**SHORT REPORT**

# Primary prevention of cardiovascular disease in a primary care setting

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**Aim:** This study was designed to investigate primary prevention of cardiovascular disease in a primary care setting in Jordan. **Methods:** Adult patients without clinical cardiovascular disease who attended a primary care setting were interviewed and their medical files were reviewed. Data collected to assess primary prevention of cardiovascular disease included lifestyle/risk factor screening, weight assessment, blood pressure measurement and control, and blood lipid measurement and control. **Results:** A total of 224 patients were interviewed. The proportions of patients' files with risk factors documentation were 37.9% for smoking status, 30.4% for physical activity assessment and 72.8% for blood pressure assessment. The majority of hypertensive patients (95.9%) had a blood pressure reading at their most recent visit of ⩽140/90 or was prescribed ⩾2 antihypertensive medications. **Conclusion:** Documentation of cardiovascular disease risk factors was suboptimal. Healthcare providers should be encouraged to document and assess cardiovascular risk factors to improve primary prevention.

**Key words:** cardiovascular disease; Jordan; primary prevention

## Introduction

Death attributed to cardiovascular events is considered preventable or avoidable cause of death. In 2010, >80 000 deaths in the United Kingdom were attributed to ischemic heart disease (Nowbar *et al.*, 2014). In the same year, mortality data from the National Vital Statistics System in the United States showed that >200 000 avoidable deaths from heart disease, stroke and hypertensive disease occurred. The later report enforced the importance of controlling cardiovascular risk factors and clinical preventive strategies such as aspirin use when appropriate, blood pressure control, cholesterol management, smoking cessation, and low sodium,

trans fat-free diet (Centers for Disease Control and Prevention, 2013).

Controlling cardiovascular risk factors was associated with substantial decrease in the incidence of cardiovascular disease (CVD) in various ages and in both genders (Lloyd-Jones *et al.*, 2006; Robinson *et al.*, 2012). In a study evaluating Physicians' Health Study participants, 4182 male participants were enrolled with a mean age of >73 years. The study evaluated the relationship between controlling four modifiable risk factors and primary prevention of CVD; the risk factors studied were smoking, non-high-density lipoprotein cholesterol, blood pressure and aspirin use. After a follow-up period of a mean of 9.3 years the study found that when comparing the participants who controlled the four risk factors with participants who did not control any, the risk for CVD was almost quadrupled (0.4% of participants; event rate 41.2%; HR 3.83, 95% CI 1.72–8.55).

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It also found that greater cardiovascular protection was associated with the control of each additional cardiovascular risk factor (Robinson *et al.*, 2012).

The third Behavioral Risk Factor Surveillance Survey conducted by Jordan Ministry of Health investigated the prevalence of selected non-communicable diseases risk factors in Jordan including cigarettes smoking, high blood pressure and high blood cholesterol. Physical activity and dietary intake were also investigated. The results showed that among 3654 adults interviewed 29.0% were smokers, 38% participated in moderate physical activity and only 17% consumed five or more servings of fruit and vegetables per day. The study also evaluated 765 participants medically and found that 30.5% were overweight and 36.0% were obese, and among the same population 20.7% were found to have high blood pressure, 29.8% were on high blood pressure medications, 10.0% had high blood cholesterol ($\geqslant 6.22$ mmol/L) and 13.9% were on lipid-lowering agents (Al-Nsour *et al.*, 2012).

The American College of Cardiology Foundation and the American Heart Association developed performance measurement sets to assess the quality of care for CVD in several areas, such as chronic heart failure, chronic stable coronary artery disease, hypertension, primary prevention of CVD and others. The main purposes of these sets are quality improvement and accountability. One of the areas studied by the American College of Cardiology Foundation/the American Heart Association Writing Committee is primary prevention of CVD. The Writing Committee specified 13 measures for primary prevention of CVD; 11 are suitable for public reporting. The 11 performance measures are lifestyle/risk factor screening, dietary intake counseling, physical activity counseling, smoking/tobacco use, smoking/tobacco use cessation, weight/adiposity assessment, weight management, blood pressure measurement, blood pressure control, blood lipid measurement, and blood lipid therapy and control (Redberg *et al.*, 2009).

The objective of this study was to assess primary prevention of CVD in a primary care setting in Jordan. We aimed to improve quality of medical care provided to patients in Jordan by drawing physicians', pharmacists' and other healthcare providers' attention to the level of primary prevention of CVD provided.

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## Methods

The study was conducted at Jordan University of Science and Technology Healthcare Center. Physicians working in the healthcare center are family physicians and family medicine residents.

Adult patients (18 years and older) without clinical CVD, who attended the Healthcare Center at least twice in the past year were approached by a research assistant and asked to participate in this study. Those who agreed to participate had the research goals and methods explained to them.

A questionnaire was adapted from Redberg *et al.* (2009); the questionnaire included questions about demographics, relevant clinical characteristics and the 11 performance measures specified by the American College of Cardiology Foundation/the American Heart Association Writing Committee to be assessed for primary prevention of CVD. The performance measures are lifestyle/risk factor screening, dietary intake counseling, physical activity counseling, smoking/tobacco use, smoking/tobacco use cessation, weight/adiposity assessment, weight management, blood pressure measurement, blood pressure control, blood lipid measurement, and blood lipid therapy and control.

A research assistant, who was trained to conduct interviews and administer questionnaires, interviewed patients who gave their consent. Data collection for the primary prevention of CVD measures were gathered prospectively by performing face-to-face interviews with participants and retrospectively by reviewing medical records. Patients' information including gender, age, weight and height, as well as history of hypertension, diabetes mellitus and family history of congestive heart disease were collected prospectively by interviewing patients.

In an attempt to improve clarity and limit response bias, the data collection form was piloted before the study in a small sample; necessary modifications were made.

The study methodology was approved by the Institutional Review Board at Jordan University of Science and Technology (research number 87/2014) on 2 April 2014.

### Data analysis

Statistical Package for Social Sciences (version 16.0) software was used to analyze the data. Data are described using frequency distribution.

## Results

Data collection was conducted from May to June 2014. A total of 242 patients were approached, 224 patients agreed to participate in the study and were interviewed, and the response rate was 92.6%.

Respondents' demographics and documentation of cardiovascular risk factors assessment are shown in Table 1. In all, 80 patients (35.7%) are current tobacco smokers and 0% documented to be advised to quit tobacco use. Physical activity was documented for 68 patients (30.4%) and diet assessment was documented for eight patients (3.6%).

Table 2 states cardiovascular risk factors assessment according to patients' responses. Physical activity was assessed in 84 patients (37.5%) and diet was assessed in 68 patients (30.4%).

Data concerning blood pressure control, blood lipid measurement, and blood lipid therapy and control are summarized in Table 3. The majority of hypertensive patients (95.9%) had a blood pressure reading at their most recent visit of $\leq 140/90$ or was prescribed $\geq 2$ antihypertensive medications.

## Discussion

This study was first of its kind in Jordan to investigate the extent of documenting risk factors for primary prevention of CVDs. Identification of CVD risk factors is considered a crucial step in preventing CVDs. Initially, clinicians should assess presence of different risk factors through targeted medical history, physical examination and laboratory testing. In the second step, clinicians need to discuss such risk factors with patients and make pharmacological and non-pharmacological interventions in order to delay or prevent CVDs (Shah, 2012). The results of this study showed a suboptimal documentation of CVD risk factors. However, when patients were asked if they were screened for risk factors such as smoking status, and other lifestyle issues such as diet and exercise, it was found that physicians did ask patients about them and in many instances educated patients about healthy lifestyle. It is fair to say that screening for CVD risk factors was done more than documented. This may be contributed to many factors such as work load, physicians' beliefs of insignificance of documenting risk factors or physicians concentrating more on secondary prevention of CVDs.

**Table 1** Demographics and documentation of cardiovascular risk factors assessment

| Variables | $n = 224$ | |
| --- | --- | --- |
| | Number | % |
| Gender | | |
|   Male | 55 | 24.6 |
|   Female | 169 | 75.4 |
| Age (year) | | |
|   18–27 | 81 | 36.2 |
|   28–37 | 25 | 11.2 |
|   38–47 | 39 | 17.4 |
|   48–57 | 50 | 22.3 |
|   58–67 | 22 | 9.8 |
|   68–77 | 7 | 3.1 |
| Documentation of smoking status assessment | | |
|   Former smoker | 5 | 2.2 |
|   Current smoker | 80 | 35.7 |
|   Not recorded | 120 | 53.6 |
|   Missing patient's record | 19 | 8.5 |
| Documentation that patients were advised to quit tobacco use (for current tobacco users) | 0 | 0 |
| Documentation of patients' physical activity | 68 | 30.4 |
|   Missing patient's record | 19 | 8.5 |
| Documentation if patients received physical activity counseling | 5 | 2.2 |
| Documentation of patients usual diet assessment | 8 | 3.6 |
|   Missing patient's record | 19 | 8.5 |
| Documentation if patients were advised to eat healthy diet | 4 | 1.8 |
| Documentation of blood pressure measurement | 163 | 72.8 |
|   Missing patient's record | 19 | 8.5 |
| Documentation of BMI | 70 | 31.3 |
|   Missing patient's record | 19 | 8.5 |
| Number of patients with BMI $> 30 \text{ kg/m}^2$ | $n = 64^a$ | |
| | Number | % |
| Documentation if patients were advised to lose weight (for patients' BMI $> 30 \text{ kg/m}^2$) | 7 | 10.9 |
|   Missing patient's record | 7 | 10.9 |

BMI = body mass index
[a] As reported by patients

In a similar study, electronic records of 1680 patients who attended primary care settings in New Zealand were analyzed. The study objective was to investigate the extent of primary care documentation of cardiovascular risk factors. The study found that the proportions of records with risk factors documented were as follows: blood pressure, 81.8%; cholesterol, 62.4%; and smoking

**Table 2** Cardiovascular risk factors assessment according to patients' responses

| Variables | n = 224 | |
| --- | --- | --- |
| | Number | % |
| Smoking status according to patients' responses | | |
|    Former smoker | 5 | 2.2 |
|    Current smoker | 31 | 13.8 |
| Patients were advised to quit tobacco use (for current tobacco users) | 25 | 80.6 |
| Patients' physical activity was assessed | 84 | 37.5 |
| Patients reporting meeting physical activity goals | 41 | 18.3 |
| Patients received physical activity counseling (for patients who did not meet physical activity goals) | 78 | 42.6 |
| Patients usual diet was assessed | 68 | 30.4 |
| Patients were advised to eat healthy diet | 88 | 39.3 |
| Number of patients with BMI > 30 kg/m$^2$ | n = 64 | |
| | Number | % |
| Patients were advised to lose weight (for patients' BMI > 30 kg/m$^2$) | 55 | 85.9 |

BMI = body mass index

**Table 3** Documentation of blood pressure control and fasting lipid profile[a]

| Number of patients with hypertension | n = 49[b] | |
| --- | --- | --- |
| | Number | % |
| Hypertensive patients with recorded blood pressure reading at their most recent visit of ≤140/90 mmHg | 35 | 71.4 |
|    Blood pressure not checked | 1 | 2.0 |
|    Missing patient's file | 2 | 4.1 |
| Hypertensive patients who were recorder to be prescribed ≥2 antihypertensive medications | 30 | 61.2 |
| Hypertensive patients with recorded blood pressure reading at their most recent visit of ≤140/90 mmHg or who were recorder to be prescribed ≥2 antihypertensive medications | 47 | 95.9 |
| Number of men aged ≥35 and women aged ≥45 with at least one risk factor (HTN, DM, family history of CHD, current smoker)[b] | n = 75 | |
| | Number | % |
| Documentation of patients with total cholesterol | | |
|    <6.22 mmol/L | 24 | 32.0 |
|    ≥6.22 mmol/L | 2 | 2.7 |
|    Missing electronic record | 49 | 65.3 |
| Documentation of LDL cholesterol level | | |
|    <3.37 mmol/L | 1 | 1.3 |
|    ≥3.37 mmol/L | 0 | 0 |
|    Was not done | 25 | 33.3 |
|    Missing electronic record | 49 | 65.3 |
| Documentation of HDL cholesterol level | | |
|    ≥1.04 mmol/L for males and ≥1.30 mmol/L for females | 0 | 0 |
|    <1.04 mmol/L for males and <1.30 mmol/L for females | 2 | 2.7 |
|    Was not done | 24 | 32.0 |
|    Missing electronic record | 49 | 65.3 |

HTN = hypertension; DM = diabetes mellitus; CHD = congestive heart disease; LDL = low-density lipoprotein cholesterol; HDL = high-density lipoprotein cholesterol
[a] Fasting lipid profile is for men aged 35 and more and women aged 45 and over with at least one risk factor
[b] As reported by patients

status, 41.5% (Rafter *et al*., 2008). The results are similar to our study, where blood pressure documentation is the highest (72.8%).

Previously published studies showed that hypertension control in Jordan is below optimal level (Jaddou *et al*., 2000; 2011). Interestingly, the majority of hypertensive patients in this study were controlled, this can be due to the high blood pressure assessment rate (72.8%). As discussed earlier, identification of risk factors will help eliminate or control risk factors. Other healthcare institutions in Jordan are encouraged to copy this healthcare facility experience, which is expected to improve blood pressure control. However, why blood pressure assessment was higher than smoking status and diet assessment is not clear. Physicians in this facility may be more competent in blood pressure measurement and treatment of high blood pressure compared with smoking cessation techniques and diet counseling.

The present study showed that level of physical activity, diet and weight assessment, and smoking cessation counseling provided was inadequate. Obesity, hypertension, hyperlipidemia and diabetes are major public health concerns in Jordan

(Al-Nsour *et al*., 2012), which necessitates health authorities to encourage risk factor assessment, health promotion and disease prevention. Looking at other countries experiences can improve the current situation. For example, in the United Kingdom, an incentive program, 'The Quality and Outcomes Framework,' was applied to reward good practice through a scoring system. If similar

incentive programs are applied in Jordan we expect quality of care to improve, which includes assessing and management of CVD risk factor (Lester and Campbell, 2010). In the United Kingdom also software that identifies individuals at risk of CVD was applied to data from a population aged 50 years and over. Similar software can be applied in primary care settings in Jordan, which can assist healthcare providers in assessing CVD risk factors (Holt *et al.*, 2008). Other example is the New Zealand cardiovascular risk initiatives, which focused on four areas to encourage systemic documentation of risk factors. First area concentrated on increasing patients' awareness of cardiovascular risks. The second area focused on training healthcare providers to use computer software for risk factors documentation, whereas the third area focused on providing administrative tools that facilitates developing information culture. Finally, financial incentives for collecting and documenting risk factors were provided (Rafter *et al.*, 2008). These four areas can be applied in Jordan in order to encourage risk factors assessment and documentation to promote primary prevention.

The results of the study should be considered within the context of its limitations. Limitations include incomplete documentation in patients' records and recall bias in patients' responses. Number of women was higher than men. In addition, the primary healthcare center where the study was conducted started electronic records documentation for laboratory findings, consequently and due to this transitional period 49 patients' lipid profiles could not be found.

In conclusion, documentation of CVD risk factors assessment was suboptimal. However, blood pressure control was high. Healthcare providers should be encouraged to assess and document CVD risk factors and work in concordance with patients in order to control risk factors. Opportunities exist for health authorities to develop and implement information culture to improve documentation of risk factors and encourage the collaborative and continued effort between clinicians to prevent CVD.

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## Conflicts of Interest

The authors report no conflicts of interest.

## References

**Al-Nsour, M., Zindah, M., Belbeisi, A., Hadaddin, R., Brown, D.W.** and **Walke, H.** 2012: Prevalence of selected chronic, noncommunicable disease risk factors in Jordan: results of the 2007 Jordan Behavioral Risk Factor Surveillance Survey. *Preventing Chronic Disease* 9, E25.

**Centers for Disease Control and Prevention.** 2013: Vital signs: avoidable deaths from heart disease, stroke, and hypertensive disease – United States, 2001–2010. *Morbidity and Mortality Weekly Report* 62, 721–27.

**Holt, T.A., Thorogood, M., Griffiths, F., Munday, S., Stables, D.** 2008: Identifying individuals for primary cardiovascular disease prevention in UK general practice: priorities and resource implications. *British Journal of General Practice* 58, 495–98.

**Jaddou, H.Y., Bateiha, A.M.** and **Ajlouni, K.M.** 2000: Prevalence, awareness and management of hypertension in a recently urbanized community, eastern Jordan. *Journal of Human Hypertension* 14, 497–501.

**Jaddou, H.Y., Batieha, A.M., Khader, Y.S., Kanaan, A.H., El-Khateeb, M.S.** and **Ajlouni, K.M.** 2011: Hypertension prevalence, awareness, treatment and control, and associated factors: results from a national survey, Jordan. *International Journal of Hypertension* 2011, 828797.

**Lester, H.** and **Campbell, S.** 2010: Developing Quality and Outcomes Framework (QOF) indicators and the concept of 'QOFability'. *Quality in Primary Care* 18, 103–9.

**Lloyd-Jones, D.M., Leip, E.P., Larson, M.G., D'Agostino, R.B., Beiser, A., Wilson, P.W., Wolf, P.A.** and **Levy, D.** 2006: Prediction of lifetime risk for cardiovascular disease by risk factor burden at 50 years of age. *Circulation* 113, 791–98.

**Nowbar, A.N., Howard, J.P., Finegold, J.A., Asaria, P.** and **Francis, D.P.** 2014: 2014 global geographic analysis of mortality from ischaemic heart disease by country, age and income: statistics from World Health Organisation and United Nations. *International Journal of Cardiology* 15174, 293–98.

**Rafter, N., Wells, S., Stewart, A., Selak, V., Whittaker, R., Bramley, D., Roseman, P., Furness, S.** and **Jackson, R.T.** 2008: Gaps in primary care documentation of cardiovascular risk factors. *New Zealand Medical Journal* 121, 24–33.

**Redberg, R.F., Benjamin, E.J., Bittner, V., Braun, L.T., Goff, D.C. Jr, Havas, S., Labarthe, D.R., Limacher, M.C., Lloyd-Jones, D.M., Mora, S., Pearson, T.A., Radford, M.J., Smetana, G.M., Spertus, J.A.** and **Swegler, E.W.** 2009:

AHA/ACCF 2009 performance measures for primary prevention of cardiovascular disease in adults: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures for Primary Prevention of Cardiovascular Disease): developed in collaboration with the American Academy of Family Physicians; American Association of Cardiovascular and Pulmonary Rehabilitation; and Preventive Cardiovascular Nurses Association: endorsed by the American College of Preventive Medicine, American College of Sports Medicine, and Society for Women's Health Research. *Circulation* 120, 1296–336.

**Robinson, J.G., Rahilly-Tierney, C., Lawler, E.** and **Gaziano, J.M.** 2012: Benefits associated with achieving optimal risk factor levels for the primary prevention of cardiovascular disease in older men. *Journal of Clinical Lipidology* 6, 58–65.

**Shah, S.** 2012: Primary prevention of cardiovascular disease. *InnovAiT* 5, 195–203.