Comparing Nursing Interventions Delivered With Risk Factors Of Patients With Coronary Artery Disease? A Retrospective Study Within Teaching Hospital In China.

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Abstract: Background: *Coronary artery disease remains the leading cause of morbidity and mortality Worldwide. Previous reviews pointed that nursing interventions are beneficial for coronary artery patients. However, most interventions focused on education and counselling, but not consistent with the outcome set; still did not consider patient's coronary artery disease risky characteristics. Related studies in China also difficult to find. Therefore this study was conducted to investigate kinds of nursing interventions delivered to coronary artery patients and match them with patient's risk factors of coronary artery disease. Results of this study were expected to add new knowledge that will alert nurses to consider coronary artery risk factors which in turn might enable the development of appropriate approaches to improve patient's wellbeing hence reduce frequent coronary artery morbidity and mortality.*

Methods: *A descriptive, cross-sectional, retrospective design using clinical case notes was employed. Study was undertaken in coronary care wards at the teaching hospital in China from November 2017 to September 2018. Structured-literature supported self-designed questionnaire was utilized for data collection. Chi square (χ^2) test and multivariate logistic regression for adjusted odds ratio with 95% confidence interval were used to compare the relationship among independent (patient's risk coronary artery disease factors) and dependent (nursing interventions) categorical variables. Ethical permission was granted accordingly.*

Results: *A total of 300 coronary artery patients' case notes were audited with mean age 63±11.2 years. Of these 175 (58.3%) were males. 126(42%) were smoking and 224(74.7%) were hypertensive. More evidence based nursing interventions than education and counselling were found to be delivered to these patients. "Administer coronary artery disease medication and their instructions" was mostly delivered to many patients 291(97%) while "counsel to cope with stress" was the least one 60 (20.0%). Three of eight nursing interventions delivered significantly matched with three or all of these patient's coronary artery risk variables (age, smoking, hypertension and diabetes) (p < 0.05 and/or < 0.01) with Adjusted odds ratio (95% CI) within their significant ranges.*

Conclusion: *This study delivers valuable insight that, nurses in the studied teaching hospital delivered beneficial evidence based nursing interventions to patients with coronary artery disease which significantly matched with their risk factors of coronary artery illness. However, care for stress was low hence needs improvement. Furthermore, research is needed to get consistency of nursing interventions with patient's end point clinical outcomes for further appraisal of nursing efforts in caring CAD patients*
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Key words: Cardiovascular disease, coronary artery disease, risk factors, heart healthy life style, cardiac rehabilitation, cardiovascular nursing care, teaching hospital, China.

1. INTRODUCTION

Coronary artery disease (CAD) remains the leading cause of morbidity and mortality worldwide [1]. CAD also causes about one-third of all deaths in people older than 35 years in western countries while mortality from it is expected to increase in developing countries [2]. It also contributes to emergencies of hospital admissions [3], [4]. In China the absolute number of CVD deaths raised by 46% from 1990 to 2013, with ischemic heart disease such as CAD increasing by 90.9%. The risk of CAD among Chinese is emerging as a result of lifestyle changes, urbanization, and the accelerated process of aging [5].

1.1. Brief description of coronary artery disease

Coronary artery disease (CAD) arises from blocked/logged coronary artery by deposits of cholesterol, calcium, and abnormal cells (Rouleau *et al.*, 2017; Singh *et al.*, 2017. Acute coronary syndrome (ACS) is a group of clinical syndromes caused by rupture of coronary atherosclerotic plaques and secondary thrombosis [6]. An acute coronary event which is characterized by sign/symptoms such as chest and upper body/arm pain, diaphoresis, nausea, pressure and subsequent electrocardiographic and enzymatic changes, is often the first clinical manifestation [7]. It is a manifestation of the long and latent process of atherosclerosis that progressively and asymptomatically begins early in life [8]. Chest pain or discomfort is regarded as the hallmark symptom of ACS, while its absence is regarded as "atypical" presentation. In this condition the majority of men with ACS experience chest pain as the primary symptom, than women who apart from chest pain often may have upper back, neck, or jaw pain, nausea or fatigue [9]. Apart from genetic factors many environmental factors have been reported to play an important role in the development of CAD, such as tobacco usage, higher body mass index (BMI), dyslipidemia, hypertension, and diabetes mellitus [10], [11].

Over the past 2 decades, there has been improved care of cardiac patients through pharmacology, modification of cardiac risk factors, education and application of surgical approaches [12]. The goal of secondary prevention during the acute presentation is to interrupt the thrombotic process so as to restore blood flow for improving myocardial tissue perfusion. Depending on the percentage of coronary artery involved and the nature of blockage the modern advanced treatment includes percutaneous intervention (PCIs) (coronary stents and balloon angioplasty), coronary artery bypass graft (CABG), and pharmacological therapy [13], [14].

Patients have also benefited more from attending in cardiac rehabilitation programs in terms of costs per year life saved with other well-established preventive and therapeutic interventions in the treatment of CAD such as cholesterol-lowering medication, thrombolysis, coronary angioplasty, surgery or device implantation [15]. However, there was a doubt of whether providers adhered to instructions and therapy for CAD patients [12]. If not given information patients may lack understanding of their illnesses to their level of health literacy, which would also reduce adherence to medications**.**

1.2. The role of a nurse in caring CAD patients

Among efforts underway to search for innovations to strengthen the workforce, the major interests falls on having nurses in advanced practice due to an increasing demand for better chronic disease management and improved health care efficiency for patient at a great extent [16]. The nurse's caring role as a counselor and educator during CAD acute event has been found critical for helping patients understand complex therapies involved in treating ACS and develop a plan that fosters medication adherence so as to ensure safety and improved outcomes [14]. It was further added that nurse's objectives for discharge of CAD patient include preparation of a patient to return to usual activities. Those activities involve stress the importance of lifestyle and risk factor modification for CVD and risk reduction like weight management, nutrition, smoking cessation, diet and physical activity are equally important in ensuring reduced morbidity and mortality from CAD [17].

For more than 4 decades, nurses have taken on key roles in managing single and multiple risk factors for CAD, including hypertension, diabetes, smoking and lipids. Management of these squeal of chronic conditions, such as CAD and heart failure, has been done through specialized clinics and programs in primary care, worksites, and cardiac rehabilitation [18], [19]. Regardless the fact that most previous reviews of randomized trials of nursing interventions for CAD patients found heterogeneity and inconsistency of findings with the outcome set; but they revealed that, NIs have beneficial impact on the wellbeing of CAD patients [20], [21]. However, most NIs were for medication, education and counselling while most trials were for home based, outpatient settings or through telephone. No enough evidence on the implementation of the evidences to hospitalized CAD patients. The existing body of knowledge is also deficit of findings on how nursing interventions delivered are consistent with CAD patient's risk characteristics. China is also deficit of such studies. We therefore conducted a clinical setting research by tracing clinical records to collect kinds of NIs delivered to CAD patients and weigh out their consistence with regard to patients' demographic and clinical risks factors for CAD in one of the teaching hospitals in China. Results of this study were expected to alert nurses to consider CAD risk factors when caring CAD patients. Current findings will also provide clear understanding of nursing caring efforts in improving CAD patient's wellbeing for the reduction of morbidity and mortality from CAD sequel.

2. METHODS

2.1. Study design

This research was descriptive, cross-sectional, clinical records based retrospective design which was conducted from 10th November 2017 till the required sample was achieved by 18th September 2018.

2.2. Setting

Study was conducted in CAD wards in one of the teaching hospitals in China. Although University has three International teaching hospitals but the studied hospital had been of interest because it is highly specialized in offering more advanced cardiovascular (CVD) services and surgeries in its region. According to its records this hospital has been successfully performing a total of 3000 CVD surgeries and 100 heart transplants annually. It also serves other parts of the world apart from China. During our clinical survey we realized that nurses work in two shifts and at least each nurse can take care of 9 to 12 patients daily. Also nurses in those units have accomplished specialized training for caring CVD patients.

2.3. Participants and sampling

The study targeted hospital registry of discharged cardiovascular (CVD) patients who were having CAD diagnosis within the specified period of time above. Convenient sampling of CVD patient case note was used if it met the following criteria: (1) had CAD diagnosis (2) had age and sex demographic information (3) Had at least one nursing intervention documented in the file. Exception was due to lack of these criteria. Therefore, all available CAD case notes which were eligible during the specified period of data collection were perused until the required sample size was achieved.

2.4. Sample size

A single population proportion formula was used to calculate the sample size [22] as follows;

$$n = \frac{z^2 \, \alpha/2^{p \, (1-p)}}{d^2}$$

Where:

n = minimum sample size required for the study.

z = score for 95% confidence interval (z = 1.96).

p = Prevalence of stable CAD in previous studies taken as 22.8% [23].

d = Tolerable error (d = 5%).

$$n_0 = \frac{(1.96)^2 \, 0.23 \, (1\text{-}0.23)}{(0.05)^2}$$

$$n_0 = \frac{0.6803}{0.0025} = 272.12$$

$$n_0 = 272.12 + (10\%)$$

$$n_0 = 272.12 + 27.21 = 299.33$$

Therefore a sample size of 299.33 was obtained. However, authors thought a sample size of 300 was possible and precise for the strength of a single hospital setting retrospective survey.

2.5. Data collection tool and quality control

Data was collected by using structured researcher-administered questionnaire. Researchers designed the study questionnaire by utilizing some categorical variables from previous related studies. "Any other (Please specify)" option was purposively utilized in the data collection tool to capture other information apart from those listed by the researchers in the questionnaire. Finally the self-designed questionnaire was divided into three (3) parts (A,B and C): Part A: Composed of patient's demographic and clinical risk variables for CAD such as age, sex, hyperlipidemia, diabetes mellitus, hypertension, smoking, and family history for CAD; basing on [24]–[26] studies. Part B: Had information on CAD cardinal signs like cardiac chest pain, back pain and shoulder pain as reported as common in CAD patients basing sex differences [9]. Part C: Composed of nursing interventions for CAD patients; such as education and counselling according to systematic review by [20]. Nurses roles of administration of CAD medication and their instructions, promotion on diet, lifestyle and risk modification, self-care and cardiac rehabilitation were proposed in [27]–[29] studies. Nursing roles like assessment for grading pain level and identifying activities that precipitate pain were described in [30] study.

Note that clinical symptoms, CAD risky comorbidities and NIs variables were dichotomized and given "Yes" or "No" options for each. During data collection these variables were recorded once if found in patient's file without repetitions to avoid some biases of data collection among researchers due to human forgetting errors or lack of such repeated information in files. Additionally, all NIs found in the records were regarded delivered to patients. Missing of such information was regarded not delivered to patients. This grouping was just for the convenience of data entry and analysis without any other judgmental meanings. Furthermore, data collection orientation was done to all researchers to emphasize uniformity of data collection. Coding of data was done before data collection and cross-checked for consistency and completeness every day.

2.6. Validity and reliability of the tool

Self-designed English version questionnaire was translated to fit the local language needs. As part of quality control, the completed tool was reviewed by the panel of nursing research experts for face and content validity and approval to be used for data collection in that region. Additionally, a pretest of 15 (5%) questionnaires from files of before 10th November 2017 was conducted. Analysis of pretest results guided appropriate modifications of the tool before the actual data collection for the major study.

2.7. Statistical analysis

Data was entered, cleaned, proofread, coded and analyzed using the Statistical Package for Social Sciences software (SPSS) version 23. Frequency tables were displayed to present the summery of categorical variables while for continuous variables, means, standard deviations (SD) and ranges were used to summarize the information. Univariate analysis through Chi square test (x^2) was used for comparing the delivery of NIs (dependent variables) due to independent variables (Patient's demographic and clinical CAD risky characteristics). Multivariate logistic regression model was used for adjusting confounding variables like patient's chest, back and abdominal pain symptoms. During analysis all variables were treated as categorical except for the computation of means and SD for age variables. P-value in a downward direction from 0.05 and adjusted odds ratios (AOR) with 95% confidence within its ranges interval (CI) were stated as significant findings.

2.8. Ethical considerations

Permission to conduct this study was granted by the research ethical committee of Huazhong University of Science and Technology (HUST), China. However, this research didn't require physical contact with the participant as it used patient's hospital records. Furthermore researchers handled CAD patient's clinical information with very high confidentiality. Authors also used unique identifiers for eligible CAD case files so as to increase privacy of patients' documents.

3. RESULTS

3.1. Demographics and clinical characteristics of patients

A total of 300 CAD patients' case notes were audited. Their age ranged from 33-99 years with mean and standard deviation (SD) of 63±11.2 years. Table 1 below shows demographic characteristics which are among CAD risk factors. Almost one third 95(31.7%) fell under the age group of 60-69 years and more than half were males 175(58.3%). Aging and sex are both unmodifiable CAD risk factors. However, younger ones also look affected with CAD where by 41.3% were below 60 years. Cigarette smoking as modifiable CAD risk factor appeared to nearly half 126(42.0%) which indicates that most of them had been active smokers (Table 1).

Table 1: CAD risky demographic characteristics of patients

Variables		N (%)
Sex	Male	175(58.3)
	Female	12(41.7)
Age	30-59	124(41.3)
	60-89	173(57.7)
	90+	3(1.0)
Cigarette smoking	Yes	126(42.0)
	No	174(58.0)
CAD family history	Yes	107(35.7)
	No	193(64.3)

CAD: Coronary artery
disease

Table 2 below shows clinical characteristics in terms of risky comorbidities and cardinal signs and symptoms of CAD. More than half 191(63.7%) of patients presented with cardiac chest pain. Cardiac chest pain is a major chief complaint and cardinal sign of CAD. Additionally, hypertension as co morbidity and the major risk diseases of the circulatory system in CAD co-existed in almost three quarter of patients 224(74.7%) followed by diabetes mellitus 75(25.0%) (Table 2).

Table 2: CAD risky comorbidities and pain symptoms of patients

Variables		Found	Not found
		N (%)	N (%)
Signs/symptoms	Cardiac chest pain	191(63.7)	109(36.3)
	Back pain	48(16.0)	252(84.0)
	Abdominal pain	33(11.0)	267(89.0)
Comorbidities	Hypertension	224(74.7)	76(25.3)
	Diabetes mellitus	75(25.0)	225(75.0)
	Hyperlipidemia	46(15.3)	254(84.7)

3.2. Nursing interventions delivered to patients

Table 3 below lists kind of NIs delivered to CAD patients. Note that during data collection authors did not consider how repeatedly one NI was documented to each patient due to insufficient information of such clinical records. Therefore authors picked single recording of NI from each patient case note. Finally, a total of 8 kinds of NI were identified. Of these "Administer CAD medication and their instructions" was mostly delivered to many patients 291(97%) while "counsel to cope with stress" was the least one 60(20.0%) (Table 3).

3.3. Statistical test results

3.3.1. Comparing NIs delivered for coronary patient's risk factors for CAD

Table 4 below is for univariate analysis results through chi-square test (χ^2) for comparing NIs delivered as dependent variable with patient's CAD risks factors as independent variables. Most NIs gave statistical significant relationship results with CAD risk factors of patients. Therefore there is statistical evidence that they were delivered due to one or more CAD risk factors of patients ($p < 0.05$ and/or < 0.001). The delivery of two NIs like "Administer CAD medication and their instructions" and "Offer human caring (reassurance, self-care, family counseling)" was significantly related to all risk variables ($p < 0.05 < 0.01$). Therefore there is evidence that delivery of NIs have been considering patient's CAD risk characteristics (Table 4).

Table 3: Nursing interventions delivered as found documented in the patient's records

	Nursing interventions	Found N (%)	Not found N (%)
1.	Assess to grade pain severity on 1-10 scale	206(68.7)	94(31.3)
2.	Identify pain precipitating activities	210(70.0)	90(30)
3.	Administer CAD medication and their instructions	291(97.0)	9(3.0)
4.	Educate on cardiac rehabilitation skills	285(95.0)	15(5.0)
5.	Counsel on diet and life style modification	289(96.3)	11(3.7)
6.	Offer human caring (reassurance, self-care, family counseling)	284(94.7)	16(5.3)
7.	Monitor vital signs (like BP, BG, ECG, hemodynamics, ABG and lipids)	235(78.3)	65(21.7)
8.	Counsel to cope with stress	60(20.0)	240(80.0)

Note. **ABG: Arterial blood gas; BP: Blood pressure; BG: Blood glucose; CAD: Coronary artery disease; ECG: Electrocardiogram.**

Table 5 below, shows multivariate logistic regression model for adjusting confounding variables like pain symptoms and patients risk variables for the comparison of NIs delivered with patients CAD risks factors. Results show strong evidence that delivery of three (3) NIs significantly

matched with either age and or smoking, hypertension and diabetes CAD risky variables (p < 0.01; AOR (95% CI) (Table 5). And that patients with diabetes were five (5) times more likely to influence the delivery of "administer CAD medication and their instructions" than the rest (p < 0.01; AOR (95% CI) 5.02(2.080-7.647) (Table 5). This gives strong evidence that delivery of some NIs was consistently relevant with some risk factors of CAD patients.

Table 4: χ^2 test for comparing delivered NIs with patient's CAD risk factors

Nursing interventions	N (%)	Age	Sex	Smoking	CAD-Family	HT	DM	HL
Assess to grade pain severity on 1-10 scale	206(68.7)	0.02	0.11	0.02	0.62	0.01*	0.06	0.05
Identify pain precipitating activities	210(70.0)	0.02	0.37	0.02	0.62	0.15	0.01*	0.024
Administer CAD medication and their instructions	291(97.0)	0.01**	0.04	0.03	0.01	0.04	0.02	0.04
Educate on cardiac rehabilitation skills	285(95.0)	0.02	0.78	0.03	0.08	0.01*	0.01*	0.07
Counsel on diet and life style modification	289(96.3)	0.34	0.42	0.03	0.65	0.01*	0.01**	
Offer human caring (reassurance, self-care, family counseling)	284(94.7)	0.03	0.01*	0.01*	0.02	0.01**	0.001*	0.03
Monitor vital signs (like BP, BG, ECG, hemodynamics, ABG and lipids)	235(78.3)	0.08	0.32	0.04	0.90	0.04	0.16	0.71
Counsel to cope with stress	60(20.0)	0.47	0.10	0.62	0.88	0.32	0.01	0.63

Note. **ABG: Arterial blood gas; BP: Blood pressure; BG: Blood glucose; CAD: Coronary artery disease; ECG: Electrocardiogram; HT: Hypertension; DM: Diabetes Mellitus; HL; Hyperlipidemia; NIs: Nursing interventions; *p < 0.05; **p < 0.01.**

Table 5: Multivariate logistic regression analysis for adjusting the comparison of NIs delivered with patient's CAD risk factors

Nursing interventions	Age	Smoking	Hypertension	Diabetes mellitus
	AOR(95% CI)	AOR(95% CI)	AOR(95% CI)	AOR(95% CI)
Administer CAD medication and their instructions	2.603(2.208-3.003)*	1.009(1.802-4.006)*	1.202(1.107-3.824)*	5.02(2.080-7.647)**
Educate on cardiac rehabilitation skills	0.008(1.048-2.383)	0.206(0.112-2.134)*	1.439(1.206-4.128)*	0.808(0.508-2.096)**
Counsel on diet and life style modification	0.095(2.024-5.371)	1.835(1.062-5.901)*	1.429(1.001-1.703)**	1.095(2.024-5.371)*

CAD: Coronary artery disease; AOR: Adjusted odds ratio; CI: Confidence interval; NIs: Nursing interventions; *p < 0.05; **p < 0.01

4. DISCUSSION

The current study has found more promising evidence based and beneficial nursing interventions (NIs) to be delivered for hospitalized patients with coronary artery disease (CAD). These interventions outweighs 65% of secondary NIs for CAD patients found in other studies which were all for educational and behavioral counseling. Still in their findings more than half of the interventions were not significant and not consistent to the intended outcome measures as well [20]. On the contrary, NIs gathered in the current study were found relevant and significantly consistent with traditionally known CAD risk factors of patients [31]. In this study, the nursing CAD medication administration role paralleled with their instructions, promotion of heart healthy diet, life style modification and education on cardiac rehabilitation have

shown strong evidence that they were delivered with consideration of patient's CAD risky status. These interventions have been confirmed beneficial for CAD patient's wellbeing [27]. This indicates that of recently there have been extra efforts in cardiovascular nursing to meet needs of hospitalized CAD patients. Perhaps this is contributed by on job trainings of nurses on specialty care as well as advancement and emerging of various nursing specialties such as cardiovascular nursing that allows more focus on patient's risk factors for reducing CAD morbidity and adverse outcomes.

Concurrently, studies stressing on the significance of nursing medication administration role for CAD patients revealed that, a caring cardiovascular nurse has major role to play following anticoagulants medications so as to promote health

and reduce death and disability from acute coronary syndrome [32]–[34]. Furthermore, authors insisted nurses should actually be thoroughly familiar with the guidelines for treatment of these high risk vulnerable patients and should explore ways of educating patients about the importance of adherence to the prescribed medical therapies[32], [35]–[38]. Other studies revealed that chronic management of CVD will be achieved only if patients understand and follow prescribed treatment regimens [36], [39]–[41].

On the other hand, the current study is confident to reveal that the provision of NIs like education on cardiac rehabilitation skills and counselling on diet and life style modification was consistent with patient's modifiable CAD risk factors like smoking and comorbid conditions like hypertension and diabetes. We think this is an impressive observation that, nurses considered delivery of such intervention when caring for such patients. Our findings are supported by the evidence where by such interventions have been delivered because they are beneficial for cardiac stability and minimizing of frequent CAD attacks [42]. Education regarding lifestyle factors has been found as an essential part of the discharge process [14], [43]. Several studies on cardiac rehabilitation for CAD patients suggested that, it is imperative that patients receive proper medical management of coronary risk factors and support for the adoption of a healthy lifestyle [44], [45]. Furthermore, patients deserve special attention to restore their quality of life, to maintain or improve functional capacity following interventions of an acute events [15]. Therefore in achieving that they require counselling to prevent event recurrence, by adhesion to a medication plan and adoption of a healthy lifestyle [15].Interventions like "education on diet and life style modification" have been used in promoting heart health behaviors. Similar heart health promotion behaviors have been associated in cardiac rehabilitation programs (CRP) in reducing risk of coronary events and coronary death [44]–[46]. Life styles like excessive salt intake directly and indirectly influences the phenotypically expression of hypertension, worsening its consequences and influencing responses to medication therapy [46]. Cardiac rehabilitation programs (CRP) improve risk factors, medication adherence to secondary preventive therapies, exercise capacity, and survival after percutaneous coronary interventions (PCI) and coronary artery bypass graphting (CABG) surgery [29], [47]. By considering the importance of medication administration and their proper instruction in improving CAD patient's wellbeing, we give credits to all nurses who took care of studied patients for their great job basing on our findings. However, "Help the patient to cope with stress" we disregard as it has been delivered to the lowest due to its critical importance for CAD patients. Our worry is supported by the fact that Psychological factors such as depression and stress have been listed as among the underlying risk factors for CAD [48]. Individuals who adjust CAD risk factors in a constructive direction can lower the risk for CAD [49].

Regardless the fact that nurses can face time constrain and inadequate staffing still nursing practices can be developed with technology that improves the physical environment to provide CAD patients with the opportunity to feel better about themselves [50]. With the support of the evidence authors recommend that stress is necessary to be assessed and managed as it may trigger CAD attack hence hinder patient's wellbeing as well.

4.1. Limitation of the study

Our study might have limited generalizability due to the use of single center and convenient sampling approach of patient's case notes hence could be appropriate for the population attending in the studied teaching hospital. Although, large data set used increases the power of the study and minimizes the single-center limitation. However interpretation of our findings should be done with precaution as this was a study from a highly specialized teaching hospital and among best ones in providing cardiovascular services in China.

On the other hand this study has also faced scarce evidence on similar kind of study. Hence further research is urgently needed on related subject through, for example, a multicenter study employing either similar or different methods may help in elucidating this relationship and possible beneficial impacts for CAD patients. Furthermore, evaluation of patient's knowledge and experiences following reception of educational and counselling components on cardiac rehabilitation and related ill health behaviors is crucial. Nurses can also explore their experiences of caring CAD patients for further improvement of care and patients well-being. Lastly, research is needed to get consistence of nursing interventions impact with patient's clinical end point outcomes such as mortality/recovery rate, length of stay and satisfaction of nursing caring behaviors for further appraisal of nursing efforts in caring CAD patients.

CONCLUSION

This study delivers valuable insight that, nurses in the studied teaching hospital delivered beneficial evidence based nursing interventions to patients with coronary artery disease which significantly matched with their risk factors of coronary artery illness. Moreover, following adjusted analysis of controlling confounding variables, significant different findings were seen in only three nursing interventions "administer CAD medication and their instructions, educate on cardiac rehabilitation skills and counsel on diet and life style modification". They matched with either age and or smoking, hypertension and diabetes CAD risky variables; where by diabetes illness led this influence. However, care for stress was low hence nurses have to improve their care on this important psychological aspect for CAD patients. Furthermore, research is needed to get consistency of nursing interventions with patient's end clinical outcomes such as recovery, length of stay and satisfaction with caring nursing behavior for further appraisal of nursing efforts in caring CAD patients.

Abbreviations

ACS: Acute Coronary Syndrome: AOR: Adjusted Odds Ratio: AHA: CABG: Coronary Artery Bypass Grafting; CAD: Coronary Artery Disease; CI: Confidence Interval; CRP: Cardiac Rehabilitation Programme: CVD: Cardiovascular Disease; MI: Myocardial Infarction; NI: Nursing Interventions; PCI: Percutaneous Coronary Interventions; SPSS: Statistical Package for Social Sciences Software; USA: United States of America.

Competing interest

4. ACKNOWLEDGEMENT

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