Readiness for Behavior Change in Patients Living With Ischemic Heart Disease

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ABSTRACT

Background: Readiness for behavioral change may be evaluated by assessing the patient’s stage of change, as described in the transtheoretical model. Identifying readiness to change in patients with ischemic heart disease may enhance the effectiveness of interventions that target risk reduction and lifestyle modification.

Purpose: This study was designed to assess the readiness of patients with ischemic heart disease to change health behaviors as well as to identify the factors that significantly predict this change.

Methods: A descriptive correlation design approach was adopted, and a convenience sample of 122 patients with ischemic heart disease was recruited from an outpatient cardiac clinic. Readiness for behavioral change was evaluated by assessing the stages of change of the participants, as described in the transtheoretical model. Data on readiness to change were collected using the “readiness for lifestyle change inventory.”

Results: A total of 62.2% and 43.4% of the participants were in the precontemplation phase of change for “cease smoking” and “be physically active,” respectively; about 33% of the patients were in the maintenance phase for “control weight”; 36.1% were in the maintenance phase for “reduce consumption of high-fat foods”; and 51.6% and 57.4% were in the maintenance phase for “eat fruits and vegetables” and “practice relaxation,” respectively. Participants who were overweight or obese showed higher readiness to practice physical activity, and those with high cholesterol levels showed a higher readiness to reduce the amount of fat in their diet. Higher income was found to predict higher readiness to eat fruits and vegetables.

Conclusions: Patients are not adequately ready to change their health-related behaviors. Higher cardiovascular risk predicts higher readiness to change health behaviors.

Key Words: behavior, change, heart, readiness, stage of change.

Introduction

Among cardiovascular diseases, ischemic heart disease (IHD) is the leading cause of death worldwide (Go et al., 2013). Previous studies have documented the associations among risk factors, unhealthy lifestyles, and suffering from IHD. A high prevalence of risk factors as well as unhealthy behaviors among patients experiencing cardiovascular diseases and IHD have also been observed (Masana, Ros, Sudano, Angoulvant, & Lifestyle Expert Working Group, 2017; Micha et al., 2017). Jordan faces a high prevalence of IHD, which is the leading cause of death in the country and responsible for 17% of all deaths there (World Health Organization, 2015). Adult Jordanians are widely challenged by cardiovascular risk factors, including obesity (34.5% of adult Jordanians), smoking (26.5%), hypertension (23.2%), and elevated blood glucose (17.7%; World Health Organization, 2015). Moreover, a previous Jordanian study documented a critical shortage of public knowledge about IHD and its risk factors, which has made IHD a largely unrecognized killer in Jordan (Eshah, 2014).

The successful management of IHD depends on successfully controlling the related risk factors (Go et al., 2013). Fortunately, most risk factors are modifiable, and patients may reduce the risk of experiencing IHD if they control these risk factors and pursue a healthy lifestyle (Go et al., 2013). Therefore, researchers started building intervention programs that targeted risk factors and lifestyle modifications (Wolever et al., 2011). Several previous studies dealt with risk behaviors and risk factors as possible predictors of the motivation to change behaviors ( Larson et al., 2018; Morris, Ko, Hutcheson, & Quyyumi, 2018; Noureddine & Massouh, 2019).

As a part of these intervention programs, researchers looked for possible indicators of the successful achievement of their interventions as well as the significant predictors of risk reduction and lifestyle modification. Researchers subsequently became interested in assessing the concept of readiness to change as a possible indicator and predictor of lifestyle modification (Frame, Green, Herr, & Taylor, 2003; Prugger et al., 2015; Steptoe, Kerry, Rink, & Hilton, 2001; Wolever et al., 2011). Many studies highlight the importance of considering stages of change as described by the Transtheoretical Model (TTM) when designing and implementing cardiac rehabilitation and risk reduction programs (Mochari-Geenberger, Terry, & Mosca, 2010; Toth-Capelli, Brawer, Plumb, & Daskalakis, 2013).
The TTM of health behavior change, described by James Prochaska and colleagues in 1977 (Prochaska & DiClemente, 2005), facilitates the monitoring of changes in daily-lifestyle-related health behaviors. This model was gradually refined into its current form over the following two decades. The model, based on several related psychotherapy theories, has generated significant interest in the literature in recent years (Prochaska & DiClemente, 2005).

The TTM includes several constructs, including stage of change, process of change, decisional balance, self-efficacy, and temptation (Norcross et al., 2011), which produce a tool to help understand changes in health-related behaviors in humans.

This study focuses on the stage of change construct. “Change of behavior” may be defined as the process of passing through different stages over time (Norcross et al., 2011). The TTM defines five stages of behavior change, including precontemplation, contemplation, preparation, action, and maintenance. Precontemplation is the stage at which a patient is not yet ready to change and does not think that she or he needs to change her or his behavior. Contemplation is the stage at which a patient begins to weigh up the pros and cons of changing a behavior. Preparation is the stage at which a patient develops the intention to start changing her or his behavior in the near future. Action is the stage at which a patient has changed her or his behavior for a period of less than 6 months. Finally, maintenance is the stage at which a patient has changed her or his behavior for a period of longer than 6 months (Norcross et al., 2011).

The model has been used for various issues, including stress management (McKee, Bannon, Kerins, & FitzGerald, 2007), depression prevention (Levesque et al., 2011), hypertension management (Drevenhorn, Bengtson, Allen, Säljö, & Kjellgren, 2007), adherence to lipid-lowering agents (Johnson et al., 2006), weight control (Ceccarini, Borrello, Pietrabissa, Manzoni, & Castelnuovo, 2015), and smoking cessation (Chouinard & Robichaud-Ekstrand, 2005).

Studies that assessed stages of change in cardiac patients highlighted some interesting findings about factors that relate to readiness for behavior change. Doherty, Steptoe, Rink, Kendrick, and Hilton (1998) found higher-risk patients more ready to change their behaviors than lower-risk peers. For example, they found patients with higher cholesterol levels more ready to reduce fat in their diet and those who were physically inactive and overweight more ready to increase physical activities (Doherty et al., 1998). In an interventional study that targeted control over modifiable cardiac risk factors, researchers reported significant improvements in the readiness of patients to reduce consumption of fats, increase physical activities, and cease smoking (Steptoe et al., 2001). Another study reported an improvement in patient readiness to reduce fat intake and increase fruit and vegetable intake (Frame et al., 2003). Another study that assessed readiness to change in patients with heart failure reported the surprising finding that, although all of the participants committed to avoid tobacco, engage in regular physical activity, and lose weight, an assessment of the stages of change conducted afterward revealed that only a small number had actually achieved the recommended level of behavioral change (Sneed & Paul, 2003).

In this study, TTM is used to link the data from the measurement tool to the five stages of change to produce a clear picture of the readiness of patients with IHD to change their health-related behaviors. “Readiness to change” has been defined as a psychologically impeded intent to adopt a new pattern of doing things (Andreasen, 1991).Identifying the stages of change in patients describes their current readiness to change their health behaviors, which in turn provides nurses with a clear picture and a reference point to prepare patients to modify their health-related behaviors. Therefore, nurses and other related healthcare providers should focus on increasing patient readiness to change by using special techniques such as motivational interventions, which have proven to be a successful tool for achieving behavior change in at-risk patients (Eaton et al., 2018). Because of the scarcity of cardiac rehabilitation centers in Jordan, nurses may practice health education about lifestyle modification either in their patients’ rooms before discharge or in outpatient clinics. The therapeutic behaviors of motivational interview consist of open-ended questions, reflective listening, and supportive statements (Miller & Rollnick, 2012) that lead patients to self-exploration (Borsari & Carey, 2005).

In addition, considering the stages of change may help build better, more successful cardiac rehabilitation programs by allowing the preparation of content that is specific to each stage of behavior change. Therefore, this study aims to assess readiness to change of patients with IHD to identify the stage of change for each of the targeted modifiable risk factors and to identify the factors that significantly predict the readiness of patients to change their health-related behaviors.

This study asked the following research questions: (a) “How are the patient participants with IHD distributed over the five stages of change in terms of health-related behaviors (i.e., smoking cessation, physical activity, weight control, control over eating a high-fat diet, eating fruits and vegetables, and practicing relaxation)” and (b) “What are the predictors of health behavior change in patients with IHD?”

Methods

Design and Sample

This study implemented a cross-sectional descriptive correlation design. The required sample size, which was calculated by setting a medium effect size = 0.15, power = 80%, and α = 0.05, was 118 participants for testing 10 predictors (gender, age, educational level, employment status, monthly income, marital status, smoking status, physical activity, cholesterol level, and body mass index) using a logistic regression model. The 10 predictors were proposed based on the literature related to the risk factors of cardiovascular diseases. These factors were chosen and treated as possible predictors based on assumptions grounded in the “health belief
model,” which states that perceived susceptibility to a certain disease will affect a person’s future behaviors related to that disease (Green & Murphy, 2014).

A convenience sample was recruited by inviting patients with IHD who attended an outpatient clinic at one of the biggest private healthcare centers in the Jordanian capital, Amman, for regular routine follow-up care. Eligibility criteria included a previous medical history confirming myocardial infarction or angina for more than 1 year and no mental or physical disability that may limit the ability to change behaviors.

Data Collection Procedures
Data were collected from March to September 2017. A research assistant met patients in the waiting room. The goal of the study was explained to all potentially eligible patients. To confirm patient diagnosis, the medical files of those patients who were willing to participate in the study were checked. Next, meetings with those patients who satisfied the study’s inclusion criteria were arranged to collect demographical and clinical history and to provide the study questionnaire.

The questionnaires were completed either independently by the patient or, when a patient was illiterate or unable/unwilling to read the instrument, by the research assistant. In cases of the latter, the research assistant did not influence responses and simply recorded the patients’ choices.

Measures
Data related to the readiness to change stage were collected using the “readiness for lifestyle change inventory.” This scale was developed by Krisko-Hagel (2009) to assess the association between the readiness to change stage and commitment to a cardiac rehabilitation program. The scale, consisting of six multiple-choice questions, was designed to evaluate readiness for change in terms of the following six behaviors: smoking cessation, physical activity, weight control, control over eating a high-fat diet, eating fruits and vegetables, and practicing relaxation (Krisko-Hagel, 2009).

Patients were asked a question regarding each of these behaviors and asked to respond using the answer that best reflected their condition. The questions were worded in a positive format to reflect the desired healthy outcome (e.g., “Do you exercise regularly?”). Five possible answers were given for each question, with each answer reflecting a specific stage of behavior change as described in the TTM. Example of these possible answers are “Yes, and I have been for more than 6 months” (maintenance stage); “Yes, and I have been for less than 6 months” (action stage); “No, but I intend to start in the next month” (preparation stage); “No, but I intend to start in the next 6 months” (contemplation stage); and “No, and I do not intend to start in the next 6 months” (precontemplation). The two questions addressing behaviors related to smoking cessation and weight control had, respectively, one additional response, namely, “No, I have never smoked” and “No, I do not need to lose weight.” Patients were requested to choose the answer that best reflected their actual status (Krisko-Hagel, 2009).

Although multiple-choice questions are used frequently in nursing research, debate about the best methods of assessing the validity and reliability of multiple-choice questions continues (Considine, Botti, & Thomas, 2005; Masters et al., 2001). According to Haladyna (2004), the multiple-choice question format provides high reliability because of the objective scoring system used. The face validity for “readiness for lifestyle change inventory” was initially evaluated and supported by the scale developer (Krisko-Hagel, 2009).

Ethical Considerations
Approval number 1-1/2015 was assigned to this study by the responsible institutional review boards. Each patient was told explicitly that participation in the study was voluntary, that the collected data would be used only for scientific purposes, and that results would be reported in groups for the whole sample without any personal identifiers. Patients who decided to participate signed an informed consent form before receiving the study questionnaire.

Data Analysis
Data were analyzed using SPSS Version 22 (IBM, Armonk, NY, USA). Descriptive statistics were used to describe the sample, present the demographic and clinical characteristics of the participants, identify the prevalence of risk factors among the participants, and summarize the status of participants with regard to stages of change. Means and standard deviations were calculated for the continuous variables, whereas frequencies and proportions were calculated for categorical variables. Data regarding the stages of change for the six healthy behaviors were categorized dichotomously (“ready for change” and “not ready for change”). The cutoff point distinguishing “ready for change” from “not ready for change” was identified based on the TTM, in which, for each health behavior, participants in the precontemplation, contemplation, and preparation phases are considered “not ready for (behavior) change” and those in the action and maintenance phases are considered “ready for (behavior) change.” Next, a binary logistic regression model was used for each of the six healthy behaviors to predict readiness for behavioral change. The proposed predictors entered the regression model as one block (enter method).

Results
The study enrolled 122 participants with confirmed diagnoses of IHD. Of these, 25.4% experienced myocardial infarction and 74.6% experienced unstable angina. The age of the participants ranged from 35 to 83 years, with an average age of 54.3 years, and the average duration with IHD up to the point of data collection was 7.3 years. Most participants were men (60.7%), were married (86.1%), had a low educational background (56.6%), were retired (61.5%), and earned a low monthly income (72.1%; Table 1).
Screening for prevalence of cardiovascular-related risk factors revealed a high frequency of smoking behaviors (60.7%), being overweight or obese (63.9%), hyperlipidemia (60.6%), and physical inactivity (68.9%; Table 1).

Stages of Change and Health Behaviors
Two thirds (62.2%) and 43.4% of the participants who were active smokers (n = 74) were in the precontemplation phase for “cease smoking” and “be physically active,” respectively (Table 1). Although 108 of the participants self-reported being aware of the need to control their weight, only one third (33.3%) of this subgroup self-reported as being in the maintenance phase for “control weight” (Table 2).

In addition, slightly over one third of the participants (36.1%) were in the maintenance phase for “reduce consumption of high-fat foods,” whereas 51.6% and 57.4% reported being in the maintenance phase for “eating fruits and vegetables” and “practice relaxation,” respectively (Table 2).

Predictors of Readiness for Behavior Change
Although the binary logistic regression model explained 27% of the variance in readiness for behavior change related to “cease smoking” (Nagelkerke $R^2 = .27$), it was not statistically significant in predicting whether participants were ready to change their smoking behaviors ($\chi^2 = 13.43, p = .49$).

However, the binary logistic regression model significantly predicted readiness for behavior change in the category “practicing physical activity” ($\chi^2 = 55.32, p = .001$), with body mass index serving as the most significant predictor (Table 3). This model explained 52% of the variance in readiness to change for “practicing physical activity” (Nagelkerke $R^2 = .526$), with participants in the “normal weight” category 0.71 times less likely to be ready to practice physical activity than their peers in the “overweight and obese” category (odds ratio = 0.71).

In addition, 23% of the variance in readiness for behavior change related to “control weight” (Nagelkerke $R^2 = .23$), it was not statistically significant in predicting if participants were ready to change their weight control behaviors ($\chi^2 = 20.54, p = .11$).

The binary logistic regression model significantly predicted behavior change readiness for “reduce consumption of high-fat foods” ($\chi^2 = 25.81, p = .02$), with age and cholesterol level as the most significant predictors (Table 3). This model explained 25% of the variance in readiness to change for “reduce consumption of high-fat foods” (Nagelkerke $R^2 = .25$). A 1-year increase in age increased the probability of the participants being ready to control eating a high-fat diet by 1.07 (odds ratio = 1.07). Furthermore, participants in the “normal cholesterol level” category were 0.55 times less likely to be ready to control eating a high-fat diet than their “high cholesterol level” peers (odds ratio = 0.55).

The binary logistic regression model significantly predicted readiness for behavior change for “eating fruits and vegetables” ($\chi^2 = 35.91, p = .001$), with income and employment status as the most significant predictors (Table 3). This model explained 36% of the variance in readiness to change for “eating fruits and vegetables” (Nagelkerke $R^2 = .36$). Moreover, participants in the “intermediate and high income” category were 13.31 times more likely to be ready to eat fruits and vegetables than their “low-income” peers (odds ratio = 13.31). In addition, participants who were currently working were 4.06 times more likely to be ready to eat fruits and vegetables than their retired peers (odds ratio = 4.06).

The binary logistic regression model significantly predicted readiness for behavior change for “practice relaxation” ($\chi^2 = 33.51, p = .002$), with smoking cigarettes, physical activity, educational level, and age as the most significant predictors (Table 3). This model explained 33% of

**TABLE 1.**
**Participant Characteristics and Prevalence of Cardiovascular Risk Factors (N = 122)**

| Variable                          | n    | %   |
|----------------------------------|------|-----|
| Gender                           |      |     |
| Male                             | 74   | 60.7|
| Female                           | 48   | 39.3|
| Marital status                   |      |     |
| Single                           | 17   | 13.9|
| Married                          | 105  | 86.1|
| Educational level                |      |     |
| Secondary school or below        | 69   | 56.6|
| More than secondary school       | 53   | 43.4|
| Employment status                |      |     |
| Retired                          | 75   | 61.5|
| Currently employed               | 47   | 38.5|
| Monthly income                   |      |     |
| Low                              | 88   | 72.1|
| Intermediate or high             | 34   | 27.9|
| Smoking cigarettes               |      |     |
| No                               | 48   | 39.3|
| Yes                              | 74   | 60.7|
| Smoking water pipe               |      |     |
| No                               | 85   | 69.7|
| Yes                              | 37   | 30.3|
| Weight or BMI                    |      |     |
| Normal                           | 44   | 36.1|
| Overweight or obese              | 78   | 63.9|
| Cholesterol level                |      |     |
| Not elevated                     | 48   | 39.4|
| Elevated                         | 74   | 60.6|
| Physical activity                |      |     |
| Active                           | 38   | 31.1|
| Inactive                         | 84   | 68.9|
| Family history of CVDs           |      |     |
| Negative                         | 81   | 66.4|
| Positive                         | 41   | 33.6|

Note. BMI = body mass index; CVDs = cardiovascular diseases.
the variance in readiness to change for “practice relaxation” (Nagelkerke $R^2 = .33$). Moreover, participants who were smokers were 0.15 times less likely to be ready to practice relaxation than their nonsmoker peers (odds ratio = 0.15), those who were physically inactive were 4.6 times more likely to be ready to practice relaxation than their physically active peers (odds ratio = 4.6), and those with better than a secondary school education were 2.96 times more likely to be ready to practice relaxation than their less educated peers (odds ratio = 2.96). Finally, every 1-year increase in age was associated with a 1.05-times increase in probability of being ready to practice relaxation (odds ratio = 1.05).

### Discussion

This study included patients with an established diagnosis of IHD. About two thirds experienced unstable angina, whereas the remaining one third experienced myocardial infarction. Consistent with previous Jordanian studies (Eshah, 2013; Haddad, Saleh, & Eshah, 2017), the results of this study documented a high prevalence of cardiac-related risk factors. The high prevalence of these risk factors among the study sample may be responsible for the participants previously experiencing IHD and may increase the risks of their suffering from other episodes of IHD in the future.

Irrespective of the high prevalence of risk factors in the study sample, only a limited number of patients in this study showed a readiness to change their health-related behaviors. Similar to previous studies (Noureddine & Massouh, 2019; Prugger et al., 2015), about two thirds of the smokers in this study reported being in the preaction stage of behavior change, which indicates little or no intention to cease smoking. Moreover, about half of the sample had no intention of increasing their daily physical activity levels. Similar findings were reported by (Sneed & Paul, 2003), who stated that, although patients believe that they are doing well in controlling their risk

### TABLE 2.

**Stages of Change for the Six Health Behaviors (N = 122)**

| Behavior                  | Precontemplation | Contemplation | Preparation | Action | Maintenance |
|---------------------------|------------------|---------------|-------------|--------|-------------|
| Cease smoking             | 46 (46.2%)       | 9 (9.5%)      | 8 (10.8%)   | 5 (4.8%) | 8 (10.8%)   |
| Be physically active      | 53 (43.4%)       | 19 (15.6%)    | 16 (13.1%)  | 15 (12.3%) | 19 (15.6%)  |
| Control weight            | 38 (35.2%)       | 3 (2.8%)      | 16 (14.8%)  | 15 (13.9%) | 36 (33.3%)  |
| Reduce consumption of high-fat foods | 36 (29.5%) | 10 (8.2%) | 10 (8.2%) | 22 (18.0%) | 44 (36.1%) |
| Eat fruits and vegetables | 20 (16.4%)       | – (–)         | 15 (12.3%)  | 24 (19.7%) | 63 (51.6%)  |
| Practice relaxation       | 13 (10.7%)       | 16 (13.1%)    | 10 (8.2%)   | 13 (10.7%) | 70 (57.4%)  |

*Not intended to be answered by all patients, because some stated they never smoked cigarettes. | Not intended to be answered by all patients, because some stated they were at an ideal body weight.

### TABLE 3.

**Significant Predictors for Change of Health Behaviors (N = 122)**

| Outcome Behavior and Predictor | $B$   | Wald  | $p$   | Odds Ratio | 95% CI for Odds Ratio |
|--------------------------------|-------|-------|-------|------------|-----------------------|
| Be physically active           | -3.45 | 5.51  | .01   | 0.71       | [0.53, 0.94]          |
| Body mass index                |       |       |       |            |                       |
| Reduce consumption of high fat foods |       |       |       |            |                       |
| Age                            | 0.07  | 8.74  | <.01  | 1.07       | [1.02, 1.12]          |
| Cholesterol level              | -0.58 | 4.99  | .02   | 0.55       | [0.33, 0.93]          |
| Eat fruits and vegetables      | 2.58  | 8.99  | <.01  | 13.31      | [2.45, 72.31]         |
| Income                         | 1.41  | 4.79  | .02   | 4.06       | [1.15, 14.26]         |
| Employment status              |       |       |       |            |                       |
| Practice relaxation            | -1.85 | 7.96  | <.01  | 0.15       | [0.04, 0.56]          |
| Smoking cigarettes             | 1.52  | 5.48  | .01   | 4.60       | [1.28, 16.54]         |
| Physical activity              |       |       |       |            |                       |
| Education                      | 1.08  | 3.95  | .04   | 2.96       | [1.01, 8.66]          |
| Age                            | 0.05  | 3.93  | .04   | 1.05       | [1.00, 1.11]          |

Note. CI = confidence interval.
factors, a limited number of them actually performed activities to control these risk factors effectively. These findings may be attributed to a false belief among patients that they are controlling their own health status as well as a lack of appropriate and effective interventions that may improve awareness and correct self-perceptions regarding personal health status.

The stages of change as reflected by the TTM indicate that overall readiness to change healthy behaviors among the study sample fell below expectations. Specifically, the participants were more ready to change their behaviors related to practicing relaxation, eating fruits and vegetables, and reducing the amount of fat in their diets and were not ready for smoking cessation, physical activity, and weight control (Table 2). This finding is consistent with previous studies that reported higher levels of readiness among participants to change behaviors related to consuming more fruits and vegetables and reducing consumption of fats (Frame et al., 2003; Noureddine & Massouh, 2019).

Changing behaviors related to practicing relaxation, eating fruits and vegetables, and reducing fat intake may be achievable through simple intervention programs such as education interventions that increase patient knowledge and awareness about the importance of modifying these behaviors (Eshah, Bond, & Froelicher, 2010). However, behaviors such as smoking cessation, physical activity, and weight control may require interventions that are more advanced and specialized (McKee et al., 2007; Mochari-Greenberger, Terry, & Mosca, 2010; Steptoe et al., 2001). These latter interventions should combine activities such as education, counseling, and skill-building techniques. Moreover, changing these behaviors may require the availability of sufficient infrastructure and resources such as referrals to smoking cessation clinics and dieticians as well as the availability of walking yards and sports facilities (Eshah et al., 2010).

The low readiness among the participants to stop smoking, engage in physical activity, and practice weight control behaviors may relate to the lack of cardiac rehabilitation centers in Jordan and the general paucity of professional assistance available in-country to help patients quit smoking and achieve weight control (Eshah, 2011). Although Jordan has a relatively high level of healthcare for the region, attention to cardiac rehabilitation remains inadequate. This may relate to resource availability, the present focus on primary healthcare, and/ or the lack of healthcare decision-maker attention on rehabilitation. Thus, healthcare providers and cardiac researchers must increasingly prioritize the importance of cardiac rehabilitation to convince decision makers regarding the important role of specialized cardiac rehabilitation centers in improving the quality of life of cardiac patients and in reducing cardiac-disease-related suffering and mortality.

Moreover, physical activity is not a daily routine in Jordan, and so cardiac patients are unlikely to respond to traditional instructions on increasing levels of daily physical activities (Eshah, 2011).

In terms of predicting readiness to change health-related behaviors, the results of this study echoed those of a previous study (Doherty et al., 1998) that found that suffering from higher risks predicted more advancement in the stage of change described by TTM and, consequently, greater readiness to change behaviors. In this study, greater readiness to practice physical activity was predicted by being overweight. In addition, readiness to control eating a high-fat diet was predicted by having a high cholesterol level. In this study, being at a higher risk may intensify the feeling of susceptibility to disease recurrence, which may in turn motivate behavior change.

Eating fruits and vegetables was predicted by a higher income and by being employed. Thus, this behavior may relate to economic status, as people with higher incomes and/or who are currently employed may have relatively more resources. This finding echoes that of Adams and White (2007), who stated that people with higher incomes are more ready to change their behavior than those with lower incomes. Jordan is a middle-income country, and most Jordanians earn a middle-to-low monthly income. Thus, people of lower economic status may perceive buying more fruits and vegetables as an extra burden on their budget and, consequently, are less ready to change their fruit and vegetable purchasing behaviors.

Being physically inactive and having a higher level of education predicted readiness to practice relaxation. People who are physically inactive may perceive themselves as “more fit” to practice relaxation and (falsely) believe that relaxation involves minimal physical exertion. Those who are highly educated may be more knowledgeable about relaxation techniques as well as the benefits of practicing relaxation. Surprisingly, in this study, tobacco smokers were less likely to practice relaxation. This finding is contradictory to a frequently used argument used by tobacco smokers that smoking leads to relaxation.

The generalizability of the study findings should be considered in light of several study limitations, including the relatively small size of the sample, the sampling technique used, the reliance on self-reported measurements, and the collection of the data from one site only. Future studies should collect data from larger samples and include patients from various healthcare settings. Furthermore, it will be helpful to compare the construct of readiness to change with the actual adoption of healthy lifestyles.

Finally, studying readiness for health-related behavioral change over an extended period using a longitudinal study design may provide researchers with valuable information to better understand behavior change processes.

Conclusions

Readiness to change health-related behaviors varies among patients with IHD. Two thirds of the participants in this study self-reported being ready to practice relaxation and to eat more fruits and vegetables. Furthermore, half of the participants self-reported being ready to reduce their fat intake and control their weight. However, only one third self-reported being ready to increase physical activity and to stop smoking.

Higher cardiovascular risk predicts higher readiness to change health behaviors. The participants who were overweight...
or obese showed a higher readiness to engage in regular physical activity, whereas those with high cholesterol levels showed a higher readiness to reduce the amount of fat in their diet. In addition, higher income predicts greater readiness to eat fruits and vegetables.

Implications for Nursing Practice

The findings of this study may assist nurses and other healthcare providers worldwide who are dealing with patients living with chronic heart diseases to modify current and secondary intervention programs. Each of the points below may contribute positively to the improvement of these programs:

- The content and nature of interventions to modify lifestyle and control risk factors should be prepared and tailored individually based on the patient’s stage of change.
- Nurses may utilize tools that are based on the TTM of behavioral change to evaluate patients’ current stages of behavioral change.
- Clinical nurses should set realistic goals for moving patients forward gradually through the stages of change, starting from their current reference point.
- Interventions targeting specific behaviors may need to be changed or tailored based on patient needs. For instance, behaviors such as smoking, physical activity, and weight control may require different interventional strategies than those used for behaviors such as eating foods and vegetables, reducing fat intake, and practicing relaxation.
- Nurses and other healthcare practitioners must tailor interventions to target lifestyle modification and focus on increasing the readiness to change of patients with IHD as a medium for behavior change.
- The five stages of change as described by TTM may be used to reflect the degree of patient readiness for behavior change.

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