elderly. The average age of male patients was 66 years old and graduated from high school and vocational education late 40.2 %, consistent with the quality of life study in patients after coronary bypass surgery found that most of the patients were male, aged. And education level below bachelor's degree. (Naknonehun, Prechaterasat, & Kittayarak, 2020; Pacaric et al., 2020) This study also found that 19% of the variance in the sexual quality of life including sexual knowledge and sexual response was explained by eGFR. These results confirm that sexuality is multidimensional and affected by a person's demographic characteristics, health status, and sexual knowledge and sexual response.

This study had a mean sexual quality of life score of  $44.94 \pm 21.85$  out of 100. The study also found that CABG surgery decreases the sexual quality of life and interest in sex. (Lai et al., 2011; Reese et al., 2012) In addition, sexual quality of life is a dynamic status and changes over time in different circumstances. Therefore, encourage nurses to be aware of and increase their comprehensive sexual competency skills to patients should involve an assessment of history including patients, sexual knowledge and sexual response.

According to the theory of the transition theory in after CABG, it was found that the nature of transition. In terms of basic factors, it was found that estimated Glomerular Filtration Rate (eGFR) was able to predict the variance of the sexual quality of life. Most of the samples had an estimated Glomerular Filtration Rate (eGFR) at 51.50% in stage 2 and 31.10%, in stage 3 consistent with other related studies. (Jitauraungkoon, Wanitkun, Danaidusadeekul, & Tocharoenchok, 2017; Suzuki et al., 2018) Glomerular Filtration Level can predict chronic nephrotic syndrome and the effect of erectile dysfunction, consistent with the study of patients with functional renal impairment. In addition, it has been found that the malfunction of Hypothalamic- pituitary-gonadal can cause the loss of secretion of sex hormones. In this case, the study found that 26-80 percent did not cause sexual arousal. Difficulty having an orgasm until erectile dysfunction. (Hess, Hicks, & Hough, 2017; Iglesias, Carrero, & Diez, 2012)

This study found that the sample group had a mean score of sexual knowledge  $41.17 \pm 15.46$  out of a full score of 100, and found that sexual knowledge was able to significantly predict the sexual quality of life ( $p < .05$ ). Most of the samples never received information about having sex after surgery intercourse. 90.9% In accordance with in a Thai study of heart surgery samples found that most of the participants were not educated on sex practices.(Thinpayup, Asdornwised, Ou-Yeong, & Ongcharit, 2015) and there was a need for sex advice 84.1, which corresponded to 83.87% of patients after cardiac catheterization. (Boonrueang & Ua-Kit, 2020)

Thailand has been entrenched with a closed culture and votive strong sense of sexual conservatism. Sexual in Thai society is not a matter of personal identity, yet a matter of tradition, extended family system and social image (Duangwises, 2020) and most of the patients were elderly. There is a need to know about sexuality but Thai culture have an effect on receiving information. The elderly patients think that talking about sex is inappropriate behavior. (Jaroenjtitkul, 2011)

This study found that only 17.1% of nurses advice sexual education to their patients consistent with the study of sexual knowledge in patients after surgery. The study also found that nurses have the sexual advice of 14 % (Heydarpour, Ezzati, Soroush, Saeidi, & Komasi, 2019)because sex issue in Thailand is a specific matter so nurses must have sexual comprehensive education before talking to patients. There is no personal space to educate patients about sex and therefore were unable to talk about. (Abreu et al., 2018; Gok & Demir Korkmaz, 2018). As a result, the patient had a low level of sexual knowledge. This study found that the sample group had a sexual response score of  $39.25 \pm$

20.59 score a full score of 100, and found that sexual response was able to significantly predict the sexual quality of life ( $p < .001$ ) consistent with the patient study of coronary bypass surgery. It was found that the frequency of sexual activity after surgery was significantly decreased and the sexual response was significantly decreased. (Lai et al., 2011)

As showed in the study of male sexual dysfunction after of surgery with significant sexual function (Dehestani et al., 2019), it was found that coronary bypass surgery had a significant effect on the cardiovascular sexual response. According to CABG surgery, sex hormone levels decreased, luteinizing hormone, Follicle Stimulating Hormone (FSH), Prolactin, Testosterone, Dehydroepiandrosterone (DHEA) and Estrogen, Finally, sex hormones can affect sexual function. (Forouzannia, Abdollahi, Hekmatimoghaddam, & Sayegh, 2012)

In accordance with a comparative study of patients before and after CABG surgery, the studies showed significant impairment of sexual function, including erectile dysfunction, work of the climax, sexual desire, sexual satisfaction and marital satisfaction decreased. (Mourad et al., 2017; Pourebrahimi et al., 2020) In other words, when nurses evaluate the sexual response of the patient, they will know patient's problems.

## CONCLUSION

This study showed that patients did not have sufficient information about sexual quality after coronary artery bypass grafting surgery so the patients had sexual problems including decreasing in sexual knowledge and sexual response after having surgery. Therefore, this research encourages nurses to be aware of and have their comprehensive of sexual competency skills. When the transition occurs among patients after coronary artery bypass grafting surgery, patient has a good sexual quality of life. Taking into account the sexual response, the patients realized in assessing glomerular filtration rate, promoted sex education and counseling. In addition, nurses will have knowledge and understand about appropriate sexual activity for the patients as they provide patients to have better sexual quality of life.

## Implications for practice

1. A wide range of patient life span and patients reported insufficient sexual knowledge about sexual life.
2. Should be studied in post CABG patients having gender-specific, The perspective of the partner, the view of the healthcare professional and comparative study of different stages.
3. Nurses should assess factors affecting the sexual quality of life in patients with heart disease.

## Declaration of Conflicting Interest

The author(s) report no conflicts of interest in this work

## Acknowledgment

The research team would like to thank the patients for their contribution to this study. The researcher would like to express sincere gratitude to the thesis advisors, the thesis examination committee, and all experts for their valuable suggestions, most importantly, the research team would like to thank the patients for their cooperation and support in this study.

## Funding

This project was partially funded by Bangkok Metropolitan Administration General Hospital, Bangkok, Thailand.

## References

- 1) Abraham, L., Symonds, T., & Morris, M. F. (2008). Psychometric validation of a sexual quality of life questionnaire for use in men with premature ejaculation or erectile dysfunction. *J Sex Med*, 5(3), 595-601. doi:10.1111/j.1743-6109.2007.00749.x
- 2) Abreu, A., Mendes, M., Dorés, H., Silveira, C., Fontes, P., Teixeira, M., . . . Morais, J. (2018). Mandatory criteria for cardiac rehabilitation programs: 2018 guidelines from the Portuguese Society of Cardiology. *Revista Portuguesa de Cardiologia (English Edition)*, 37(5), 363-373. doi:10.1016/j.repce.2018.02.017
- 3) American Thoracic Society. (2002). ATS Statement: Guidelines for the Six-Minute Walk Test. *American Journal Of Respiratory And Critical Care Medicine* 166, 111-117. doi:10.1164/rccm.166/1/111
- 4) Boonrueang, P., & Ua-Kit, N. (2020). Selected Factors Associated with Sexual Function among Patients with Myocardial Infarction after Percutaneous Transluminal Coronary Intervention. *Royal Thai Navy Medical Journal*, 47(1), 140-157. (in Thai).
- 5) Borson, S., Scanlan, J., Brush, M., Vitalian, P., & Dokmak, A. (2000). The MINI-COG: A Cognitive 'Vital signs' Measure for Asure for Dementia Screening in Multi-Lingual Elderly. *International Journal of Geriatric Psychiatry*, 15, 1021-1027.
- 6) Catania, J. A. (1998). *Dyadic sexual Communication Scale* (Vol. 1). India: International Educational and Professional.
- 7) Dávolos, I., Naya, E. G., & Marcilla, M. M. (2020). Sexual Activity After Myocardial Revascularization Surgery. *Current Problems in Cardiology*. doi:10.1016/j.cpcardi.2020.100660
- 8) Dehestani, G., Moeinipour, A., Mizani, K., Akbari, M., Fattahi, S. P., Moallemi, M., & Hoseinikhah, H. (2019). Comparison of Sexual Dysfunction Before and After CABG by International Index of Erectile Dysfunction Questionnaire. *Iranian Heart Journal*, 20(3), 47-51.
- 9) Duangwises, N. (2020). Romantic Love in the Building of the Thai Nation State during the 1930s. *Journal of Anthropoligy*, 3(2), 115-151.
- 10) Forouzannia, S. K., Abdollahi, M. H., Hekmatimoghaddam, S., & Sayegh, S. A. H. (2012). Sex hormone levels and sexual dysfunction in men after coronary artery bypass graft. *Iranian Journal of Reproductive Medicine* 10(5), 425-428.
- 11) Fox, N., Hunn, A., & Mathers, N. (2009). Sampling and Sample Size Calculation. In *The NIHR Research Design Service for Yorkshire & the Humber* (pp. 1-41).
- 12) Gok, F., & Demir Korkmaz, F. (2018). Sexual Counseling Provided by Cardiovascular Nurses: Attitudes, Beliefs, Perceived Barriers, and Proposed Solutions. *Journal of Cardiovascular Nursing*, 33(6), E24-E30. doi:10.1097/JCN.0000000000000535
- 13) Greenberg, J. M., Smith, K. P., Kim, T. Y., Naghdechi, L., & IsHak, W. W. (2017). *Sex and Quality of Life*. In W. W. IsHak (Ed.), *The Textbook of Clinical Sexual Medicine* (pp. 539-572). doi:10.1007/978-3-319-52539-6\_34
- 14) Hess, M., Hicks, T. A., & Hough, S. (2017). Sex and Chronic Physical Illness. In *The Textbook of Clinical Sexual Medicine* (pp. 479-506).



- 15) Heydarpour, B., Ezzati, P., Soroush, A., Saeidi, M., & Komasi, S. (2019). Comparison of Sexual Knowledge between Patients Prepared for Cardiac Surgery and Patients Prepared for Cardiac Rehabilitation in Iran *The Journal of Tehran University Heart Center* 14(3), 103-108.
- 16) Hudec, S., Spacek, M., Hutyra, M., Moravec, O., & Taborsky, M. (2018). Sexual activity and cardiovascular disease, erectile dysfunction as a predictor of ischemic heart disease. *Cor et Vasa*, 60(3), e296-e305. doi:10.1016/j.crvasa.2017.08.006
- 17) Iglesias, P., Carrero, J. J., & Diez, J. J. (2012). Gonadal dysfunction in men with chronic kidney disease: clinical features, prognostic implications and therapeutic options. *J Nephrol*, 25(1), 31-42. doi:10.5301/JN.2011.8481
- 18) Jaroenjitkul, C. (2011). Sexuality in Older Adults. *HCU Journal*, 15(29), 97-112. (in Thai).
- 19) Jitauraungkoon, P., Wanitkun, N., Danaidusadeekul, S., & Tocharoenchok, T. (2017). Predictors of Quality of Life during 6-18 Weeks among Patients with Post Coronary Artery Bypass Graft. *Journal of Nursing Science*, 35(3), 106-119.
- 20) Jones, P. S., Lee, J. W., Phillips, L. R., Zhang, X. E., & Jaceldo, K. B. (2001). An Adaptation of Brislin's Translation Model for Cross-cultural Research. *Nursing Research* 50(5), 300-304.
- 21) Lai, Y. H., Hsieh, S. R., Ho, W. C., & Chiou, A. F. (2011). Factors associated with sexual quality of life in patients before and after coronary artery bypass grafting surgery. *Journal of Cardiovascular Nursing*, 26(6), 487-496. doi:10.1097/JCN.0b013e3182050269
- 22) Lanzarone, E., Gelmini, F., Fumero, A., Carini, M., Costantino, M. L., Fumero, R., & Alfieri, O. (2010). Preservation of endothelium nitric oxide release during beating heart surgery with respect to continuous flow cardiopulmonary bypass. *Perfusion*, 25(2), 57-64. Doi:10.1177/0267659110364442
- 23) Meleis, A. I., Sawyer, L. M., Im, E.-O., Messias, D. K. H., & Schumacher, K. (2010). Transitions Theory. In A. I. Meleis (Ed.), *Transitions Theory Middle-Range And Situation-Specific Theories In Nursing Research And Practice* (pp. 52).
- 24) Mourad, F., Ghanam, M. E., Mostafa, A. E., Sabry, W., & Bastawy, M. (2017). Sexual dysfunction before and after coronary artery bypass graft surgery in males. *Journal of the Egyptian Society of Cardio-Thoracic Surgery*, 25(1), 45-51. doi:10.1016/j.jescts.2017.03.001
- 25) Naknonehun, P., Prechaterasat, A., & Kittayarak, C. (2020). Risk Factors for Postoperative Cognitive Dysfunction after Coronary Artery Bypass Grafting in Older Adults. *Nursing Journal of the Ministry of Public Health*, 30(2), 72-82.
- 26) Nobre, P. J., & Pinto-Gouveia, J. (2003). Sexual modes questionnaire: measure to assess the interaction among cognitions, emotions, and sexual response. *J Sex Res*, 40(4), 368-382. doi:10.1080/00224490209552203
- 27) Pacaric, S., Turk, T., Eric, I., Orkic, Z., Petek Eric, A., Milostic-Srb, A., . . . Nemcic, A. (2020). Assessment of the Quality of Life in Patients before and after Coronary Artery Bypass Grafting (CABG): A Prospective Study. *Int J Environ Res Public Health*, 17(4). doi:10.3390/ijerph17041417
- 28) Pourebrahimi, M., Fallahi-Khoshknab, M., Taghipour, H., Ebadi, A., Gholizadeh, L., & Hosseini, M. (2020). Sexual Dysfunction Status in Iranian Cardiovascular Patients: A Systematic Review. *International Journal of Cardiovascular Research*, 14(4), 119-127.

- 29) Reese, J. B., Shelby, R. A., & Taylor, K. L. (2012). Sexual quality of life in patients undergoing coronary artery bypass graft surgery. *Psychology and Health* 27(6), 736. Doi:10.1080/08870446.2011.623781
- 30) Steinke, E. E., Jaarsma, T., Barnason, S. A., Byrne, M., Doherty, S., Dougherty, C. M., . . . Allied, P. (2013). Sexual counselling for individuals with cardiovascular disease and their partners: a consensus document from the American Heart Association and the ESC Council on Cardiovascular Nursing and Allied Professions (CCNAP). *Eur Heart J*, 34(41), 3217-3235. doi:10.1093/eurheartj/eh270
- 31) Suzuki, Y., Ito, K., Yamamoto, K., Fukui, N., Yanagi, H., Kitagaki, K., . . . Goto, Y. (2018). Predictors of improvements in exercise capacity during cardiac rehabilitation in the recovery phase after coronary artery bypass graft surgery versus acute myocardial infarction. *Heart Vessels*, 33(4), 358-366. doi:10.1007/s00380-017-1076-2
- 32) Symonds, T., Boolell, M., & Quirk, F. (2005). Development of a questionnaire on sexual quality of life in women. *J Sex Marital Ther*, 31(5), 385-397. doi:10.1080/00926230591006502
- 33) Thinpayup, N., Asdornwised, U., Ou-Yeong, A. P., & Ongcharit, P. (2015). Factors related to Sexual Function in Patients with Valvular Replacement Surgery. *Journal of Nursing Scienc*, 33(1), 14-23. (in Thai).
- 34) Trongsakul, S., Lambert, R., Clark, A., Wongpakaran, N., & Cross, J. (2015). Development of the Thai version of Mini-Cog, a brief cognitive screening test. *Geriatr Gerontol Int*, 15(5), 594-600. doi:10.1111/ggi.12318
- 35) Zimmet, P., Alberti, K. G. M. M., & Serrano Ríos, M. (2005). A New International Diabetes Federation (IDF) Worldwide Definition of the Metabolic Syndrome: the Rationale and the Results. *Revista Española de Cardiología (English Edition)*, 58(12), 1371-1375. doi:10.1016/s1885-5857(06)60742-1