

Strategic Plan to Promote Cardiovascular Health and Wellness Regarding Adults Smokers

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Abstract:

Background Promoting ideal cardiovascular health is one strategy to promote health equity for adult smokers. **Aim of the study:** This study aimed to evaluate the effect of strategic plan to promote cardiovascular health and wellness regarding adults' smokers. **Subjects and Methods: Research design:** A quasi-experimental research design was utilized. **Setting:** This study was conducted at out-patients cardiology clinics, allied to Zagazig University Hospital. **Subjects:** A Purposive sample of 80 patients, 40 randomly assigned to each group study and control groups. **Tools of data collection:** Patients' interview questionnaire, The cigarette dependence scale, Self-reported dietary adherence questionnaire, Physical activity assessment questionnaire, and The Warwick-Edinburgh Mental Well-being scale. **Results:** The most of patients in the study group (90.0%) had normal pulse rate and blood pressure post intervention, the majority (80.0%) had clear breath sound, and three quarters (75.0%) had not chest pain. There was a highly statistically significant difference between study and control group post intervention concerning total knowledge, cigarette dependence, dietary adherence, physical activity, and mental well-being at $p < 0.001$. **Conclusion:** According to study findings, the level of Knowledge, cardiovascular health, dietary adherence, cigarette dependence, physical activity, and mental well-being among the study group patients was improved post intervention compared to pre intervention. Statistically significant differences happened between both groups considering Knowledge, cardiovascular health, dietary adherence, cigarette dependence, physical activity, and mental well-being, which supported the stated hypothesis. **Recommendations:** Additional study on larger probability sample is recommended for general capacity.

Keywords: Cardiovascular, Health, Smokers, Strategic Plane and Wellness

Introduction

Cardiovascular diseases (CVDs) are most important cause of morbidity and mortality throughout the world ^[1]. CVD is the leading cause of mortality globally and involves a comprehensive and varied range of subtypes, including ischemic heart disease (IHD), cardiac dysrhythmias, cerebrovascular disease, peripheral arterial disease and heart failure ^[2].

Smoking increases the risk of CVD. However, the magnitude of this increase in risk varies substantively according to a range of factors ^[3]. Smoking-related CVD risks are highest in current and recent smokers, compared to never smokers and those

who have quit in the more distant past. Risk also increases with increasing length of use and with greater intensity of smoking, as measured by the number of cigarettes smoked per day ^[4]. Smoking markedly increases the risk of acute coronary and cerebrovascular events, including myocardial infarction, stroke and sudden death. Smoking accelerates atherogenesis producing premature atherosclerosis in epicardial coronary arteries, the aorta, carotid, and cerebral arteries, as well as peripheral circulation. Other cardiovascular effects of smoking include exacerbation of stable angina pectoris, intermittent claudication, vasospastic

angina, and restenosis after thrombolysis or angioplasty of coronary or peripheral arteries and promotes progression/aggravation of heart failure [5].

In 2004 the Surgeon General's report listed six pathogenetic mechanisms of smoking-induced heart disease: endothelial damage, prothrombotic effect, inflammation, abnormal lipid metabolism, increased myocardial oxygen and blood demand and decreased myocardial blood and oxygen supply. The increased cardiovascular risk seems to be related to the adrenergic effects of nicotine that result in an increased heart rate, increased inotropic status, increased coronary microvascular resistance and reduced insulin sensitivity [6].

One strategy to reduce the burden of CVD is to promote perfect cardiovascular health, a stance supported by the American Heart Association (AHA), for the prevention of CVD. Ideal cardiovascular health is defined by seven health-promoting activities known as Life's Simple 7 (LSS; blood pressure management, cholesterol control, blood glucose/sugar reduction, physical activity, healthy diet, weight loss, tobacco cessation) [7]. Tobacco control can be conducted by promotion of a non-smoking and tobacco free lifestyle. Education about the harms and effects of tobacco and exposure to second-hand smoke to the patients is a significant part of the health promotion [8]. Smoking cessation among established smokers are key for reducing the associated negative health consequences. Confirmed tobacco cessation treatment includes pharmacotherapy and behavioral support, which are most effective when provided together [9].

Facts of positive psychological well-being, such as optimism, have been identified as positive health assets because they are prospectively associated with the 7 metrics of

cardiovascular health (CVH) and improved outcomes related to cardiovascular disease. Connections between psychological well-being and cardiovascular conditions may be mediated through biological, behavioral, and psychosocial pathways. Individual-level interventions, such as mindfulness-based programs and positive psychological interventions, have shown promise for modifying psychological well-being [10].

Significance of the study

Egypt is a developing country that exhibits an increase in the extent of smoking in its population. The prevalence of smoking in Egypt in 2010 was 22% (approximately 11 504 500 individuals) and is increasing to 24.4% and 50% of Egyptian people exposed to secondhand smoke in their own homes. In 2004, almost 170 000 tobacco-related deaths took place in Egypt. approximately 3.4 billion Egyptian pounds a year are spent in dealing with tobacco-related health problems [11]. Cigarette smoking is the most confusing and complex risk factor for CVDs because it is a mixture of over 7,000 chemical compounds from many different classes. A few numbers of smokers know that there are a lot of substances such as ammonia, arsenic, lead, mercury and radioactive elements are contained in cigarettes, most of them know only about carbon monoxide and nicotine. What is even worse is the light awareness of the individuals on the unhealthy effects of smoking.

Aim of the study

This study aimed to evaluate the effect of strategic plan to promote cardiovascular health and wellness regarding adults smokers.

This aim was accomplished through the following objectives:

1. Assess smokers' knowledge regarding smoking effect on cardiovascular health
2. Determine the effects of smoking on cardiovascular function.

3. Design nursing strategic plan for adults smokers.
4. Implement and evaluate the effect of nursing strategic plan for promoting health and wellness regarding cardiovascular smoking adults.

Research Hypothesis

To fulfill the purpose of this study, the following research hypotheses were formulated:

H₁ The Knowledge level of study group patients will be higher post nursing guidelines implementation than pre implementation.

H₂ The mean cardiovascular health assessment and wellness parameters scores of study group patients after implementation of the guidelines are improved than that pre implementation.

Operational Definition

Health

A Condition or quality of the human organism expressing the sufficient functioning of the organism in a given condition, genetic or environmental.

Wellness

The fullest ability of an individual physically, psychologically, socially, spiritually, economically, and the satisfaction of one's role expectations in the family, community, place of worship, workplace and other settings.

Smoking

The activity of inhaling and exhaling the fumes of burning plant material.

Subjects and methods:

Research Design:

A quasi-experimental research design was utilized to conduct the study. quasi-experimental research designs examine whether there is a fundamental relationship between independent and dependent variables. Simply defined, the independent variable is expected to bring about some variation or change in the dependent variable ^[12]. In both experimental and quasi-experimental designs, the program or policy is considered as an 'intervention' in

which a treatment – including the elements of the program /policy being evaluated – is tested for how well it accomplishes its objectives . White and Sabarwal ^[13].

Study Setting

The study was carried out at out-patients cardiology clinics, affiliated to Zagazig University Hospital, the clinics involved two clinics for cardiovascular disease, one clinic for cardiovascular surgeries, and one clinic for arrhythmia.

Study Subjects

A purposive sample of (80) patients admitted to out-patients cardiology clinics. The study subjects were divided into two equal groups, study and control (40 patients for each group). The sample was estimated by power and sample size calculation program to provide power of 80%. Formula of calculating

sample size is

$$n = N * X / (X + N - 1),$$

$$X = Z_{\alpha}^2 * p * (1-p) / MOE^2$$

Sample criteria: Any patient joining the study setting during the period of the study was appropriate for inclusion in the sample once fulfilling the following criteria.

- Inclusion criteria:
 - Adult patient (18-60 years old), both sexes, smokers for at least one year, and able to communicate.
- Exclusion criteria
 - Congenital heart diseases, End stage chronic diseases, and extremely obese (BMI > 40)

Study group had nursing guidelines, and control group had the routine care

Tools of data collection:

Tool I: Patients' interview questionnaire.

It was designed by the researcher based on literature review and views of expertise for content validity. It was translated in Arabic form to avoid misunderstanding; it was applied to all studied patients before (pretest) and after (posttest) implementation of the

guidelines. The questionnaire covered five main parts as the following:

Part I; demographic Data

It included eight items of personal demographic characteristics of the patients such as age, gender, marital status, level of education, occupation, residence, income, living status.

Part II; Patient's Medical and Surgical History: It involved five questions about the medical and surgical history of the patients related to diagnosis, history of surgeries, comorbid, and associated manifestations. **It was adopted from** Lim, et al^[3].

Part III; History of smoking and smoking habits: It involved 9 questions about history of smoking and smoking habits. It was adopted from GATS^[14], Lim et al^[3], & Yathish et al^[15].

Part IV; Patient's knowledge assessment questionnaire (Pre/ Posttest): It involved 15 questions about Patient's knowledge regarding smoking and its effect on cardiovascular health. It was adopted from Khan et al,^[16] Messner & Bernhard^[1], and Gallucci et al,^[17]. These questions were classified into 2 sections:

Section (A) Patient's knowledge about smoking: involved 5 questions about numbers of substances are in a cigarette, components of a cigarette, the main ingredient in a cigarette that leads to addiction, the effect of nicotine on the body, Gas produced by burning tobacco in a cigarette.

Section (B) Patient's knowledge about cardiovascular diseases: included 10 questions about cardiovascular diseases caused by smoking, the risk factors for developing cardiovascular disease in smokers, symptoms, complications, diagnosis, treatment, prevention, healthy diet for cardiovascular patients, unhealthy diet, effect of physical activity on cardiovascular health.

The scoring system:

The total score of the knowledge was 72 grades (100%). Scoring of questions (1,3,5), each question has one correct answer, if the patient answer is correct, patient would score one grade. But, in questions (2,4,6,7,8,9,10,11,12,13,14,15), each correct option has score 1 grade, and then all selected options are collected, and score given. The option of "I don't know" has score zero grade. Knowledge level was considered satisfactory at cut of point $\geq 50\%$ and it was considered unsatisfactory at cut of point $< 50\%$ based on statistical analysis.

Part V: Patient cardiovascular health assessment sheet (pre\posttest): to assess patient's cardiovascular health. It was adapted from Khan et al,^[16] and Duncan et al^[18]. It covered 21 questions that grouped under 10 main sections: homodynamic data, ECG, coagulation test, cardiac enzymes, lipid, lower limb edema, chest pain, neck vein distension, body math index (weight in kilograms/ height² in meters. Baladad et al^[19], and blood glucose level.

Tool II: The Cigarette Dependence Scale. It used to assess smokers' dependence level for tobacco. It was adopted from^[20]. The CDS-12 scale is a 12-item scale that assesses some components of formal diagnostic systems' e.g., definitions of dependence with an emphasis on compulsion to smoke, withdrawal, loss of control, time allocation, neglect of other activities, and persistence despite harm. Items on self-perception of addiction and smoking rate are also included. Response choices are on a five-point Likert scale from 1 to 5^[21]. The item scores of the CDS-12 are recoded and aggregated on a level of dependence scale that ranges from 12 (lowest) to 60 (highest). The CDS includes a range of variables thought to be associated with cigarette dependence and produces a score indicating the level of individual dependence. Higher scores indicate

higher cigarette dependence, while lower scores indicate lower cigarette dependence. The cut-off score for low cigarette dependence =12 while, high dependence > 12 Stavem et al ^[22].

Tool III: Self-reported dietary adherence questionnaire. it was used to measure the overall adherence to dietary eating pattern, as well as the consumption of individual food groups. A point was given if the consumption of the specific food group was above or below a cut-off value. it was adopted from Bishop et al ^[23]. The cut-off values were obtained from the questionnaires developed by Martínez-González et al ^[24], and further adapted by Schröder et al ^[25].

These cut-off values were determined by a dose-response curve of food consumption in relation to cardiovascular disease risk. The questionnaire was designed in two parts (13 questions) were used to determine the current level of adherence to diet. Part, one involved eight questions; five about the average intake of food groups on a daily basis, and three questions about the current food habits. Part two concerned five questions about the average intake of food groups on a weekly basis.

The Scoring system:

The total score of dietary adherences was 13 grades (100%). The scoring of first five questions of part one and the five questions of part two was zero, one, two. While the three questions of part one had two answers either " yes, or no" scored as one, zero consecutively. to determine the adherence to diet; higher adherence was linked with a higher number. Low, intermediate and high adherence scores were classified as 0-5, 6-9 and 10-13, respectively Bishop et al ^[23].

Tool IV: Physical activity assessment questionnaire (pre/posttest)

It was developed by the researcher based on Craven, and Hirnle ^[26] & Wilkinson and Leuven ^[27].

It involved eight questions about patient's practice of physical activities. Each question had three answers; "never, once, twice", or " never, 30 min, 30-60 min" scored as zero, one, two consecutively. Physical activity level was considered satisfactory at cut of point $\geq 70\%$ and it was considered unsatisfactory at cut of point $< 70\%$ based on statistical analysis.

Tool V: The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (pre/posttest)

The scale was used to assess mental well-being status for studied patients. It was adopted from; *NHS Health Scotland* ^[28], the scale involved 14 items, each of the 14 item responses in WEMWBS are scored from 1 (none of the time) to 5 (all of the time) and a total scale score is calculated by summing the 14 individual item scores. The minimum score is 14 and the maximum is 70 based on statistical analysis. The total scale score was measured as mean and standard deviation.

Validity and Reliability of the proposed tools by using face and content validity. Face validity aimed at verifying the items to determine whether the tools measure what supposed to measure. Content validity was conducted to decide whether the content of the tools covering the aim of the study. Tools were modified by five experts in each specialty and academic position "three expertise from medical-surgical nursing staff, and two from cardiology staff "who reviewed the tool's content for clarity, relevance, comprehensiveness, understanding, and ease for implementation. According to their opinions, minor modifications were done, and the final form was developed.

The reliability of the tools was tested using the internal consistency method. It was found that Cronbach's alpha reliability coefficient was 0.824 for patient knowledge, Patient

cardiovascular health score was reliable at 0.807, the Cigarette Dependence Scale score was 0.873, while Self-reported dietary adherence was reliable at 0.841, Physical activity score was reliable at 0.852 and finally, the reliability of the Warwick-Edinburgh Mental Well-being Scale score was 0.833. Content validity and reliability tests were performed before beginning of data collection.

Pilot study:

A pilot study was conducted on eight patients (10%) of the whole study sample to test the clarity and practicability of the tools and to approximate the required time to fill in each form. Necessary adjustments were done according to the pilot study results. Pilot subjects were later excluded from the main study sample.

Field work

Upon securing all necessary official permissions were obtained, the field work was started in December 2021 and lasted to May 2022. The researchers visited the study setting, met with the director and head nurses to explain the study aim and procedures, and to gain their approval and cooperation. Then, the researcher met with the patients who accomplished the eligibility criteria, explained to them the purpose of the study and its procedures as well as their rights, and invited them to participate. Those who participated were randomly assigned either to the intervention or to the control group. The researchers also explained what is required from each patient in the study or control groups to do for participating in the study. The study was conducted through four phases: preparatory, planning, implementation, and evaluation.

Preparatory phase:

This phase was concerning to construction of the study tools and production of strategic plan by the researchers based on extensive review of current, related literature, it was written by simple Arabic language

and included pictures for more illustrations to simplify patients' understanding.

Planning phase: During this phase, the researchers designed the strategic plan based on review of the most recent and appropriate literature, and under the guidance of the supervisors. The main goal was to promote cardiovascular health and wellness for adults smokers. The content of the strategic plan was developed based on this general aim in addition to specific objectives, which responded to patients' needs identified in the assessment phase.

Specific objectives: By the end of the program, the participants will be able to list components of cigarette, mention the main component of cigarette causing addiction, determine the effect of nicotine on the body, recognize the effect of smoking on cardiovascular health, list common cardiovascular manifestations, explain risk factors of cardiovascular diseases, mention complications of cardiovascular diseases, enumerate methods of diagnosis of cardiovascular diseases, repeat methods of treatment of cardiovascular diseases, discuss methods of prevention of cardiovascular diseases, explain the healthy diet and restricted food for cardiovascular patients, explore benefits of smoking cessation in promoting cardiovascular health, recognize the importance physical activity on cardiovascular health, repeat the rules to be considered when doing physical activity, apply physical exercises of each phase of physical activity, perform talking test, demonstrate steps of measuring radial pulse, and demonstrate steps of measuring blood pressure to guide the patient when to stop physical exercises.

Teaching methods were selected to suit teaching of small groups in the form of lectures, brainstorming, demonstration, and re-demonstration

to facilitate comprehension and integration of theory and practice. Teaching media were prepared as PowerPoint presentation, videos, and colored posters. Additionally, the researchers prepared a booklet that covered theoretical and practical information.

Implementation phase: The developed strategic plan was implemented in the form of sessions carried out in the study settings for the patients in the study group over two days per week (Sunday & Tuesday). The study group patients were distributed into small groups including 3-5 patients in each group. The content of the strategic plan was distributed over 7 consecutive sessions. The first session was for orientation to clarify aim and contents of the strategic plan, its general objectives, the teaching methods, learner's activities, and evaluation methods. Two sessions covered the theoretical part of the program, whereas the remaining four sessions were for the practical part. These included two sessions for demonstration and re-demonstration of physical exercises, one session for demonstration and re-demonstration of steps of measuring radial pulse, and the last session for demonstration and re-demonstration of steps of measuring blood pressure. Measuring radial pulse and blood pressure were covered in the booklet for the purpose of guiding the patient when to stop exercises. Moreover, the researchers handed the booklet of strategic plan to each patient in study group. The duration of each session was 40–45 minutes.

Concerning the control group, the patients received their routine nursing care by outpatient clinic nursing staff (measuring vital signs, performing ECG, and medication refill) during the time of strategic plan implementation to the study group. They had no additional interventions from the researchers.

Evaluation phase:

Is the latter phase carried out to both groups after 6 months from application of the strategic plan to evaluate its effect by the using of the same pre-test tools for knowledge, cigarette dependence, cardiovascular health assessment, dietary adherence, physical activity practice, and wellness. The researchers evaluated the control group firstly and then the study group to achieve fairness of the results.

Administrative and ethical considerations:

Before the preliminary interview, an oral consent was obtained from each subject after being notified about the nature, purpose and benefits of the study. Patients were also informed that sharing is voluntary and about their right to withdraw at any time without giving reasons. Confidentiality of any obtained information was confirming through coding of all data. The researchers assured patients that the data would be used for only the research purpose. The control group received the same nursing guidelines at the end of the study.

Statistical Analysis:

The collected data organized, tabulated and statistically analyzed using Statistical Package for Social Science (SPSS) version 25 for windows, running on IBM compatible computer. Descriptive statistics were applied (e.g., frequency, percentages, mean and standard deviation). Qualitative variables were compared using qui square test (χ^2) as the test of significance and paired (t) test was used to compare mean score between two groups. Correlation coefficient test (r) was used to assess the correlation between studied variables. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when $p < 0.05$ and a highly significant level value was considered when $p < 0.01$.

No statistical significance difference was considered when $p > 0.05$.

Results

According to the current study table (1) reveals that all studied patients (100.0 %) were males with mean age of both study and control group patients (45.49 ± 6.82 & 47.20 ± 8.23 respectively). More than three quarters of study group patients and more than two thirds of control group patients were educated (77.5% & 70.0% respectively). There were no statistically significant differences between both groups (p value > 0.05).

Table (2) shows that less than half of study and control group patients (40.0% & 47.0% respectively) experienced coronary artery disease. The hypertension was the most common comorbid among study and control group patients (87.5% & 95.0% respectively), followed by diabetes and respiratory diseases. All studied patients (100.0 %) suffered from chest pain, the majority of patients in study and control groups (90.0% & 80.0% respectively) had dyspnea.

Table (3) indicates that all studied patients (100.0 %) were Current smokers, with \bar{X} S.D of smoking duration among study and control group patients were (18.37 ± 4.08 & 17.91 ± 3.97 respectively). All studied patients (100.0 %) tried to quit smoking before. The electronic cigarettes were the most common method followed to quit smoking by study and control group patients (35.0% & 42.0% respectively).

Table (4) illustrates that the majority (85.0%) of patients in study group had a satisfactory level of knowledge regarding smoking and cardiovascular diseases post intervention with a highly statistically significant difference between pre and post phases at $p \leq 0.01$, and there was a highly statistically significant difference between study and control group at post intervention with $p \leq 0.01$.

Table (5) indicates that the most of patients in the study group (90.0%) had normal pulse rate and blood pressure post intervention compared to only one third (35.0%) and (20.0%) of patients in control group respectively. Regarding to breath sounds, the majority of patients in the study group (80.0%) had clear breath sound post intervention while, one quarter (25.0%) of patients in control group were clear. Three quarters (75.0%) of study group patients had not chest pain post intervention compared to over one tenth (12.5%) of control group patients. Nearly one quarter of patients in the study group (22.5.0%) had normal level of High-Density Lipoprotein (HDL) at post intervention while, over one tenth (12.5.%) of control group patients had normal level.

Table (6) reveals that the majority (87.0%) of patients in study group had low cigarette dependence post intervention while the majority (85.0%) of patients in control group had high cigarette dependence with a highly statistically significant difference between both groups at $p \leq 0.01$.

Table (7) explores the majority (80.0%) of patients in study group had high level of dietary adherence post intervention while the majority (80.0%) of patients in control group had low level of dietary adherence with a highly statistically significant difference between two groups at $p \leq 0.01$.

Table (8) shows over three quarters of study group patients (77.5%) while, more than one tenth (12.5%) of patients in control group had a satisfactory level of physical activity post intervention with a highly statistically significant difference between two groups at $p \leq 0.01$.

Table (9) indicates there was a highly statistically significant difference between study group patients at pre and post intervention regarding mental well-being with (36.54 ± 8.97 & 60.37 ± 5.85) respectively at $p \leq 0.01$. and there was a highly statistically

significant difference between study and control group at post intervention with $p \leq 0.01$.

Table (10) reveals there was a positive correlation coefficient between total knowledge and total dietary adherence, total physical activity, and total mental well-being at $p \leq 0.01$. There was a negative correlation coefficient between total cigarette dependence and total knowledge, total dietary adherence, total physical activity, and total mental well-being at $p \leq 0.01$.

Discussion

Regarding to knowledge, the present study showed there was a highly statistically significant difference between study group patients at pre and post intervention, and between study and control group at post intervention. This is supported by Kubzansky et al ^[10], who recommended that it is important to put more effort into adults' education about smoking. **Moreover**, knowledge was the strongest forecaster of whether or not the students were current smokers, in addition to increasing the level of exposure to information on the health risks of smoking, may help lessen the smoking prevalence among Egyptian adolescents. These results are in contralateral with Khodaveisi et al ^[29], who stated less than three fifth of patients did not have the necessary knowledge

According to cardiovascular health assessment, the present study showed that most of patient in the study group had normal pulse rate and blood pressure post intervention. This was in harmony with Gallucci et al ^[1] & Sivadasanpillai, and Ganapathi ^[30] stated that Smoking acutely increases blood pressure as well as heart rate due to sympathetic nervous system activity and there was early reduction in blood pressure on smoking cessation. **As regarding to chest pain**, three quarters of patients in the study group had no exertional chest

pain post intervention. This result was parallel to the results of Yathish et al ^[31] revealed that nearly half of studied patients had no exertional chest pain.

Finally, the current study illustrated that there was a reduction in HDL level for study group patients post intervention where, more than two thirds of the patients had high HDL level pre intervention while, post intervention nearly one quarter were normal and over three fifth were borderline. These findings were in the same line with ^[32] mentioned that giving up smoking improves HDL levels, regardless of body weight, contributing to an improvement in cardiovascular health after smoking cessation. According to the researchers' point of view these findings reflects the positive effect of the intervention.

As regarding dietary adherence, the present study explored that the majority of patients in study group had high level of dietary adherence post intervention and there was a highly statistically significant difference between study and control groups. These findings came in contact with Anurag et al ^[33], Atrous et al ^[34] & Khodaveisi et al ^[29] **pointed** to that the majority of participants had a high adherence post-teaching program, and the dietary compliance (calories, fat, cholesterol, and sodium intake) of the participants in the study group was significantly better than that of participants in the control group.

According to physical activity, the current study illustrated that over three quarters of study group patients had a satisfactory level of physical activity post intervention with a highly statistically significant difference between study and control groups. These results were supported by Pinckard et al ^[33] revealed that two thirds of participants followed the recommended daily physical activities.

Regarding to Mental wellness, the results of the present study allow to assume hypothesis 3 illustrated that

there was a highly statistically significant difference between study group patients at pre and post intervention, and between both groups post intervention. These results were supported by Kubzansky et al ^[35] revealed that there was an association between greater psychological well-being and lower likelihood of smoking. Moreover, Olszewski et al ^[36] in the study about Forms of Emotional Health and Coping with Stress in People with Cardiovascular Diseases added that in the subgroup of "floundering" people, there are significant strong correlations between life satisfaction and the ways of coping with stress.

According to the existing study findings, there was a positive correlation coefficient between total knowledge and total dietary adherence, total physical activity, and total mental well-being. There was a negative correlation coefficient between total cigarette dependence and total knowledge, total dietary adherence, total physical activity, and total mental well-being. These findings were supported by Khodaveisi et al ^[29] & Pinckard et al ^[37] mentioned that educational intervention was effective in promoting physical activity, improving weight control, nutrition, and mental health. **Furthermore**, Salman et al ^[38] pointed to persons with cardiovascular disorders who met the current recommendations for physical

activity were more likely to have better mental well-being and this effect was prompted by diet, BMI, and cigarette smoking.

Conclusion

According to the study findings and the research hypothesis, the level of Knowledge, cardiovascular health, dietary adherence, cigarette dependence, physical activity, and mental well-being among the study group patients was improved post intervention compared to pre intervention. Statistically significant differences happened between both groups considering Knowledge, cardiovascular health, dietary adherence, cigarette dependence, physical activity, and mental well-being. A positive correlation coefficient occurred between total knowledge and total dietary adherence, total physical activity, and total mental well-being, which supported the proposed hypothesis.

Recommendations

Based on results of the current study it can be recommended that:

1. Arabic booklet with easy language and various simple photos should be accessible and provided for all smokers, involving guidelines for appropriate diet and lifestyle modifications.
2. Additional study on larger probability sample is recommended for general capacity

Table (1): Frequency and Percentage Distribution of Demographic Characteristics of the Studied Groups (n=80).

Socio-demographic data	Study group (n=40)		Control group (n=40)		X ²	P-Value
	No.	%	No.	%		
Age (Year)						
30-<40	8	20.0	4	10.0	1.058	0.274
40-<50	24	60.0	25	62.5		
50-<60	8	20.0	11	27.5		
X̄ S.D	45.49 ± 6.82		47.20 ± 8.23		t=2.088	0.101
Sex						
Male	40	100.0	40	100.0	0	0
Female	0	0.0	0	0.0		
Marital Status						
Married	37	92.5	38	95.0	0.196	0.809
Not married	3	7.5	2	5.0		
Educational level						
Educated	31	77.5	28	70.0	0.917	0.176
Not educated	7	17.5	12	30.0		
Occupation						
Working	37	92.5	30	75.0	1.121	0.203
Not working	3	7.5	10	25.0		
Residence						
Rural	22	55.0	30	75.0	1.231	0.191
Urban	18	45.0	10	25.0		
Income						
Sufficient	12	30.0	8	20.0	0.517	0.708
Insufficient	28	70.0	32	80.0		
Living status						
With family	40	100.0	38	95.0	0.205	0.891
Without family	0	0.0	2	5.0		

X²: Chi-square

No statistically significant at p > 0.05.

Table (2): Patient's Medical and Surgical History of the Studied Groups (n=80).

Items	Study group (n=40)		Control group (n=40)		X2	P-Value		
	No.	%	No.	%				
Diagnosis								
Coronary artery disease	16	40.0	19	47.5	1.099	0.219		
Myocardial infarction	12	30.0	10	25.0				
Congestive heart failure	12	30.0	11	27.5				
Surgical history								
Yes	12	30.0	15	37.5	0.925	0.203		
No	28	70.0	25	62.5				
*If yes,								
Coronary angiography	6	50.0	5	33.3				
Percutaneous coronary intervention	12	100.0	12	80.0				
Coronary artery bypass grafting	0	0.0	2	13.3				
*Comorbid								
Hypertension	35	87.5	38	95.0	1.207	0.117		
Diabetes	12	30.0	15	37.5				
Osteoarthritis	0	0.0	0	0.0				
Cancer	0	0.0	2	5.0				
Brain Stroke	0	0.0	2	5.0				
Bone Fracture	0	0.0	0	0.0				
Respiratory diseases	12	30.0	8	20.0				
Chronic Kidney Disease	3	7.5	2	5.0				
Liver disease	0	0.0	1	2.5				
Ophthalmic problems	4	10.0	2	5.0				
*Associated manifestations								
Chest pain	40	100.0	40	100.0	1.444	0.099		
Dyspnea	36	90.0	32	80.0				
Palpitation	25	62.5	22	55.0				
Headache	35	87.5	30	75.0				
Sputum	35	87.5	28	70.0				
Fatigue	28	70.0	35	87.5				
Urinary incontinence	0	0.0	0	0.0				
Loss of appetite	8	20.0	12	30.0				
Others	0	0.0	0	0.0				
No signs	0	0.0	0	0.0				
(*) select more answer	X²: Chi-square		No statistically significant at p > 0.05.					

Table (3): History of Smoking and Smoking Habits of the Studied Groups (n=80).

Items	Study group (n=40)		Control group (n=40)		X ²	P- Value
	No.	%	No.	%		
Duration of Smoking (Years)						
< 10	4	10.0	5	12.5	1.197	0.310
10-<20	13	32.5	15	37.5		
≥ 20	23	57.5	20	50.0		
X̄ S.D	18.37 ± 4.08		17.91 ± 3.97		t=1.143	0.291
*Which type of tobacco do you smoke?						
Manufactured cigarettes	32	80.0	35	87.5	0.501	0.731
Hand-rolled cigarettes	0	0.0	0	0.0		
Pipes	0	0.0	0	0.0		
Cigars	0	0.0	0	0.0		
Water pipes/shisha/ Second hand smoking	12	30.0	10	25.0		
	0	0.0	0	0.0		
How much do you spend for getting tobacco per month? (L.E)						
200-<400	12	30.0	10	25.0	1.099	0.215
400-<600	20	50.0	18	45.0		
≥ 600	8	20.0	12	30.0		
X̄ S.D	407.8 ± 127.5		459.3 ± 147.2		t=2.397	0.141
Did you try to quit smoking before?						
Yes	40	100.0	40	100.0	0	0
No	0	0.0	0	0.0		
How many times did you try to quit smoking?						
One	3	7.5	7	17.5	1.266	0.187
Twice	26	65.0	21	52.5		
Three and more	11	27.5	12	30.0		
*Which method did you follow to quit smoking?						
Counseling	0	0.0	2	5.0	2.014	0.105
Chew on sugarless gum	7	17.5	8	20.0		
Avoid triggers	12	30.0	10	25.0		
Nicotine replacement strategy	10	25.0	8	20.0		
Electronic cigarettes	14	35.0	17	42.5		

(*) select more answer

X²: Chi-square

No statistically significant at p > 0.05.

Table (4): Comparison Between the Studied Patients (Study and Control Group) Regarding to Total Knowledge at Pre and Post Intervention (n=80).

Items	Study group (n=40)								Control group (n=40)								(p ₁)	(p ₂)	(p ₃)	(p ₄)
	Pre				Post				Pre				Post							
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%				
Patients' knowledge about smoking	5	12.5	35	87.5	32	80.0	8	20.0	3	7.5	37	92.5	6	15.0	34	85.0	X ² =23.97 P=.000**	X ² =1.60 .187·p=	X ² =1.08 .317·p=	X ² =21.0 5 p=.000**
Patients' knowledge about cardiovascular diseases	7	17.5	33	82.5	36	90.0	4	10.0	6	15.0	34	85.0	9	22.5	31	77.5	X ² =25.0 7 P=.000**	X ² =1.53 2 99\..p=	X ² =0.75 8 .493·p=	X ² =22.1 0 p=.000**
Total knowledge	6	15.0	34	85.0	34	85.0	6	15.0	4	10.0	36	90.0	7	17.5	33	82.5	X ² =31.7 4 P=.000**	X ² =1.95 5 p=0.162	X ² =0.95 8 p=0.390	X ² =29.2 7 p=.000**

X²: Chi-square p= p-value No statistically significant at p > 0.05.
 P₁: p value for comparing between study group at pre and post intervention.
 P₃: p value for comparing between two group at pre intervention.

**: Highly statistically significant at p ≤ 0.01.
 P₂: p value for comparing between control group at pre and post intervention.
 P₄: p value for comparing between two group at post intervention.

Table (5): Cardiovascular Health Assessment of the Studied Groups at Pre and Post

Items	Study group (n=40)				Control group (n=40)				p ₁	p ₂	p ₃	p ₄
	Pre		Post		Pre		Post					
	No.	%	No.	%	No.	%	No.	%				
Pulse												
Normal	14	35.0	36	90.0	11	27.5	14	35.0				
Abnormal	26	65.0	4	10.0	29	72.5	26	65.0	X ² =13.57	X ² =1.190	X ² =0.967	X ² =13.51
									P=.000**	.218	p= .414	p=p=.000**
Blood pressure												
Normal	7	17.5	36	90.0	5	12.5	8	20.0	X ² =16.3	X ² =1.30	X ² =0.955	X ² =15.0
Abnormal	33	82.5	4	10.0	35	87.5	32	80.0	1	2	.419	p=p=.000**
									P=.000**	p=.314		
Respiratory rate												
Normal	18	45.0	35	87.5	16	40.0	18	45.0	X ² =15.3	X ² =1.00	X ² =0.999	X ² =14.6
Abnormal	22	55.5	5	12.5	24	60.0	22	55.0	4	7	.403	p=p=.000**
									P=.000**	p=.407		
Adventitious breath sounds												
None	8	20.0	32	80.0	6	15.0	10	25.0	X ² =16.1	X ² =2.80	X ² =1.208	X ² =15.9
Crackles	8	20.0	4	10.0	9	22.5	8	20.0	5	4	.279	p=p=.000**
Wheezes	24	60.0	4	10.0	25	62.5	22	55.0	P=.000**	p=.217		
Lipids												
Cholesterol level												
Normal	5	12.5	9	22.5	3	7.5	5	12.5	X ² =10.27	X ² =1.741	X ² =0.961	X ² =9.21
Border line	5	12.5	24	60.0	5	12.5	5	12.5	P=.007**	.165	p= .398	p=p=.009**
High	30	75.0	7	17.5	32	80.0	30	75.0				
HDL												
Normal	5	12.5	9	22.5	3	7.5	5	12.5				
Border line	5	12.5	25	62.5	4	10.0	5	12.5	X ² =10.01	X ² =1.500	X ² =1.055	X ² =9.70
High	30	70.0	6	15.0	33	82.5	30	75.0	P=.007**	.149	p= .357	p=p=.009**
Lower limb edema												
Yes	6	15.0	2	5.0	8	20.0	6	15.0	X ² =8.16	X ² =1.015	X ² =0.934	X ² =8.09
No	34	85.0	38	95.0	32	80.0	34	85.0	5	p=0.430	.411	p=p=.015*
									P=.014*			
Chest pain												
No	0	0.0	30	75.0	0	0.0	5	12.5	X ² =15.0	X ² =2.102	X ² =2.055	X ² =14.7
Only with effort	30	75.0	10	25.0	25	62.5	22	55.0	5	p=0.224	.199	p=p=.000**
Always	10	25.0	0	0.0	15	37.5	13	32.5	P=.000**			
Blood glucose level												
Normal	28	70.0	37	92.5	25	62.5	28	70.0	X ² =17.4	X ² =1.03	X ² =1.057	X ² =15.0
Abnormal	12	30.0	3	7.5	15	37.5	12	30.0	6	2	.396	p=p=.000**
									P=.000**	p=0.355		

Intervention (n=80).

X²: Chi-square p= p-value No statistically significant at p > 0.05. **: Highly statistically significant at p ≤ 0.01. P₁: p value for comparing between study group at pre and post intervention. P₂: p value for comparing between control group at pre and post intervention. P₃: p value for comparing between two group at pre intervention. P₄: p value for comparing between two group at post intervention.

Table (6): Comparison Between the Studied Patients (Study and Control Group) Regarding to Cigarette Dependence Scale at Pre and Post Intervention (n=80).

Items	Study group (n=40)								Control group (n=40)								(p ₁)	(p ₂)	(p ₃)	(p ₄)				
	Pre				Post				Pre				Post											
	Low dependence		High dependence		Low dependence		High dependence		Low dependence		High dependence		Low dependence		High dependence									
No	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%							
Cigarette dependence	5	12.5	35	87.5	34	85.0	6	15.0	3	7.5	37	92.5	6	15.0	34	85.0	X ² =21.63	X ² =1.507	X ² =1.201	X ² =19.81	P=.000**	p=0.147	p=0.171	p=.000**
x̄ S. D	45.25 ± 7.39				19.10 ± 4.13				46.50 ± 7.11				43.09 ± 5.21				t=34.79	t=2.522	t=0.955	t=31.07	p=.000**	p=0.115	p=0.353	p=.000**

X²: Chi-square p= p-value t= t. test. No statistically significant at p > 0.05. **highly significant at p < 0.01.
P₁: p value for comparing between study group at pre and post intervention. P₂: p value for comparing between control group at pre and post intervention.
P₃: p value for comparing between two group at pre intervention. P₄: p value for comparing between two group at post intervention.

Table (7): Comparison Between the Studied Patients (Study and Control Group) Regarding to Self-Reported Dietary Adherence at Pre and Post Intervention (n=80).

Items	Study group (n=40)						Control group (n=40)						(p ₁)	(p ₂)	(p ₃)	(p ₄)
	Pre			Post			Pre			Post						
	High	Intermediate	Low	High	Intermediate	Low	High	Intermediate	Low	High	Intermediate	Low				
No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)				
Self-reported dietary adherence	2 (5.0)	5 (12.5)	33 (82.5)	32 (80.0)	8 (20.0)	0 (0.0)	2 (5.0)	4 (10.0)	34 (85.0)	3 (7.5)	5 (12.5)	32 (80.0)	X ² =27.82 P=.000**	X ² =1.01 p=0.198	X ² =0.85 p=0.401	X ² =25.10 p=.000**
x̄ ± S. D	5.92 ± 1.86			20.15 ± 3.07			5.53 ± 1.55			6.31 ± 1.51			t=21.67 p=.000**	t=1.171 p=0.167	t=1.130 p=0.180	t=20.20 p=.000**

X²: Chi-square p= p-value t= t. test. No statistically significant at p > 0.05. **highly significant at p < 0.01.
P₁: p value for comparing between study group at pre and post intervention. P₂: p value for comparing between control group at pre and post intervention.
P₃: p value for comparing between two group at pre intervention. P₄: p value for comparing between two group at post intervention.

Table (8): Comparison Between the Studied Patients (Study and Control Group) Regarding to Physical Activity Assessment at Pre and Post Intervention (n=80).

Items	Study group (n=40)								Control group (n=40)								(p ₁)	(p ₂)	(p ₃)	(p ₄)				
	Pre				Post				Pre				Post											
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory									
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%								
Physical activity assessment	4	10.0	36	90.0	31	77.5	9	22.5	3	7.5	37	92.5	5	12.5	35	87.5	X ² =18.27	X ² =0.955	X ² =0.888	X ² =16.50	P=.000**	p=0.305	p=0.361	p=.000**
\bar{x} S. D	2.88 ± 1.17				12.49 ± 2.05				2.62 ± 0.91				2.75 ± 0.99				t=13.47	t=1.111	t=1.307	t=12.08	p=.000**	p=0.218	p=0.250	p=.000**

X²: Chi-square p= p-value t= t. test. No statistically significant at p > 0.05. **highly significant at p < 0.01.
P₁: p value for comparing between study group at pre and post intervention. P₂: p value for comparing between control group at pre and post intervention.
P₃: p value for comparing between two group at pre intervention. P₄: p value for comparing between two group at post intervention.

Table (9): Comparison Between the Studied Patients (Study and Control Group) Regarding to Mental Well-Being Scale at Pre and Post Intervention (n=80).

Variable	No	Study group (n=40)		Control group (n=40)		p ₁	p ₂	p ₃	p ₄
		Pre	Post	Pre	Post				
		\bar{x} S. D	\bar{x} S. D	\bar{x} S. D	\bar{x} S. D				
Mental Well-being Scale	14	36.54 ± 8.97	60.37 ± 5.85	35.08 ± 7.83	36.11 ± 6.90	t=26.74 p=.000 **	t=1.319 p=0.18 3	t=1.210 p=0.19 0	t=22.93 p=.000**

t= t. test. No statistically significant at $p > 0.05$. **highly significant at $p < 0.01$.

P₁: p value for comparing between study group at pre and post intervention.

P₂: p value for comparing between control group at pre and post intervention.

P₃: p value for comparing between two group at pre intervention.

P₄: p value for comparing between two group at post intervention.

Table (10): Correlation Between Study Group Knowledge, Cigarette Dependence Scale, Self-Reported Dietary, Physical Activity Assessment and Mental Well-Being Scale at Pre- and Post-Intervention (n=80).

Variables		Total knowledge		Total Cigarette Dependence Scale		Total self-reported dietary		Total Physical activity assessment	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Total cigarette dependence scale	r	-0.485	-0.525						
	p	.000**	.000**						
Total self-reported dietary	r	0.495	0.519	-0.470	-0.502				
	p	.000**	.000**	.000**	.000**				
Total physical activity assessment	r	0.514	0.567	-0.515	-0.537	0.580	0.525		
	p	.000**	.000**	.000**	.000**	.000**	.000**		
Total mental well-being scale	r	0.522	0.538	-0.471	-0.483	0.571	0.519	0.493	0.507
	p	.000**	.000**	.000**	.000**	.000**	.000**	.000**	.000**

r= correlation coefficient test

**highly significant at $p < 0.01$.

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