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Effect of Combined Interventions of Diet and Physical Activity on the Perceived and Actual Risk of Coronary Heart Disease among Women in North of Jordan

[1]Muneer Mohammad Bustanji and [2]Sawsan Majali

[1]Faculty of Nursing/ AL-Hussein Bin Talal University/ Jordan
[2]Secretary General of Higher Population Council/ Jordan

Abstract: Women have received little attention in cardiac research in Jordan. This study aimed to evaluate the effectiveness of combined interventions of diet and physical activity on the perceived and actual risk for coronary heart disease among women in the north of Jordan. An experimental pretest/ posttest design was used. The sample consisted of asymptomatic women aged 40 years or older who lived in the north of Jordan. The intervention involved recommendations concerning healthy diet and physical activity to modify the actual risk for coronary heart disease. The Kruskal-Wallis test; $X^2(2, N = 134) = 46.62$, $p < 0.001$, showed that women who applied both diet and physical activity interventions scored lower actual risk for heart disease than women who only applied one type of intervention (either diet or physical activity). The results indicated the need for constant national heart disease education programmes for women emphasizing adopting healthy lifestyle behaviors.

Key words: Interventions · Diet · Heart disease · Healthy · Liufe

INTRODUCTION

Cardiovascular disease (CVD) and stroke are rapidly growing problems and are the major causes of illness and deaths in the Eastern Mediterranean Region, accounting for 31% of deaths [1].

Jordanian women were found to underestimate their risk for coronary heart disease (CHD); and perceived breast cancer as a greater risk to their health than CHD [2]. Despite that, 28.9% of deaths among women in Jordan were attributed to CHD and 23.5% were due to breast cancer [3]. The majority of research on Jordanian women's health has focused exclusively on reproductive health aspects [4] and screening for breast cancer [5] and so far no study has been performed which investigates the perceived and the actual risk of coronary heart disease and or interventions that could reduce the risk of CHD among women in Jordan.

This study aimed to assess the perceived risk and the actual risk for coronary heart disease among women in the north of Jordan. This study also aimed to evaluate the effectiveness of combined interventions of diet and physical activity on the perceived and actual risk for coronary heart disease among women in north of Jordan.

MATERIALS AND METHODS

Setting and Sample: A true experimental pretest/ posttest study was conducted among a convenience sample of women who visited the out- patients department at a university hospital and at a government (hospitals are located in the Irbid governorate). The inclusion criteria of the sample were age is equal to or more than 40 years willing to participate and not known to have CHD. The sample size was estimated using power analysis which yielded a sample size of 159 participants. In this study, the researcher gathered data from 165 women to avoid the attrition risk.

Procedure

Phase One: Pretest Phase: After obtaining the approval to conduct the study from the Committee on Human Research- the Jordanian Ministry of Health and the university hospital, the researcher visited the out- patient

Corresponding Author: Muneer Mohammad Bustanji,
Faculty of Nursing/ AL-Hussein Bin Talal University/ Jordan.

department of each setting, where the women were invited to participate in the study. Those who accepted to participate in the study were asked to read and sign the informed consent form. The form explained the purpose of the study, supplied the woman with information about her rights as a participant and included directions for completing each of the forms. In adherence with ethical standards, the informed consent form also included information regarding confidentiality, the intervention involved in the study and a statement regarding the participants' ability to withdraw from the study at any time without penalty.

After signing the informed consent form, each woman completed the survey forms; Demographic information sheet and the Perception of Risk of Heart Disease Scale (PRHDS). The PRHDS is a newly developed and previously tested 20-item questionnaire composed of three subscales: dread risk, risk and unknown risk [6]. These subscales are intended to place individuals on a continuum from low perception of risk to high perception of risk of CHD.

Dread risk, was defined at its high end as perceived lack of control, dread, catastrophic potential, fatal consequences; while unknown risk, was defined at its low end as perception of hazards judged to be unobservable, unknown, new and delayed in their manifestation of harm; and (in between) risk reflecting a hazard that has few moderate known outcomes and consequences [6].

Items were formatted using a four-point Likert scale ranging from 1–4 (strongly disagree to strongly agree). To score the instrument, item scores were summed for each subscale, as well as across subscales for a total scale score; reverse scoring of negative-response items is required [6]. Higher scores on the PRHDS subscales indicate a higher perception of risk of CHD. Cronbach's alpha internal consistency reliability coefficients of the original PRHDS were. 80, 0.72 and 0.68 for the dread risk subscale, the risk subscale and the unknown risk subscale respectively with a total scale reliability of. 80 [6]. A test–retest correlation coefficient was also calculated for the original version and yielded a total reliability of 0.72 with 0.76 for the dread risk subscale, 0.70 for the risk subscale and 0.61 for the unknown risk subscale [6].

After completing the surveys forms, the researcher carried out the physiologic measures (body height, body weight, blood pressure and blood glucose level). After weighing each woman with the same scale, the researcher calculated the body mass index of each woman using the results of height and weight measurments.

Regarding measuring blood pressure, the researcher measured the BP for each participant after ten minutes rest. Two independent measurements of blood pressure were obtained with an interval of at least ten minutes between them and the average BP had been calculated. For the purpose of this study, hypertension (HTN) was defined as a person having a blood pressure equal or more than 140/90 mmHg or those individuals who are on antihypertensive agents [7, 8].

Regarding measuring blood glucose level, the researcher used an Accu- Check machine, test strips, lancets, gloves and biohazard container. For the purpose of this study, a person who has diabetes is defined as someone taking insulin or oral hypoglycemic drugs, or with a fasting plasma glucose concentration above 7.0 mmol/l (126 mg/dl).

After measuring the physiologic measures, the researcher used the WHO/ISH risk prediction chart of the EMRO- B region without cholesterol level to estimate the actual risk of CHD among women (Figure 1). To estimate the actual risk using these charts, the researcher collected data about the items included in the charts; age, smoking status (all current smokers and those who quit smoking less than one year before the assessment were considered smokers for assessing cardiovascular risk), blood pressure and presence of diabetes mellitus. Then, the researcher classified each participant into a category of high risk (30% to <40% and =40%; red and maroon color), medium risk (from 10% to <20% and from 20% to <30%; yellow and orange), or low risk (<10%; green color) for heart attack or stroke in the following ten years.

Phase Two: Intervention Phase: In this phase, the researcher randomly assigned the participants into three groups (A, B and C) and randomly also assigned the interventions (diet and physical activity, diet part only, or physical activity part only) to the groups. Eventually, group A was assigned to the diet part of the intervention, group B was assigned to both diet and physical activity interventions and group C was assigned to the physical activity part of the intervention.

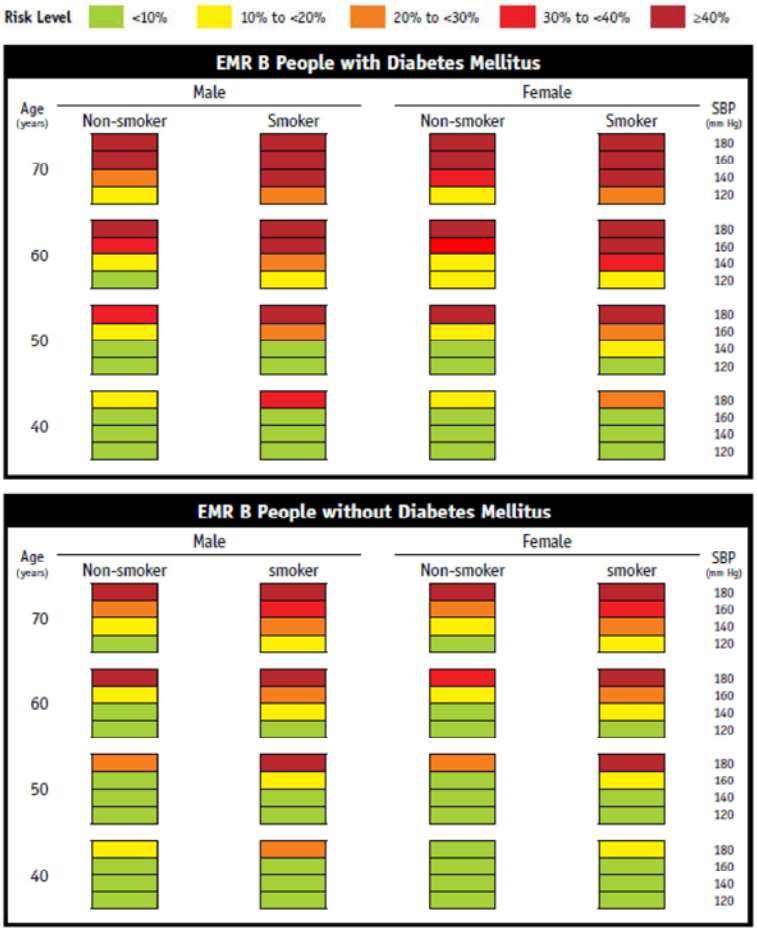

Fig. 1:

In this study, group B acted as the experimental group and received both components of the intervention and group A and C acted as the control groups and received only one component of the intervention; either physical activity or diet component.

The researcher then provided a presentation for group A about how to prevent the CHD using the diet intervention only, a presentation for group B about how to prevent CHD using both diet and physical activity interventions and a presentation for group C about how to prevent CHD using physical activity intervention only. Finally, the researcher emphasized to the women the importance of following the guidelines for 12 weeks. Each four weeks of this phase, the researcher contacted the participants in order to make sure that they were committed to the guidelines and to discus any inquiry they had. Participants were contacted via mobile phone.

Phase Three: Posttest Phase: After 12 weeks, the women individually returned to the out-patient clinic to be reassessed for their physiologic measures and to complete the PRHDS.

Educational Materials: The educational material was developed based on the "Pocket guidelines for assessment and management of cardiovascular risk with the WHO/ISH cardiovascular risk prediction charts for WHO epidemiological sub-regions EMR- B, EMR- D" [9]. The content of educational material was on how to prevent occurrence of coronary heart disease through following specific recommendations regarding diet and physical activity.

Regarding the recommendations about diet changes, women at risk for CHD were strongly encouraged to reduce total fat and saturated fat intake. In addition, they were strongly encouraged to reduce daily salt intake by at

least one-third and, if possible, to <5 g per day. The women were encouraged to eat, at least 400 g a day, of a range of fruits and vegetables, as well as whole grains. In addition, the women were strongly encouraged to take at least 30 minutes of moderate physical activity (e.g. brisk walking) a day, through leisure time, daily tasks and work-related physical activity.

RESULTS

Sample Characteristics: Table 1 shows the demographic characteristics of the sample. The mean age of the women in the sample was 52.6 (*SD* = 4.4) ranging from 41 to 69 years. About 79.4% of the participants were married and the monthly household income of 17.0% of the participants was less than 200 JD. More than half of the women (53.4%) had a high school education or higher.

Risk Factors for CHD: The results indicated that 29.1% of participants were smokers, 30.9% had a family history of CHD, 60.6% were known to have DM, 50.9% were known to have HTN and 28.5% were obese (BMI > 30). In addition, 69.7 % of the participants had multiple risk factors for CHD (Table 2).

Level of Perceived Risk and The Actual Risk: Table 3 provides data about the level of perceived risk among the participants at the pretest phase of the study. The results show that the mean score of total perceived risk was 49.7 out of 80.0, ranging from 33 to 71.

Table 1: Demographic Characteristics of the Sample (N = 165)

Characteristics	Subcategory	N(%)
Education Level	Illiterate	7(4.2)
	Preparatory	6(3.6)
	Elementary	64(38.8)
	High school	46(27.9)
	Diploma	32(19.4)
	Baccalaureate	10(6.1)
Household Income	Less than 200 JD per month	28(17.0)
	200 JD to 399 JD per month	61(37.0)
	400 JD to 599 JD per month	44(26.7)
	600 JD per month or more	32(19.4)
Martial Status	Single	14(8.5)
	Married	131(79.4)
	Widow	20(12.1)
	Divorced	0(0.0)

Table 2: Risk Factors for CHD (N= 165)

Risk Factor	Subcategory	N(%)
Smoking	Yes	48 (29.1)
	No	117 (70.9)
Family History of CHD	Yes	51 (30.9)
	No	114 (69.1)
History of DM	Yes	100 (60.6)
	No	65 (39.4)
History of HTN	Yes	84 (50.9)
	No	81 (49.1)
BMI	Normal: 18.5 to 24.9	50 (30.3)
	Overweight: 25 to 29.9	68 (41.2)
	Obese: =30	47 (28.5)
Two or more of risk factors	Two risks	49 (29.7)
	Three risks	40 (24.2)
	Four risks	25 (15.2)
	Five risks	1 (0.6)

Table 3: Mean, Median and Standard Deviation of Perceived Risk at Pretest (N= 165)

Type of Risk	M (SD)	Median	Possible Range	Actual Range
Total PRHDS	49.7 (6.6)	50.0	20-80	33-71
Dread Risk	15.1 (5.1)	14.0	7- 28	7- 28
Risk	16.7 (2.6)	16.0	7- 24	11- 24
Unknown	17.9 (1.9)	18.0	7- 28	11- 25

Table 4: Mean, Median and Standard Deviation of Perceived Risk at Posttest (N= 134)

Type of Risk	M (SD)	Median	Possible Range	Actual Range
Total PRHDS	54.0(6.1)	55.0	20- 80	40- 72
Dread Risk	17.6 (3.9)	17.0	7- 28	12- 28
Risk	18.1 (2.5)	18.0	7- 24	13- 24
Unknown	16.3 (1.7)	17.0	7- 28	10- 20

Table 5: Percentages of Actual Risk (N= 134)

	Subcategory	Pretest Phase N (%)	Posttest Phase N (%)
Actual Risk	Low	0 (0.0)	44 (32.8)
	Medium	118 (88.1)	79 (59.0)
	High	16 (11.9)	11 (8.2)

Table 4 shows data about the level of perceived risk among the participants at the posttest phase. Noting that, 31 women from the original sample (N= 165) apologized for participating in the posttest phase. The results show that the mean score of total perceived risk was about 54.0 out of 80.0, ranging from 40 to 72(N = 134). Whereas, the mean score of total perceived risk for same group (N = 134) was 48.6 out of 80.0 at pretest phase.

Regarding the level of the actual risk among participants (Table 5), 32.8% of participants were at a low level of actual risk for CHD according to the WHO/ ISH prediction charts.

To evaluate the impact of intervention on the perception level, a Paired sample t test was conducted to estimate the difference in the mean score of the level of perceived risk for CHD from the pretest and posttest phases of the study. The results showed that there was a statistically significant increase in the perception for CHD between the pretest phase (M = 48.6, SD = 6.0) and the posttest phase (M = 54.0, SD = 6.1), t (133) = -23.543, P<.0001. Since, the mean increase was 5.4 with a 95% confidence interval ranging from 4.9 to 5.8. In addition, a Wilcoxon Signed Rank test was conducted to evaluate the difference in the level of actual risk among participants from the pretest and posttest phases of the study. The analysis revealed a statistically significant reduction in risk for CHD following participation in the program, Z = -6.486, P<0.001.

A Kruskal-Wallis test was conducted to evaluate differences among the three types of interventions (diet only, diet and physical activity and physical activity only) on median change in the level of actual risk for CHD. The test, which was corrected for tied ranks, was significant $X^2(2, N = 134) = 46.62, p< 0.001$. The Mann-Whitney U test was conducted to evaluate pairwise differences among the three types of interventions, controlling for Type I error across tests by using the Bonferroni approach. The results of these tests indicated a significant difference in the level of actual risk between the group who implemented both interventions (diet and physical activity) and the group who only implemented the diet intervention (U= 441.5, p< 0.001). Also, there was a significant difference in the level of actual risk between the group who implemented both interventions (diet and physical activity) and the group who implemented the physical activity intervention (U= 302.5, p< 0.001). Therefore, implementing both interventions (diet and physical activity) elicited statistically lower level of actual risk than implementing only one type of intervention (p< 0.001). Noting that, there was no statistically significance difference in the level of actual risk median between the group who implemented the diet intervention and the group who implemented the physical activity intervention (U= 922, p= 0.051).

DISCUSSION

Perceived Risk of Heart Disease: Several studies had found that a majority of women underestimated their risk to the heart disease [2, 10-12]. This study supports the work of others in pointing out the lack of awareness among women about their susceptibility to this disease. In the view of this fact, the mean of total score of the PRHDS among women in this study was consistent with the mean of total score of the PRHDS among participants in a study conducted in Jordan by Ammouri, *et al*., (2010) [2]; of 43 out of 80 ranging from 20 to 57. In addition, the mean score of unknown subscale in this study was 17.9 out of 24 which corresponded with results reported by Ammouri, *et al*. (2010) [2]; of 14.4 out of 24. These results indicated that participants tend to downplay their risk to the heart disease.

Intervention: The results of the effectiveness of combined diet and physical activity interventions that have been used in this study are analogous to the results of other studies. Muto and Yamauchi (2001) conducted a workplace health promotion program targeting diet and exercise to reduce CVD risk among 152 employees in which the intervention group spent four days at a resort for intensive lectures and training [13]. The participants were assessed at baseline and at three month intervals for one year after the program. Those in the intervention group showed significant improvements in body mass index and systolic blood pressure [13]. Similarly, a 12 week employee wellness pilot program involving university employees (N = 50) focused on reducing risk factors for CHD through interventions aimed at improving diet and implementing a consistent exercise regimen [14]. The study's participants attended monthly workshops and had pre- and post-intervention measurements, which included weight, body composition, BP, TC, LDL-C, HDL-C, TC/HDL-C ratio, TG and blood glucose [14]. A significant difference was observed between pre- and post-intervention measurements of weight (p =. 01) [14]. However, statistically significant improvement was not seen in blood pressure. They also confirmed that only 25 of the original 50 participants remained (50%) at post-test, which potentially skewed the results of an already miniscule sample size [13].

Limitations: One of the limitations of this study was the use of a convenience sample which may not be truly representative of women in Jordan. Although recruitment took place at several local hospitals, generalizability is limited due to geographic and nonrandom sample selection. Also, about 19% of participants did not complete the post test phase.

Recommendations

Recommendations for Future Research:

- Conduct additional studies to include women with less education, as well as women from different regions and age categories.
- Conduct additional studies that include practical training of the recommendations before starting the actual program.
- Conduct additional studies that include the WHO/ISH risk predictions charts with cholesterol.
- Conduct qualitative research to understand why women do not perceive themselves susceptible to heart disease and why they do not practice behaviors that could reduce their risk of developing heart disease and promote overall wellness.

Recommendations for Health Education Practice:

- There is a need for an increase in education regarding personal risk factors for heart disease and devising strategies to increase perceived susceptibility to the disease. It is imperative that nurses help resolve common misperceptions women have about heart disease and create increased awareness of the disease. Current awareness campaigns have achieved greater recognition of the impact of heart disease, but a gap in awareness continues to exist. This gap might be narrowed with more emphasis on social marketing through a media (i.e., television) available to the majority of the population.
- Exploration of the role of the physician recommending heart disease screening is needed. In an effort to increase screening behaviors of women, nurses can play a key role, acting as a resource for both physicians and the community. Nurses can help direct all women, whether they perceive themselves as susceptible or not, to appropriate screening tests for heart disease. Targeting younger women and those with lower education levels also is necessary to reach a population that's often under-represented in screenings.
- Health professionals, marketing experts and non-profit organizations, such as the Jordan Nursing Council, need to collaborate to gain a better understanding of the priority population's beliefs about heart disease and motivation to participate in health-promoting behaviors to decrease risk factors for heart disease. Marketing campaigns can be developed to personalize the disease so women can relate to and understand their vulnerability to the condition.

CONCLUSION

Cardiovascular risk factors should be assessed in women starting much earlier than menopause and should then be treated as aggressively in women as in men. Few women appreciate that cardiovascular disease is their major health problem. So, any woman can benefit from increased awareness of her risks and the younger women who adopt healthy lifestyle behaviors now may avoid developing heart disease later in life.

Contributions

Study Design: MB, SM; data collection and analysis: MB, SM; manuscript preparation: MB, SM.

Conflict of Interest: The authors declare that they have no conflict of interests

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REFERENCES

1. Khatib, O., 2004. Noncommunicable diseases: Risk factors and regional strategies for prevention and care. The Eastern Mediterranean Health Journal, 6: 778-788.
2. Ammouri, A., G. Neuberger, M. Mrayyan and S. Hamaideh, 2010. Perception of risk of coronary heart disease among Jordanians. Journal of Clinical Nursing, 20: 197-203.
3. Mortality data in Jordan, 2008. Jordan Ministry of Health, 2011. http://www.moh.gov.jo/MOH/En/publications.php/ accessed 20 June 2011.
4. Qutob, R., 2001. Menopause-associated problems: types and magnitude. A study in ain al-basha area, Jordan. Journal of Advanced Nursing, 33: 613-620.
5. Petro-Nustus, W. and B. Mikhail, 2001. Factors associated with breast self examination among Jordanian women. Journal of Public Health Nursing, 19: 263-271.

6. Ammouri, A. and G. Neuberger, 2008. The perception of risk of heart disease scale: Development and psychometric analysis. Journal of Nursing Measurement, 16: 83-97.
7. Heart disease and stroke Statistics 2010 Update. American Heart Association, 2010. http://circ.ahajournals.org/cgi/reprint/121/7/e46/ accessed 8 June 2011.
8. The National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) 2001. National Institute of Health, 2002. http://www.nhlbi.nih.gov/guidelines/cholesterol/atp3full.pdf/ accessed 2 August 2011.
9. Pocket guidelines for Assessment and Management of Cardiovascular Risk with the WHO/ISH Cardiovascular Risk Prediction Charts for WHO epidemiological sub-regions EMR-B, EMR- D. World Health Organization, 2007. http://www.who.int/cardiovascular_diseases/guidelines/PocketGL.ENGLISH.AFR-D-E.rev1.pdf/ accessed 2 August 2011.
10. Lefler, L., 2001. Perceived risk of heart attack: A function of gender? Nursing Forum, 2001, 39: 18-26.
11. Mosca, L. *et al.,* 2000. Awareness, perceptions and knowledge of heart disease risk and prevention among women in the United States. Archives of Family Medicine, 9: 506-515.
12. Mosca, L. *et al.*, 2006. National study of women's awareness, preventive action and barriers to cardiovascular health. Circulation-Journal of the American Heart Association, 113: 525-534.
13. Muto, T. and K. Yamauchi, 2001. Evaluation of a multi-component workplace health promotion program in Japan on CVD risk factors. Journal of Preventive Medicine, 33: 571-577.
14. White, K. and P. Jacques, 2007. Combined diet and exercise intervention in the workplace: Effect on CVD risk factors. American Association of Occupational Health Journal, 55: 109-114.