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Associations Between Cancer Fatalism, Causal Attributions, and Perceptions of Benefits and Barriers to Screening for Colorectal Cancer

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Abstract

Background The aim of the study was to assess the associations between cancer causal attributions (divine providence, chance or luck, environmental or genetic factors, weak personal resilience), cancer fatalistic beliefs (cancer occurrence and outcome beliefs), and benefits of and barriers to screening for early detection of colorectal cancer.

Methods It was a cross-sectional study of 252 individuals (46% men and 54% women) aged 50–75. Participants completed measures of cancer causal attributions, Powe's cancer fatalism questionnaire, and the benefits and barriers to colorectal cancer screening subscales of the health belief model. The study model was assessed using path analysis and mediation tests.

Results Participants expressed moderate levels of occurrence and outcome of fatalistic beliefs, moderate levels of causal attributions, a high level of perception of the benefits of screening, and a moderate level of barriers to screening. The path model showed good fit measures ($\chi^2 = 17.38$, $df = 14$, $p = .24$; $\chi^2/df = 1.24$; $NFI = .98$; $TLI = .99$; $CFI = .99$; $RMSEA = .03$, 90% CI = .01, .07). Outcome fatalism mediated the relationship between each causal attribution and perceived barriers, whereas occurrence fatalism mediated only the relationship between the causal attribution of divine providence and the perceived benefits of screening.

Conclusions The results add to our understanding of the effects of causal attributions and fatalistic beliefs on perceptions of benefits and barriers to screening; hence, these factors should be the focus of change to reduce barriers to screening for early detection of cancer.

Keywords Cancer · Causal attribution · Cancer fatalism · Benefits of screening · Barriers to screening · Colorectal cancer

Introduction

Intensive efforts are devoted to promoting responsiveness to screening tests for the early detection of cancer, such as colorectal or breast cancer. Usually, intervention programs designed to increase the uptake of various screening tests are based on cognitive models aimed at motivating a person's decision to undergo the test [1–3]. Moreover, existing studies mostly examined the associations between perceptions of cancer using a single theoretical model and screening attendance. The present study focused on the interactions among different sets of perceptions and beliefs toward cancer to suggest an integrative conceptual model.

One of the most used models in researching perceptions of diseases, often applied as a framework for intervention programs, is the health belief model (HBM). The HBM outlines four factors that predict the likelihood that a given behavior will be performed [4]. These include perceived susceptibility to a specific health condition, perceived severity of this condition, perceived benefits of the advised behavior to reduce risk or seriousness of health problems, and perceived barriers, either tangible or psychological, to performing the specific behavior [4]. The HBM was adjusted by Champion and Miller [11] and widely used to predict uptake of screening for the early detection of breast cancer [12–16] and colorectal cancer [17–19]. The HBM components that were assessed in association with uptake of screening have differed among studies [6, 7]; however, previous studies and a recent meta-analysis have shown that

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perceived benefits (i.e., perceiving screening as increasing the chances of a cure of cancer, providing peace of mind, reducing worry, and providing reassurance about one's health) and barriers (i.e., perceiving screening as causing embarrassment, uncomfortable, taking time, expensive, and causing worry) are the most reliable predictors of health behavior performance, whereas the other dimensions elicited inconsistent results [5]. Several studies assessed the associations between perceived benefits and barriers and adherence with screening for the early detection of colorectal cancer (whether fecal occult blood tests or colonoscopy) [6–9] and found them to be significant predictors of uptake of screening [8, 10].

The use of HBM and other cognitive models [1–3] has been criticized because they rely mainly on cognitive and rational processes [20] of decision-making, assuming that an individual's actions are derived from cognitive perceptions that direct behaviors in pursuit of personal interests and goals and toward taking prudent steps [2]. In contrast, a large body of evidence shows that health behaviors are strongly influenced by internal beliefs and perceptions rooted deeply in personal and social values [1, 20, 21] and cultural influences, which indirectly affect decision-making regarding whether to engage in a specific health behavior and often without the person being aware of their effect [20, 21]. The relationship between such beliefs and their effects on elements of the HBM has not yet been examined.

Cancer fatalism is an internal belief that may indirectly affect health behaviors. Cancer fatalism has been defined as the belief that death is inevitable in the presence of cancer (i.e., outcome fatalism [22–24]) and that being diagnosed with cancer is predetermined and beyond the control of the individual (i.e., occurrence fatalism [25, 26]). Studies generally found higher cancer fatalism to be related to lower adherence to screening for various cancer types, including colorectal cancer [27, 28]. Nevertheless, other studies that controlled for background variables reported varying results, ranging from no or weak associations to strong associations between fatalistic beliefs and screening adherence (reviewed in [23, 28]). A few studies assessed the role of cancer fatalism in uptake of screening for colorectal cancer (either fecal occult blood tests or colonscopy) and found that cancer fatalism was associated with lower uptake of screening for colorectal cancer [22, 29, 30]. Additionally, inconsistent results were reported regarding ethnic differences in fatalistic beliefs [28]. However, none of the studies differentiated between occurrence fatalism and outcome fatalism.

A more recent perspective on cancer fatalism focused on causal attributions of cancer [28, 31]. Causal attributions of cancer are the perceived causes of cancer, representing the sources of fatalistic beliefs [28, 31]. This conceptualization draws from the broader theory of causal attribution, which provides a framework to explain how people interpret the causes of events as either internal (the self) or external (uncontrollable conditions [3]). Based on qualitative analysis of focus groups, Cohen et al. [31] suggested a four-factor cancer causal attribution model that focuses on sources of fatalistic beliefs regarding colorectal cancer. The suggested construct was found to have a good construct validity [31]. The model includes the following factors: belief in divine providence, perceiving that major life occurrences are in God's hands and beyond our personal control and represent a divine act of either punishment or a test of an individual's faith in God; belief in chance or luck, perceiving that cancer is a matter of chance or mere luck and cannot be controlled by individual behavior; belief in inevitable environmental or genetic factors, the perception that individuals cannot influence or change the environment or their own genes, nor can they protect themselves from factors that can cause cancer or affect its outcome; and belief in personal resilience as a protective factor, which reflects a belief that resilience is a predetermined trait that individuals either do or do not possess and thus, weak resilience may affect an individual's destiny [31]. Support for the central role of causal attributions of a disease stems from the self-regulatory model [32]. This theoretical model postulates that perceptions of the causes of a disease (among other cognitive attributions toward a disease) affect the emotional reactions to it [32]. To the best of our knowledge, causal attributions were not assessed in relation to uptake of screening for cancer.

To conclude, to date, cognitive perceptions of benefits and barriers of screening for the early detection of cancer and internal beliefs such as fatalism were mostly assessed separately, and the relationship between these constructs remained understudied. Therefore, we aimed to identify factors associated with screening beliefs (i.e., perceived benefits and barriers to screening). More specifically, the aim of the present study was to conduct a path analysis of the associations of cancer causal attributions (independent variable), cancer fatalism (mediating variable), and perceived barriers and benefits to screening (dependent variable). We hypothesized that (a) cancer causal attributions (attributing cancer to divine providence, weak personal resilience, chance or luck, or inevitable environmental or genetic factors) and occurrence and outcome fatalistic beliefs will be negatively associated with perceived benefits and positively associated with perceived barriers; (b) causal attributions will be associated with occurrence and outcome fatalistic beliefs; and (c) each fatalistic belief (occurrence and outcome fatalism) will mediate the associations between causal attributions and perceptions of benefits and barriers (Fig. 1).

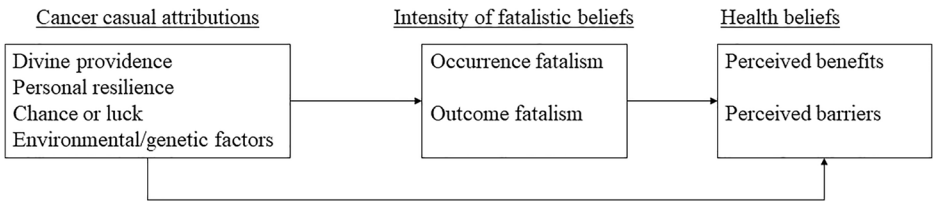

Fig. 1 The proposed study model

Methods

Participants and Procedure

This was a secondary analysis of a mixed-methods and cross-sectional study. The study was approved by the University of Haifa Committee for Ethical Research with Humans (No. 272/14). The sample was composed of 252 individuals aged 50–75 (age range recommended for screening for early detection of colorectal cancer in the general poulation). Participants were recruited by advertisements in digital media, online groups, local papers, and community social or religious meetings. Recruitment of participants and data collection occurred in 2017. Inclusion criteria were being able to answer the questionnaire, not having a diagnosis of colorectal cancer, and not having a first-degree relative diagnosed with colorectal cancer. Due to the recruitment method, the exact rate of refusal to participate cannot be determined; about 50 people directly declined and an additional 50 returned questionnaires that were only partially filled out and thus, not included in the data analysis.

Participants gave informed consent prior to enrollment in the study. Although this was a convenience sample, the sampling sought to represent the proportions of Jews, Muslims, and Christian Arabs in Israel, people residing in cities and rural communities, and people with diverse socioeconomic status and education levels. Sample size was determined based on the guideline that an adequate sample size for performing a path analysis should be 10 to 20 times the number of parameters assessed. The path analysis featured six independent or mediating variables, along with about four background control variables; thus, the minimum optimal sample size is 160, but larger samples would present an advantage.

Table 1 shows the distribution of the background variables of the participants. The mean age of the participants was about 60, and the gender distribution was almost equal. Levels of education ranged between 0 and 25 years, with a mean of 12 years; most of the participants reported a moderate level of income; and the majority lived in an urban area. Two-thirds of the participants were Jews ($n=187$) and the rest were Arabs ($n=65$). We purposely increased the rate of Arab participants in comparison to their rate in the population, to ensure ethnically representative samples; about half of the participants were secular, whereas the rest were either mildly or very religious. The distribution of the sample's characteristics is largely similar to the distribution of these characteristics in the Israeli population [33].

Measures

Background details included gender, age, marital status, type of residence, years of education, religion, degree of religiousness, average family income, and acquaintance with a person with cancer.

The Causal Attributions of Cancer Questionnaire [31] is an 18-item scale, constructed based on a qualitative analysis of individuals' perceptions of causes of cancer. The scale consists of four subscales measuring belief in divine

Table 1 Background characteristics of the participants ($N=252$)

Variables	*n* or *M*	% or *SD*	Range
Age, years	60.41	7.16	50–74
Gender			
Male	117	46.43	
Female	135	53.57	
Education, years	12.60	3.42	0–25
Family status			
Married or partnered[a]	202	80.16	
Other	50	19.84	
Economic status[a]			
Low	54	30.67	
Moderate	144	57.14	
High	53	12.00	
Place of residence			
City	187	74.21	
Rural or small community	65	25.79	
Sector			
Jewish	187	74.21	
Arab	65	25.79	
Religiosity			
Secular	118	46.82	
Mildly religious	78	30.95	
Very religious	56	22.23	
Acquainted with a cancer patient[a]	101	40.2	

[a]Percentages calculated from actual responses

providence (six items, e.g., "I believe God decides whether I get cancer"); belief in personal resilience as a protective factor, representing a predetermined trait that individuals either do or do not possess and thus, individuals low in resilience (i.e., weak resilience) are more prone to attracting cancer and worse outcome (six items, e.g., "Being affected by cancer depends on individual's strength and resilience"); belief in chance or luck (three items, e.g., "Getting cancer is a matter of chance"); and belief in inevitable environmental or genetic factors (three items, e.g., "Radiation from antennas and cellphones causes cancer"). Participants rated the items on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate higher causal attributions of cancer to divine providence, weak personal resilience, chance or luck, or inevitable environmental and genetic factors. The questionnaire was previously assessed for construct validity (divergent, convergent, and confirmatory factor analysis) and reliability, as previously described in detail [31]. In a previous study, the internal consistency (Cronbach's α) of the subscales was 0.92 for belief in divine providence, 0.81 for personal resilience and belief in chance or luck, and 0.62 for belief in inevitable environmental or genetic factors. The internal reliability coefficients in the present study were 0.88, 0.76, 0.80, and 0.62, respectively.

The revised Powe Fatalism Inventory [22, 34] is an 11-item scale based on the original Powe Fatalism Inventory regarding breast cancer and colorectal cancer [22, 35]. Participants rated items on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scale consists of items referring to occurrence fatalism and outcome fatalism (e.g., "If a woman has cancer, she will die soon"). Although Powe and colleagues referred to the items as one measure of cancer fatalism, other researchers suggested that the inventory measures two distinct concepts [25] and suggested using it as two subscales. The questionnaire was translated into Hebrew [25]. An average score was calculated for each subscale, with high scores indicating a high intensity of fatalistic perceptions. In previous studies, internal reliability was found to be $\alpha = 0.89$ [34]. The internal reliability found in the present study for all items was $\alpha = 0.90$.

The HBM questionnaire, as adjusted by Champion [36], assesses factors related to responsiveness of individuals to performing screening for the early detection of breast cancer. It was adapted by Azaiza and Cohen [17] for assessment of factors related to colorectal cancer screening, by means of the fecal occult blood test. In the present study, only the benefits (four items; e.g., "My family will benefit if I take care to perform the test") and barriers (five items; e.g., "I am afraid to perform the test for fear that something will be found") subscales were included. Responses ranged on a 5-point scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The internal reliability in Azaiza and Cohen's [12] study was 0.82 for the benefit and 0.81 for the barriers subscales. In the present study, the internal consistency was 0.81 and 0.75, respectively.

Data Analysis

Data were analyzed for missing responses; 0.36% was missing with no specific pattern of missingness. Descriptive statistics were calculated. Pearson correlations among the study variables and between the study variables and background variables were assessed. The proposed path model was tested with AMOS 23. Model fit was assessed with generally accepted thresholds for six indexes: the chi-square and normed chi-square (χ^2/df) to assess the model's overall fit and parsimony; the comparative fit index (CFI), Tucker-Lewis index (TLI), and normed fit index (NFI), which are incremental fit indexes; and root mean square error of approximation (RMSEA) and confidence interval, which measures the discrepancy per degree of freedom and indicates the absolute fit of the model. Normed chi-square values less than or equal to 2.0; CFI, TLI, and NFI scores greater than 0.95; and RMSEA values less than 0.05 indicate a good model fit. The total, direct, and indirect effects were further tested using AMOS for size of effects, 95% confidence intervals (CIs), and the significance of the effects.

Results

Means and Standard Deviations of Study Variables

Table 2 shows means and standard deviations of the study variables. The mean score of perceived benefits of the fecal occult blood test was high, whereas the mean score of perceived barriers was below the middle of the range and thus, relatively low. Of the two measures of fatalistic beliefs, the mean of the occurrence fatalistic belief was almost in the middle of the range (thus, moderate), whereas the mean score of the outcome fatalistic belief was relatively low. Moderate scores were obtained for three of the causal attributions—belief in the divine providence, belief in personal resilience, and belief in chance or luck—whereas the mean score of the belief in environmental or genetic factors as inevitable causes of cancer was above the middle of the range, therefore, moderately high.

Ethnic differences were found in occurrence fatalism ($t(250) = 2.40$, $p < 0.05$), and in belief in divine control ($t(250) = 2.51$, $p < 0.05$); both were higher among Arab participants compared to the Jewish participants. The other study variables did not differ between the Jewish and Arab participants.

Table 2 Means, SDs, and Pearson correlations among study variables

Variables	*M*	*SD*	1	2	3	4	5	6	7
Causal attributions of cancer									
1. Divine providence	2.33	0.93							
2. Weak personal resilience	2.31	0.54	.08						
3. Chance or luck	2.47	1.00	.57***	.09					
4. Environmental or genetic factors	3.21	0.80	.04	−.27**	.27**				
Intensity of fatalistic beliefs									
5. Occurrence fatalism	2.44	1.13	.68***	.12	.41***	.04			
6. Outcome fatalism	1.74	0.84	.31**	.35**	.34***	.23*	.45***		
Health beliefs									
7. Perceived benefits	4.31	0.65	−.16*	−.54***	−.10	.08	−.30**	−.43***	
8. Perceived barriers	1.97	0.84	.28**	.20**	.12	.11	.26**	.38***	−.23*

*$p < .05$;**$p < .01$; ***$p < .001$

Associations Between the Study Variables

Table 2 shows associations between the study variables. Perceived benefits and barriers were negatively and significantly associated. Occurrence and outcome fatalistic beliefs were negatively associated with perceived benefits and positively associated with perceived barriers; the higher the intensity of the fatalistic beliefs, the lower the perceived benefits and the higher the perceived barriers. Both fatalistic beliefs were positively associated with causal attributions of cancer. Whereas occurrence fatalistic belief was significantly associated only with divine providence and belief in chance or luck, the associations of outcome fatalism with each causal attribution were all statistically significant. Thus, the higher the causal attributions, the higher the fatalistic beliefs. Next, attributions of cancer to divine providence and weak personal resilience were significantly associated with perceived benefits and perceived barriers (negatively and positively, respectively). Thus, the higher these two causal attributions, the lower the perceived benefits and the higher the perceived barriers. Due to multiple correlations among the variables, the Benjamini and Hochberg [37] correction for multiple comparisons was conducted, which revealed that all single-paired correlation coefficients remained statistically significant.

Path Model

First, the associations between study variables and background characteristics were examined to determine which background variables should be controlled. Age, education, income, religion, and religiosity were associated with the study variables and therefore, were entered to the initial model (except income, which was strongly associated with education). Thus, the initial variables in the examined model were age, education, religion, religiosity, causal attributions, fatalistic beliefs, and barriers and benefits perceptions; however, the background variables were omitted during the analysis due to lack of associations. The final model (Fig. 2) showed a good fit: $\chi^2 = 17.38$, $df = 14$, $p = 0.24$; $\chi^2/df = 1.24$; $NFI = 0.98$; $TLI = 0.99$; $CFI = 0.99$; $RMSEA = 0.03$, 90% CI = 0.01, 0.07.

The total, direct, and indirect effects were further tested for size of the effects (unstandardized and standardized) and

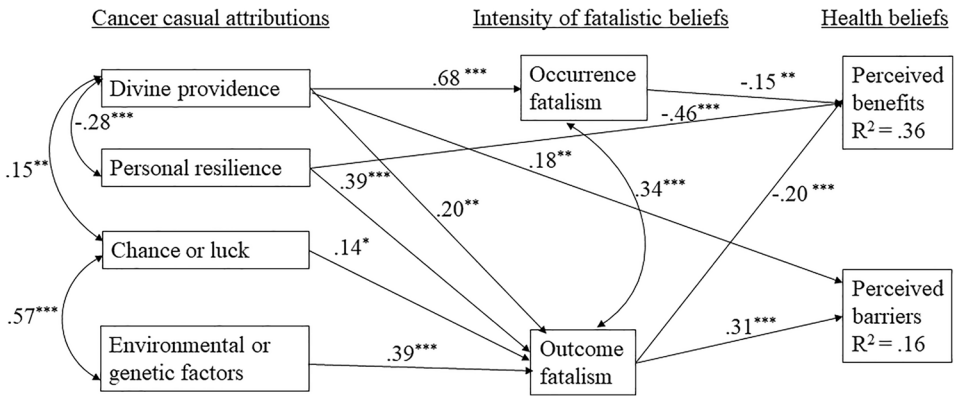

Fig. 2 The direct and indirect associations among study variables

Table 3 Direct, indirect, and total effects and 95% confidence intervals for the final model

Model pathways	Direct effect (95% CI)	Indirect effect (95% CI)	Total effect (95% CI)
Occurrence fatalism ← divine providence	.68** (.68, .94)	–	.68** (.57, .76)
Outcome fatalism ← divine providence	.20** (.07, .28)	–	.20** (.08, .33)
Outcome fatalism ← personal resilience	.39** (.41, .74)	–	.39** (.28, .49)
Outcome fatalism ← chance or luck	.14* (.01, .23)	–	.14* (.03, .25)
Outcome fatalism ← environmental or genetic factors	.31** (.19, .42)	–	.31** (.20, .41)
Perceived benefits ← occurrence fatalism	− .20* (− .16, − .01)	–	− .20* (− .28, − .02)
Perceived barriers ← outcome fatalism	.31 (.20, .42)	–	.31** (.20, .42)
Perceived benefits ← divine providence	–	− .10 (− .22, − .05)	− .14** (− .23, − .07)
Perceived barriers ← divine providence	.18** (.06, .28)	.06 (.03, .11)	.24** (.13, .01
Perceived benefits ← personal resilience	− .46** (− .71, − .41)	− .08** (− .14, − .03)	− .54** (− .64, − .42)
Perceived barriers ← personal resilience	–	.19*** (.07, .19)	.12** (.07, − .42)
Perceived benefits ← chance or luck	–	− .02* (− .07, − .01)	− .03* (− .07, − .01)
Perceived barriers ← chance or luck	–	.04* (.07, .19)	.05* (.01, .10)
Perceived benefits ← environmental or genetic factors	–	− .05** (− .11, − .02)	− .06** (− .12, − .02)
Perceived barriers ← environmental or genetic factors	–	.10** (.05, .16)	.10** (.05, .15)

Standardized coefficients are presented

*$p < .05$. **$p < .01$. ***$p < .001$

their significance. Table 3 summarizes the standardized path coefficients and corresponding statistical values. The model depicts several direct associations: From cancer causal attributions, only the belief in divine providence was associated with occurrence fatalism, whereas all four causal attributions were associated with outcome fatalism. Outcome fatalism was associated with perceived benefits and perceived barriers, and occurrence fatalism was associated only with perceived benefits.

Additionally, several indirect associations were found and their significance was further assessed: Occurrence fatalistic belief mediated the association between the causal attribution of cancer to divine providence and both benefits and barriers perceptions. Thus, the higher the attribution of cancer to God, the lower the perceived benefits of screening and the higher the barriers, through the mediation of occurrence belief. The outcome fatalistic belief mediated the associations between each causal attribution and benefits and barriers perceptions. Namely, the stronger the causal attribution, the lower the perceived benefits and the higher the barriers, through the mediation of outcome fatalistic belief. All indirect effects were significant; thus, the results are mostly consistent with the research hypotheses.

Discussion

The study points to a moderate and similar level of fatalistic beliefs regarding cancer occurrence and cancer outcome as inevitably leading to death. Participants also expressed a moderate degree of each causal attribution, a high level of perceived benefits of screening, and a moderate level of perceived barriers to screening. The occurrence fatalistic belief was associated with lower perceived benefits only, whereas outcome fatalistic belief was associated with both lower perceived benefits and higher perceived barriers. Outcome fatalism mediated the relationship between each causal attribution and perceived barriers, whereas occurrence fatalism mediated only the relationship between the causal attribution of divine providence and the perception of the benefits of screening.

Recently, researchers presented a model of causal attributions of cancer that was supported by confirmatory factor analysis [31]. The present study extended these findings by describing the relations between causal attributions that were conceptualized as the sources of fatalistic beliefs with (a) occurrence and outcome fatalistic beliefs and (b) perceptions of benefits and barriers. Regarding the associations with the two types of cancer fatalistic beliefs, the higher each causal attribution, the stronger the belief in death as the inevitable outcome of cancer. In contrast, occurrence fatalism was found to be significantly related only to belief in divine providence (simple correlations were also significant for the attribution of chance or luck). A possible explanation may be that all four causal attributions evoke beliefs related to inevitable death together with a sense of helplessness and fear of death. On the other hand, more religious people who believe that a disease is an act of God as a response to human actions or a test often also believe that with the help of God, they may recover, especially if they successfully meet the

challenge that God posed [13, 38]. Therefore, the attribution of cancer to divine providence is not necessarily related to the outcome fatalistic belief [25].

Regarding the relationship between the causal attributions and perceived barriers and benefits, attributing cancer to God and to weak personal resilience was significantly correlated with both perceptions. However, in the path analysis, when all study variables were examined in a common model, only attribution of cancer to weak personal resilience was directly associated with perceptions of benefits of screening. Thus, the more individuals believed that cancer is a result of weak resilience, the less benefit they ascribed to screening. This finding further reinforces that attributing causality to weak personal resilience is a fatalistic perception that negatively affects the perception of the benefits of early detection tests.

Most studies have treated cancer fatalism as a single entity, with beliefs of occurrence and outcome being examined as a single variable indicating the intensity of cancer fatalism [22–24]. The present study is among the few [25] to distinguish between the two beliefs. The present findings indicate that although a connection existed between the two beliefs of medium strength ($r = 0.45$), they constituted different structures and were differently associated with perceptions of benefits of and barriers to screening and causal attributions. Support for them being different sets of beliefs has been found in a few qualitative studies as previously described, which suggested that the belief that being ill with cancer is in God's hands and belief in the ability to recover from cancer with God's help can coexist [38–40]. Thus, in the present study, although outcome fatalism was found to be related to perceptions of both benefits and barriers regarding the performance of screening tests, occurrence fatalism was found to be related only to the perception of benefits. Similarly, Baron-Epel and colleagues [25] reported that occurrence fatalism was associated with adherence to mammograms, whereas outcome fatalism had no association. It is possible that their findings can be explained by the link reported in the current study between outcome fatalism and perceived lower benefits of screening tests.

The mediation results found in the path analysis and mediation tests connected the three structures examined in the present study—attribution of cancer causality, occurrence and outcome fatalistic beliefs, and perceptions of benefits of and barriers to screening. Occurrence fatalism was found to be a statistically significant mediator between attributing causality to God and the perception of benefits of screening, whereas outcome fatalistic belief served as a mediator between all causal attributions and perceptions of both benefits and barriers. Although this was a cross-sectional study and it is not possible to indicate the directions of relationships between variables, the findings offer a possible view of the factors that may influence perceptions of benefits and barriers, which, in turn, were major factors in influencing adherence to screening for early detection of various cancer types, including colorectal cancer [12, 15, 18, 19]. Therefore, it is possible that the present study points to the origins of the perceptions of benefits and barriers.

Several studies, mostly qualitative ones, have reported that causal attributions are not necessarily associated with stronger barriers or avoidance of screening tests [37, 40, 41]. Also, scholars have argued that attributing cancer to God can increase compliance with screening tests [40, 42, 43]. However, in the present study, all attributions of causality and occurrence and outcome beliefs were associated with perceptions of higher barriers and lower benefits of screening. The differences in results may be attributed to different populations studied (i.e., Latinas and Black Americans) or different research tools. To the best of our knowledge, no previous studies that assessed this connection could be found to compare these results.

Ethnic differences in perceptions and beliefs between Arab and Jewish participants, although not the focus of the study, were additionally examined; generally, no differences were found in perceived barriers and benefits of screening and two of four causal attributions. This finding is in contrast to several previous studies regarding fatalistic beliefs and perceived barriers and benefits of screening for colorectal or breast cancer (causal attributions had not been studied before in this regard) [12, 17, 21, 25]. This finding may indicate a change in the population's attitudes toward cancer due to intensive efforts to provide information and education in Israel on prevention and cure strategies. This is reflected in reduced or stable cancer mortality despite the increase in cancer incidence, mainly attributed to higher adherence to screening and prevention measures [45].

Clinical Implications

The results add to our understanding of the effects of causal attributions and fatalistic beliefs on perceptions of benefits of and barriers to screening; hence, these factors should be the focus of change to reduce barriers to screening for early detection of cancer. Whereas interventions to change cognitive perceptions of cancer, including perceptions of benefits and barriers to screening, have generally shown limited success in changing health behaviors, interventions focused on changing fatalistic beliefs show initial promise to change perceptions of benefits and barriers [46]. Therefore, it is suggested to develop tailored interventions to reduce specific causal attributions of individuals, while accounting for religious and cultural factors, so that the process of change will be effective.

Study Limitations

The study has several limitations, the primary one being that the study was cross-sectional; hence, conclusions cannot be drawn about the causality or direction of the relationships among variables. The second limitation is that the sample was medium sized and based on convenience sampling. Therefore, although the sampling sought to represent the proportions of Jews, Muslims, and Christian Arabs in Israel; people residing in cities and rural communities; and people of diverse socioeconomic status and education levels, caution should be used when generalizing the research findings to other populations [44]. The present study focused on causal attributions from the perspective of perceptions that represent sources of fatalistic beliefs; a more comprehensive examination of causal attributions may be warranted. The decision to use only two components of the HBM was based on the rationale that these represented the factors most consistently related to screening [5] and in accordance with previous studies that used only some of the HBM components [6–9]. However, assessment of the other components of the HBM in the context of attributions and fatalistic beliefs is suggested. Additionally, it is suggested to explore causal attributions and their relations to HBM components in the framework of the self-regulatory model, which may provide a more comprehensive assessment of cognitive perceptions of cancer that affect fatalistic beliefs and health beliefs. Moreover, the predictive validity of the model regarding actual screening for the early detection of cancer should be examined in future studies.

Conclusions

The present study examined a multidimensional model of cancer causal attributions and fatalistic beliefs related to perceptions of barriers and benefits of adherence to screening for the early detection of cancer. The model conceives fatalism as a two-dimensional construct (occurrence and outcome of cancer) combined with four causal attributions (beliefs in divine control, weak personal resilience, chance or luck, and environmental and genetic factors). Results show direct and indirect connections between the four causal attributions and perceived barriers and benefits of screening. Specifically, causal attributions were associated with a higher perception of barriers to screening, mediated by outcome fatalism, whereas occurrence fatalism mediated only the relationship between the causal attribution of divine providence and the perception of benefits of screening. Although this was a cross-sectional study, the results add to our understanding of the effects of causal attributions and fatalistic beliefs on perceptions of the benefits of and barriers to screening; hence, these factors should be the focus of change to reduce barriers to screening for early detection of cancer. Further studies are needed to confirm the findings with respect to perceptions of screening for other cancer types, such as breast cancer, or for genetic mutation tests. Researchers should examine causal attributions among cancer survivors compared with individuals not affected by cancer and individuals with high familial risk of cancer.

Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors declare no competing interests.

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