

Ambulatory Nurse Education Improves Metabolic Profile and Physical Activity in Patients with Cardiovascular Disease

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Abstract

Introduction: Although interventions combining patient education and post discharge management have demonstrated benefits in patients with cardiovascular disease the benefit attributable to ambulatory nurse education (ANE) alone is uncertain.

Material and Method: A quasi experimental study was conducted in Specialist Cardiology Ambulance D & D in Pristina among 98 patients. Ambulatory nurse education was implemented to assess the effectiveness on awareness on life style where pretest and posttest design without control group was used. A complete clinical and laboratory measurements before and after ANE (at 30, 60 and 90 days) were performed. The clinical outcome were physical activity, body mass index, blood pressure, lipid and diabetic profile. The pre-post tested (validity, reliability and pilot testing) structured questionnaire was used for data collection.

Results: At follow up to 90 days, in patients that underwent ANE program, the following indices were decreased: BMI ($p < 0.001$), glycemic level ($p < 0.001$), HbCA1 ($p = 0.02$), lipid profile (cholesterol, triglycerides and LDL-C, $p < 0.001$ for all). HDL-C was increased ($p = 0.01$) In addition, physical activity was significantly improved: total activity and daily activity were increased ($p < 0.001$) and $p = 0.002$, respectively).

Conclusion: The ambulatory nurse education improves glycemic and lipidic control, BMI and physical activity in patients with cardiovascular disease.

Keywords: Ambulatory nurse education, cardiovascular disease, clinical outcome.

Introduction

Cardiovascular diseases (CVD) are the most common cause of morbidity and mortality worldwide, becoming a major public health problem in recent decades.¹ Despite investment in the diagnosis and treatment of these diseases, the mortality rate still remains high and quality of life still is not satisfied.² While promoting health has been the classic goal of public health, recently the accurate assessment of CVD risk is an essential objective of disease prevention.^{3,4} Moreover, Patients suffering from chronic cardiovascular disease are prone not only to a continuous poly-therapy intake but also to significant lifestyle changes. These alterations are incorporated and affect the psychological sphere which lead into influencing the psychosocial wellbeing.^{5,6} In addition, lifestyle changes may be very

difficult challenge and associated with poor precipitation of having lost control of their live.⁷ The role of nurse in this delicate phase of disease is very important, starting from developing a close relationship with these patients to carrying out educational activities and achieving the patient's therapeutic adherence.^{8,9,10} The educational role of nurse in primary and secondary prevention was found to be effective in these patients.^{11,12} According to recommendation of European Society of Cardiology (ESC) on CVD prevention in clinical practice, educational stage, which is indispensable in nursing professional care, needs to be developed in a targeted manner.¹² Although interventions combining patient education and post discharge management have demonstrated benefits in patients with CVD,^{13,14} the benefit attributable to ambulatory nurse education (ANE)

alone is still uncertain. Therefore, we underwent this study, aiming to assess the effect of ANE on metabolic profile and physical activity in patients with CVD.

Method

Study population: This study included 98 consecutive CV patients with median age 44 (36-80) years, 52% were male. A complete clinical and laboratory measurements before and after ANE (at 30, 60 and 90 days) were performed. Patients were referred Specialist Cardiology Clinic at the University Clinical Center of Kosovo, Pristina, Kosovo, between January 2019 and Jun 2019. At the time of the study all patients were on convectional medical treatment. Patients that had clinical evidence for other non-cardiac disease, which may cause deterioration of physical activity (e.g. rheumatic disease, limited physical activity, chronic obstructive pulmonary disease, anemia, recent stroke and advanced chronic renal failure) were excluded from the study. The study was approved by the local Ethics Committee and patients gave written informed consent to participate.

Data collection: Detailed history and clinical assessment were obtained in all study patients. The primary outcomes of the study were: change in physical activity, body mass index (BMI), blood pressure (BP), lipid and diabetic profile by ANE program. ANE was focused mainly in the assessment of patients' knowledge of self-management and self-care of risk factors such as, arterial hypertension, smoking, diabetes mellitus, dyslipidemia and physical activity.

Ambulatory nurse education: Educational sessions were developed and were provided to nurses on a medical telemetry unit. Educational method were Face-to-Face education session, printed materials and pictures, which were provided to the participants.

The patient centered care and nursing education models was used to develop the immense potential of the profession, with the objective of a continued growth in competence, responsibility and autonomy and to make professionals aware of the important role they play in terms of quality of care and health in chronic conditions.

It also emerges that nurses are not yet fully aware of the self-care concept, which should play a part in the management of patients with CVD, but that participating in training programs for skills development has led to an increase in knowledge of the principles of self-care.

Follow-up and outcomes: Ambulatory nurse education was performed at 30, 60 and 90 days. The primary outcomes were physical activity, BMI, BP, lipid and diabetic profile, after the ANE program.

Statistical analysis: Values are expressed as mean \pm SD for continuous variables and percentage for dichotomous data. Continuous data was compared with two-tailed Student *t*- test and discrete data with Chi-square test. Quantitative data were analyzed through the SPSS statistical program.

Results

Demographics data of study patients are presented in **Table No 1**. Most of respondents were Male (52.1%), 52.2% were > 65 years of age, followed by (51%) had worked in the Professional (51%) and attended secondary school (62.2%).

All patients underwent educational sessions (98), all of whom were diagnosed with cardiovascular disease. 53 of them were with heart failure (HF), 13 with coronary heart disease (CHD), 6 with valvular heart disease (VHD), 5 with atrial fibrillation (AF), while 18 of them had another cardiac comorbidities. All patients underwent education sessions by an experienced ambulatory nurse education on day 30, 60 and 90 days, Figure No 1.

At follow up 90 days, the BMI was decreased ($p < 0.001$), glicemic level and HbCA1 were decreased ($p < 0.001$, $p = 0.02$, respectively). The lipid profile was also changed at the 90 days follow-up: cholesterol, tryglicerides and LDL-C were decreased ($p < 0.001$ for all), whereas HDL-C was increased ($p = 0.01$). In addition, physical activity significantly was improved: total activity and daily activity were increased ($p < 0.001$ and $p = 0.002$, respectively) by educational program at 90 days follow-up. Whereas, blood pressure remains unchanged. **Table No 2 and Figure No 2 and 3.**

Discussion

In this study we evaluate changes of metabolic profile by educational program in patients with cardiovascular disease. The main findings of our study were: 1) BMI was decreased by ANE; 2) The control of diabetes and lipid profile were improved by ANE; and 3) The capacity of physical activity was improved by ANE. Our finding regarding improvement of BMI by educational program I in line with previous studies,

which found that in cardiac patients BMI is reduced after the implementation of health education programs.^{15, 16, 17}

Previously was also reported that regular physical activity decreases the risk of many adverse health conditions, including CHD, stroke, diabetes and premature death.^{18, 19} It was also found that the increase of physical activity for any level is associated with risk reduction for cardiovascular disease.²³ on the other hand, the body weight and BMI regular monitoring is important for the prevention of further heart-related health complications in these patients with known cardiovascular disorders. Furthermore, a regular physical activity in these patients is recommended. The patients' weight is associated with their blood pressure and therefore it is related to cardiovascular risk profile in general population²⁰ and it can be also in patients with known cardiovascular disease.

Providing educational interventions to patients is one of the most important activity of a nurse, which has a major role in overall health of general population

and of patients with different known diseases. By this activity, they can help different patients to improve their outcomes through self-management. In this line, by self-education of patients and increasing their knowledge about understanding and living with cardiovascular disease, through educational sessions, there was achieved an improvement in the control of the level of lipids and glucose in our study patients with cardiovascular disease. These our findings are similar with previous studies, which suggested that in addition to the treatment of the cause and symptoms of a diseases, to underwent continuing educational programs aiming prevention of additional and-or deterioration of known cardiovascular disorders in study patients with heart disease.^{21,22}

As a result, the study found that the role of ambulatory nurses was crucial and that nursing education sessions results in increased knowledge of self-management of the disease and convincing patients to adhere to lifestyle modifications while achieving modification of modifiable factors that may be threatening in living with cardiovascular disease.

Table No 1. Distribution of the demographic data (n = 98)

		N	%
Gender	Female	47	47.9
	Male	51	52.1
Age-group	36-45 old years	13	11.5
	46-55 old years	12	10.6
	56-65 old years	14	12.4
	old years > 65	59	52.2
Occupation	Not working	40	40.8
	Non-professional	8	8.2
	Professional	50	51
Education level	Primary	16	16.3
	Secondary	61	62.2
	Tertiary	21	21.5

Table No 2. Clinical measurement data between patients pre educational and post educational

Variable	Pre educational (n = 98) Mean ± Std. Deviation	Post educational (n = 98) Mean ± Std. Deviation	P value
Age (years)	36 ± 80	36 ± 80	0.07
Sex (male, %)	52	52	0.08
Smoking (%)	43	43	0.79
BMI (kg/m ²)	3.08 ± 0.74	2.7 ± 0.79	0.000

Variable	Pre educational (n = 98) Mean ± Std. Deviation	Post educational (n = 98) Mean ± Std. Deviation	P value
SBP (mmHg)	2.43 ± 1.33	2.33 ± 1.32	0.709
DBP (mmHg)	82.2 ± 8.88	81.9 ± 7.68	0.564
Glucose (mmol/L)	1.64 ± 0.86	1.51 ± 0.82	0.23
HbA1c (mmol/L)	1.64 ± 0.85	1.52 ± 0.84	0.23
Cholesterol (mmol/L)	1.64 ± 0.86	1.31 ± 0.63	0.000
HDL (mmol/L)	2.77 ± 1.05	2.13 ± 0.94	0.000
LDL (mmol/L)	3.26 ± 1.01	2.73 ± 0.72	0.000
Triglyceride (mmol/L)	2.08 ± 0.79	1.78 ± 0.66	0.001
Physical activity	2.14 ± 0.71	1.66 ± 0.57	0.000
DPA	1.73 ± 0.44	1.60 ± 0.49	0.002
TPA	1.26 ± 0.97	1.07 ± 0.43	0.08
PAD	1.73 ± 0.58	1.34 ± 0.47	0.000
CTU	1.75 ± 0.43	1.0 ± 0.00	0.000

BMI: body mass index; SBP: systolic blood pressure; DBP: diastolic blood pressure., DPA: Daily physical activity, TPA: Type of physical activity, PAD: Physical activity duration, CTU: Cholesterol type f use.

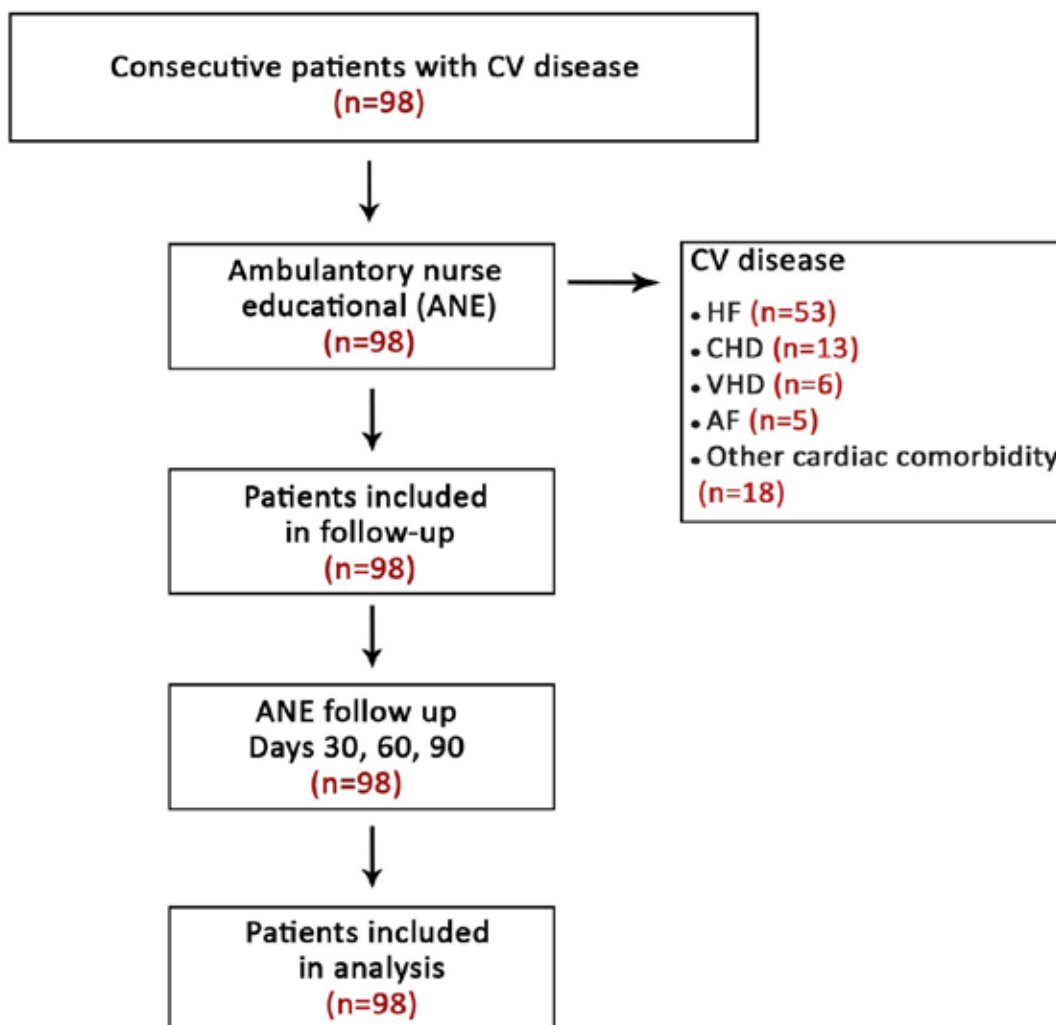


Figure No 1. Presents Consecutive patients with Cardiovascular disease (n=98)

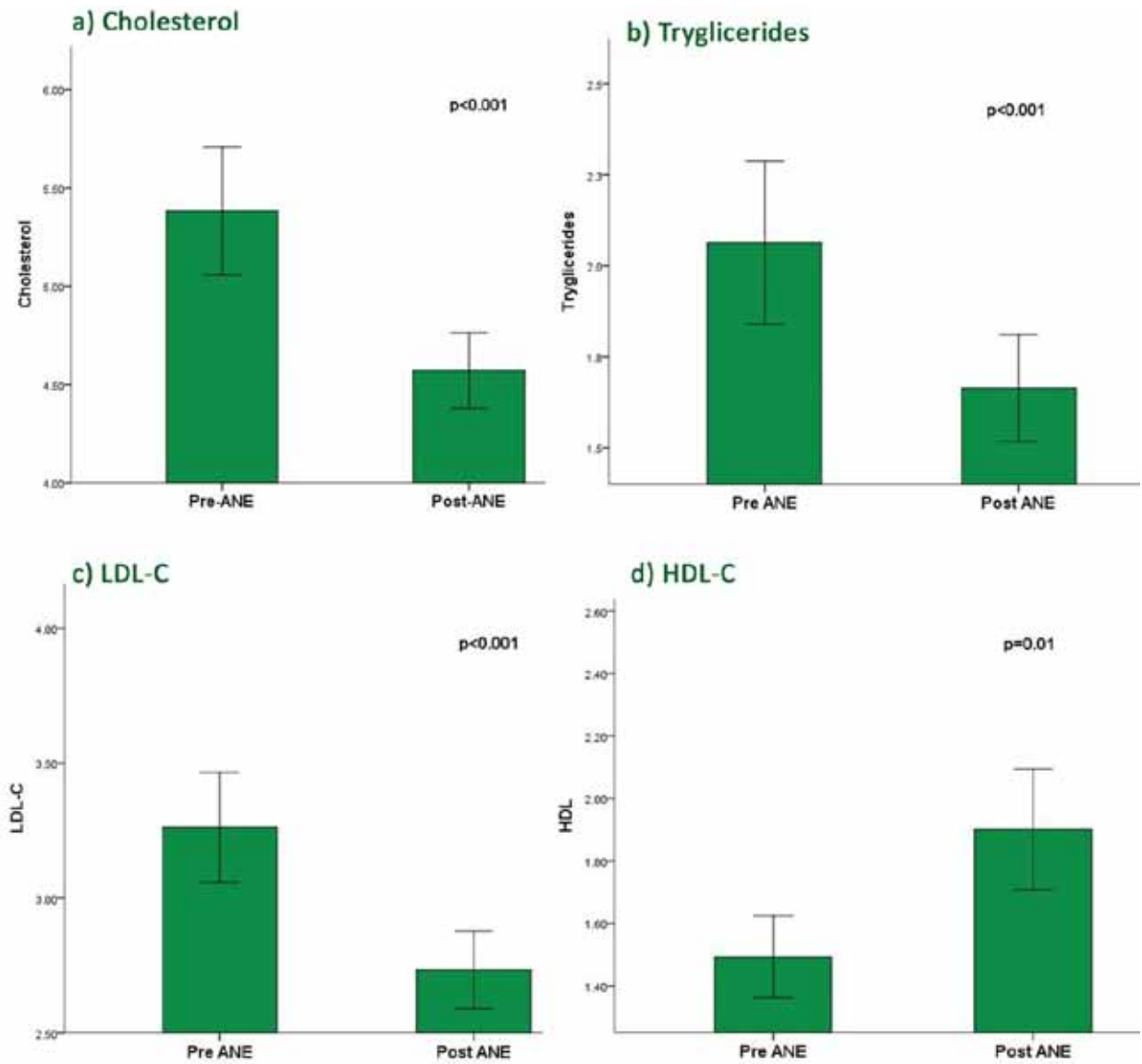


Figure No 2. Lipid profile before and after ANE: a) cholesterol; b) triglycerides; c) LDL-C; d) HDL-C. ANE: ambulatory nurse education; LDL; low density lipoprotein; HDL: high density lipoprotein.

Figure No 2. Presents: The differences of cardiovascular disease cholesterol levels between pre-test and post-test

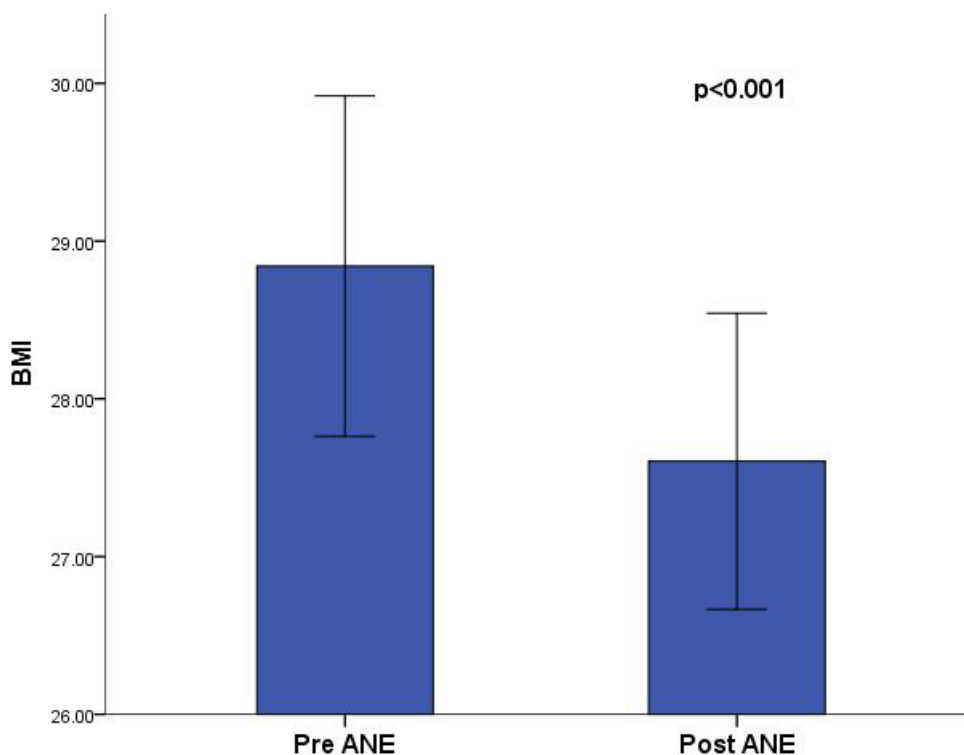


Figure No 3. Presents: The differences of cardiovascular disease BMI between pre-test and post-test

Figure 3. BMI before and after ANE. BMI: body mass index; ANE: ambulatory nurse education

Conclusion

The ambulatory nurse education improve BMI, control of diabetes and lipid profile in patients with known cardiovascular disease. This education also improves the capacity of physical activity in these patients. These findings emphasis the need of ambulatory nurse educational program implementation in all patients with cardiovascular disease.

Ethical Cleansing: The study was approved by the local Ethics Committee and patients gave written informed to participate and ethical principles were followed while conducting a study.

Source of Funding: Self

Conflict of Interest: Nil

References

1. Go AS, Mozaffarian D, Roger VL, et al. Heart disease and stroke statistics--2013 update: a report from the American Heart Association. *Circulation*. 2013;127: e6–e245.
2. Bytyçi I, Bajraktari G. Mortality in heart failure patients. *Anatol J Cardiol*. 2015; 15: 63–68.
3. Xu J, Murphy SL, Kochanek KD, Bastian B, Arias E. Deaths: final data for 2016. *Natl Vital Stat Rep*. 2018; 67:1–76.
4. World Health Organization. The top 10 causes of death. Geneva Switzerland: World Health Organization; 2018.
5. Wilson PWF, D’Agostino RB, Levy D, Belanger AM, Silbershatz H, Kennel WB. Prediction of coronary heart disease using risk factor categories. *Circulation*. 1998; 97:1837–1847.
6. Goff DC, Lloyd-Jones DM, Bennett G, Coady S, D’Agostino RB, Gibbons R, Greenland P, Lackland DT, Levy D, O’Donnell CJ, Robinson JG, Schwartz JS, Shero ST, Smith SC, Sorlie P, Stone NJ, Wilson PWF. 2013 ACC/AHA guideline on the assessment of cardiovascular risk. *Circulation*. 2014; 129: S49–S73.
7. Brindle P, Beswick A, Fahey T, Ebrahim S. Accuracy and impact of risk assessment in the primary prevention of cardiovascular disease: a systematic review. *Heart*. 2006; 92:1752–1759

8. Bodenheimer T, Lorig K, Holman H. Patient self- management of chronic disease in Primary care. *Innovations in Primary Care. Jama.* 2002;288(19):2469–75.
9. Curtin RB, Mapes D, Petillo M, Oberley E. Long-Term Dialysis Survivors: A Transformational Experience. *Qual Health Res.* 2002;12(5):609–24.
10. Sahlsten MJ, Larsson I, Sjostrom B, Plos K A. Nurse strategies for optimising patient participation in nursing care. *Scand J Caring Sci.* 2009;23(3):490–7.
11. Johansson P, Dahlstrom U, Brostrom A. Factors and interventions influencing health-related quality of life in patients with heart failure: a review of the literature. *Eur J Cardiovasc Nurs.* 2006;5(1):5–15.
12. Jørstad HT, et al. RESPONSE study: Randomised Evaluation of Secondary Prevention by Outpatient Nurse Specialists. *Neth Heart J.* 2009;17(9):322–8.
13. Fuochi G, Foà C. Quality of Life, Coping Strategies, Social Support, and Self-efficacy in Women after Acute Myocardial Infarction: a Mixed Method Approach. *Scand J Caring Sci.* 2017:1471–6712.
14. Foà C, et al. Bio-clinical and psycho-social nursing practice. An experimental research in a Intensive Coronary Care Unit. *Acta Biomed.* 2015;86(2):116–26.
15. Vardanjani SA, Fanisberi L, Shahraki F, Khalilzadeh A, Vardanjani AT, Dehkordi FG. The effect of face-to-face education and educational booklet on heart health indexes of hospitalized patients with myocardial infarction. *Nurs Res Pract.* 2013;2013:1–8. <https://doi.org/10.1155/2013/675634>.
16. Abu Shuaib K, Ismail M, Fouad NAM. Effect of educational program on compliance of myocardial infarction patients in Gaza. *JEP.* 2014;5:5–14.
17. Reddy KS, Prabhakaran D, Jeemon P, Thankappan KR, Joshi P, Chaturvedi V, et al. Educational status and cardiovascular risk profile in Indians. *Proc Natl Acad Sci U S A.* 2008;104:16263–16268. <https://doi.org/10.1073/pnas.0700933104>.
18. Physical Activity Guidelines Advisory Committee. (2008) Physical activity guidelines advisory committee report. Washington DC: US Department of Health and Human Services; 2008.
19. Iller TD, Balady GJ, Fletcher GF. Exercise and its role in the prevention and rehabilitation of cardiovascular disease. *Annals of behavioral medicine : a publication of the Society of Behavioral Medicine.* 1997 Summer;19(3):220–229.
20. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, et al. Seventh report of the joint national committee on prevention, detection, evaluation and treatment of high blood pressure. *Hypertension.* 2006; 42:1206–1252. <https://doi.org/10.1161/01.HYP.0000107251.49515.c2>
21. Marta Gorina, Joaquín T Limonero, María Álvarez. Effectiveness of Primary Healthcare Educational Interventions Undertaken by Nurses to Improve Chronic Disease Management in Patients With Diabetes Mellitus, Hypertension and Hypercholesterolemia: A Systematic Review. DOI: 10.1016/j.ijnurstu.2018.06.016.
22. Francis Jude Selvaraj, Mafauzy Mohamed, Khairani Omar et alii, The impact of a disease management program (COACH) on the attainment of better cardiovascular risk control in dyslipidaemic patients at primary care centres (The DISSEMINATE Study): a randomised controlled trial. DOI: 10.1186/1471-2296-13-97
23. Jeffrey B Lanier, David C Bury, Sean W Richardson. Diet and Physical Activity for Cardiovascular Disease Prevention. *Am Fam Physician*93 (11), 919-24. 2016 Jun 1