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## *THE HEALTH BELIEFS MODEL IN SHIPBOARD*

### *U. S. NAVY MEN AND WOMEN*

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**The Health Beliefs Model in Shipboard U.S. Navy Men and Women**

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## SUMMARY

### Problem

Recently, it has been revealed that shipboard men and women use health care differently (women significantly more than men). The Health Beliefs Model (HBM), a theoretical model of health-seeking behavior, was used to examine differential health care utilization among shipboard men and women.

### Objective

The objective of this study was to determine what the theoretical reasons are for differential shipboard health care utilization among U.S. Navy men and women. Included in this theoretical examination is an identification of barriers to health care utilization.

### Approach

Discriminant function analysis was employed to determine whether the HBM can produce a significant discriminant function, thus discriminating between those who use health care and those who do not. HBM variables include: health value, health comparison, illness activities, perceived susceptibility to health problems, perceived susceptibility to serious conditions, perceived severity of health problems, perceived severity of serious conditions, perceived benefits, perceived barriers of time constraints, perceived barriers of motivation, perceived barriers of "reasons," and perceived barriers of "worries." A self-report measure of medical care avoidance and health care satisfaction were included in analyses. The dependent measure used to determine self-report health care utilization was, "During the past 30 days, how many times did you visit sick call, a medical doctor, or other health care provider to obtain care for yourself." Follow-up MANOVA analyses were performed to determine where specific group differences exist on HBM variables.

### Results

Initial chi-square analyses indicated statistically significant gender differences in health care utilization. A discriminant function analysis for women indicates that, the HBM can significantly discriminate health care utilization, although the amount of variance accounted for is somewhat small. For men, the HBM does not appear to significantly discriminate between health

care users and non-users. Health care utilization barriers for women appears to center around motivational barriers (i.e., laziness, lack of interest) and "worries" barriers (i.e., fear of the results of screening, embarrassment, worry about any aspects of the screening appointment). For women, apparent barriers of miscellaneous "reasons" (i.e., "I might be 'told off'," "I don't know enough about it," and "I am already seeing the doctor a lot.") are significantly higher for health care users than non-users.

### Conclusions

This study replicates previous findings indicating that shipboard women use health care significantly more than shipboard men. The HBM appears to be a useful predictor of health care utilization behavior for women, but not for men. Significant discriminating variables for women include medical care avoidance, health comparison, and perceived "reasons" barriers. Due to a non-significant discriminant function for males, MANOVA analyses indicate significant differences between groups on measures of health value, perceived motivational barriers, and perceived "worries" barriers.

## The Health Beliefs Model in Shipboard U.S. Navy Men and Women

Women have been shown to utilize health-care significantly more than men in both military and civilian populations. In an examination of U.S. Navy shipboard personnel and their utilization of health-care, Nice and Hilton (1994) found that shipboard women utilize health-care more than men and that women in nontraditional occupations visited sickcall significantly more than women in traditional occupations. In a civilian population, controlling for pregnancy-related health-care utilization and age, numerous studies have demonstrated that women utilize health-care more than men (Andersen & Anderson, 1967; Briscoe, 1987; Cleary, Mechanic, & Greenley, 1982; Hohn & White, 1976; Nathanson, 1975; Tessler, Mechanic, & Dimond, 1976; Verbrugge, 1979; Verbrugge, 1985; Verbrugge & Depner, 1980).

The Health Beliefs Model (Becker, 1974; HBM) has been investigated as a theory that attempts to explain health-seeking/promotion behavior by describing antecedent conditions within the individual. Initially, the willingness of the individual to seek health-care is influenced by that person's perception of his or her susceptibility to, and the severity of, that particular illness or disease. The cue to action can be triggered by an individual's evaluation of his or her own health status. This evaluation of one's health status is a reflection of the risks of one's susceptibility to and severity of a particular disease. Health-seeking behavior is a condition of an individual's estimate of the potential benefits of health-seeking action to reduce susceptibility or severity. The benefits are then weighed against perceptions of physical, psychological, financial, and other risks, costs, or barriers in the health-finding effort.

The HBM was conceptualized as a framework for understanding why individuals did or did not engage in a wide variety of health-related actions (Janz & Becker, 1984). Since the 1950s, the HBM has been utilized in preventive breast self-examination (Calnan & Moss, 1984; Hallal, 1982), adherence to therapeutic regimens (Becker, Drachman, & Kirscht, 1972; Cummings, Becker, Kirscht, & Levin, 1982; Gordis, Markowitz, & Lilienfeld, 1969; Harris, Skyler, Linn, Pollack, & Tewksbury, 1980; Inui, Yourtee, & Williamson, 1976; Kirscht & Rosenstock, 1979; Langlie, 1977), preventive health behavior (Taylor, 1979), smoking (Weinberger, Green, Mamlin, & Jerin, 1981), and dietary compliance (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977). In a review of the results of 29 HBM-related investigations, Janz and Becker (1984, p. 1) conclude that there is "substantial empirical support for the HBM."

Norman and Fitter (1989) examined the role of the HBM in health screening attendance. Correlational and regression analyses show general health beliefs (health value, health comparison,

and illness activities) to be poor predictors of intent to attend screenings, while significant predictors include perceptions of the efficacy of screenings, perceptions of barriers ("worries" of the screening appointment), and perceived susceptibility to common illness. Norman and Fitter (1991) then sought to identify variables that would be predictive of health screening attendance. A stepwise discriminant analysis showed that patients' beliefs about the severity of high blood pressure and weight problems, "worries" about the screening appointment, and the extent to which patients reported cutting back on everyday activities when ill discriminated between screening attenders and nonattenders. Norman (1993) examined the HBM and intent to attend a health screening. Of the HBM variables included in analyses, only health value was a significant predictor of attendance. Norman and Conner (1993) used the HBM questionnaire as well as the Theory of Planned Behaviour (Azen, 1988, 1991; TPB) to predict attendance at health screenings. HBM factors that were significantly predictive of attendance, as shown by a discriminant analysis, included health value, perceived benefits of health checks, and motivational factors.

Using HBM questionnaire items (Norman & Fitter, 1988, 1991), this study examined what variables are predictive of health-care utilization among men and women serving aboard ship in the U.S. Navy. This study also attempted to determine which HBM factors (health value, perceived susceptibility to disease, perceived severity of disease, potential benefits, perceptions of barriers) may influence sex differences that exist in health-care utilization aboard ship.

## Method

### Participants.

Participants in this study were selected from U.S. Navy personnel serving aboard ship for the study titled, "Women Aboard Navy Ships: A Comprehensive Health and Readiness Research Project" conducted at the Naval Health Research Center in San Diego, California, as part of the Defense Women's Health Research Program, administered by the U.S. Army Medical Research and Materiel Command, Fort Detrick, Maryland. This study is a multi-year effort with all women serving aboard ship eligible for inclusion, along with an equal number of men, matched on important demographic characteristics. For the first year of this research project, data were provided from 22 ships, including 4 submarine tenders, 4 ammunition ships, 3 destroyer tenders, 3 fast combat support ships, 2 destroyers, 2 fleet oilers, 2 fleet support ships, 1 auxiliary command ship, and 1 dock landing ship.

Men were matched to women on the following characteristics: ship, work division, department, race, paygrade, rating, and date of birth (not to exceed plus or minus two years). In the infrequent instances where these criteria could not be met, men that matched as closely as possible to women were selected. The matching procedure was as follows: (1) the eligible population was determined using an electronic roster which included all data elements necessary for matching; (2) each ship corrected and verified personnel rosters; (3) a matching program was run to select men to be included in the survey; and (4) individual identification labels were created and affixed to survey packets.

Of study participants, an overall median ship response rate for the 22 ships was 65.1%, and the overall mean response rate was 56.5%. From those who received the HBM questionnaire, a sample of 610 men and 611 women were included in this study ( $n = 1,221$ ). Due to incomplete and missing data, 157 subjects were excluded from subsequent analyses leaving a sample of 1,064 subjects (males = 529, females = 535).

The mean age of participants was 25.69 years for females and 25.99 years for males. For the study sample, 55.5% of subjects were Caucasian/non-Hispanic, 31.7% were African-American/non-Hispanic, 5.5% were Caucasian/Hispanic, 4.0% were Asian/Pacific Islander, 1.7% were African-American/Hispanic, and 1.6% were Native American. Of the study sample 44.3% of subjects had never been married, 43.7% were "currently married," 6.1% were divorced/not married, 5.8% were separated, and 0.1% were widowed.

### Instrument.

The Health Beliefs Questionnaire (Norman & Fitter, 1988, 1991; HBQ) is based on the HBM (see Appendix 1). Items were selected for the HBQ from items in previous studies measuring the HBM (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977; Berkanovic, Telesky, & Reeder, 1982; Calnan, 1984; Champion, 1984; Cummings, Jette, & Rosenstock, 1978; Elder, Artz, Beaudin, Carleton, Lasater, Peterson, Rodrigues, Guadagnoli, & Velicer, 1985; Jette, Cummings, Brock, Phelps, & Naessens, 1981; King, 1982; Mainman, Becker, Kirscht, Haefner, & Drachman, 1977; Pill, French, Harding, & Stott, 1988; Schwoon & Schmool, 1979). Items that did not possess adequate item-total correlations for each subscale ( $r_{i,T} < .30$ ) and reduced the subscale Cronbach alpha to an unacceptable level ( $\alpha < .50$ ) were excluded from further analyses. These items were: "I seem to resist illness better than other people," "When I'm ill, I try to keep going on as usual," and "I already feel healthy." For the remaining items, Cronbach alpha shows subscales possess adequate internal consistency reliability.

A measure of medical-care satisfaction was constructed for this study. Five items measured quality of medical services provided, amount of privacy during exam, amount of waiting time, availability of medications, and availability of medical supplies. This composite score possessed adequate internal consistency reliability to be included in subsequent analyses. Reliabilities for the HBM questionnaire and medical-care satisfaction scale used in this study as well as other studies appear in Table 1 (see Table 1).

Table 1.

Cronbach alpha for Health Beliefs Model questionnaire subscales.

Subscale Name	A	B	C	D	E
Health Value	.82	.54	.69	.77	.80
Health Comparison	.90	.70	.75	---	---
Illness Activities	.49	.56	.64	---	---
Susceptibility to Serious Illnesses	.95	.89	.94	.91	.86*
Susceptibility to Health Problems	.60	.54	.53	---	.90*
Severity of Serious Illnesses	.98	.95	.95	.97	.86*
Severity of Health Problems	.78	.58	.82	---	.90*
Barrier: Motivation	.68	.84	.72	.75	.92
Barrier: Worries	.81	.72	.71	.66	.76
Barrier: Reasons	.67	.58	.76	---	.79
Barrier: Time Constraints	.78	---	.90	.58	---
Medical-care Satisfaction	.88	---	---	---	---

A Schwerin & Corcoran (current study)

B Norman & Fitter (1989)

C Norman & Fitter (1991)

D Norman (1993)

E Norman & Conner (1993)

\* Serious and Health Problems were combined into one scale.

The five scales of the HBQ include: General Health Beliefs, Perceived Susceptibility, Perceived Severity, Perceived Benefits, and Perceived Barriers.

The first scale, General Health Beliefs, is composed of three subscales. The first subscale measures health value ("How important do you think it is that people take special care of their health?"), the second subscale measures health comparison ("Compared to other people of your age, would you say you get ill much more/less often?"), and the third general health beliefs subscale measures illness activities ("When I'm ill I try to keep going on as usual.").

The next series of scales directly measure the HBM. Perceived Susceptibility asks the individual's perceived vulnerability to health problems (weight problems, high blood pressure) and serious conditions (cancer, heart disease, stroke, heart attack).

Perceived Severity measures the respondent's level of concern over health problems (weight problems, high blood pressure) and serious conditions (cancer, heart disease, stroke, heart attack).

Perceived Benefits is measured by a single item: "How effective do you think health screening is in reducing your chances of getting a serious illness?"

Finally, Perceived Barriers is measured by four subscales: time constraints ("I would have problems getting an appointment."), motivation ("I'm too lazy."), reasons ("I'm already seeing the doctor a lot."), and worries ("Fear of the results of screening -- of what they might find.").

An item of health-care avoidance ("Have you avoided going to the medical department aboard this ship during the past 30 days when you felt you needed medical-care or advice?") and a series of five items measuring health-care satisfaction aboard ship (quality of medical services, the amount of privacy during the visit, waiting time, availability of medications, availability of medical supplies) were included in all analyses.

Demographic variables included in these analyses include age, sex, race, and marital status. For discriminant function analyses, only the demographic variable for age was included in analyses due to the requirement that discriminator variables represent continuous dimensions and satisfy the requirements for the ordinal level of measurement (Brown & Tinsley, 1983).

The dependent measure for intent to utilize health-care or not utilize health-care was measured by the item, "During the past 30 days, how many times did you visit sickcall, a medical doctor, or other health-care provider to obtain care for yourself?" Participants could provide a

dichotomous response ("yes"/"no") and specify the number of visits in the past 30 days if they did utilize health-care.

### Procedure.

The overall administration plan included the distribution of individually identified packets with all necessary materials to each study subject. Whenever possible, study subjects were brought together in a common location aboard ship, briefed on the study, asked to sign an informed consent form and complete the survey while the study coordinators were present. When, due to shipboard activity, it was not practical for all study subjects to remain in one area, surveys were distributed, and the participants were allowed to complete them in their work spaces. All completed surveys were sealed in envelopes and collected by study staff. Testing time of the entire survey was approximately 45 min.

### Results

A MANOVA examining gender differences among HBM variables indicated significant differences at the multivariate level (Wilks Lambda = .90,  $df = 15, 1040$ ,  $p < .001$ ). Subsequent univariate analyses indicated women aboard ship report higher medical-care avoidance (when medical-care or advice is needed); more positive perceptions of health value; more perceived illness when compared to others their own age (health comparison); greater perceived susceptibility to health problems; greater perceived susceptibility to serious health conditions; and greater perceived barriers, such as "worries" (fear of screening results and procedures) and "reasons" ("I might be told off."). Men report significantly greater health-care satisfaction (see Table 2).

Table 2.

Univariate F-tests: Means and standard deviations<sup>1</sup> of Health Belief Model subscales between females and males.

Variable	Female HBM Mean (st dev)		Male HBM Mean (st dev)	
Age	25.69 (5.99)		25.99 (6.64)	
Medical-care Avoidance	1.45 (0.49)	***	1.26 (0.44)	
Health-care Satisfaction	3.37 (0.94)		3.65 (0.85)	***
Health Value	3.27 (0.64)	**	3.14 (0.69)	
Health Comparison	1.45 (0.79)	***	1.27 (0.62)	
Illness Activities	2.06 (0.65)		2.00 (0.68)	
Perceived Susceptibility to Health Problems	1.90 (0.74)	***	1.61 (0.67)	
Perceived Susceptibility to Serious Conditions	1.54 (0.60)	*	1.47 (0.59)	
Perceived Severity to Health Problems	2.58 (0.88)		2.46 (0.87)	
Perceived Severity to Serious Conditions	3.04 (1.10)		3.06 (1.11)	
Perceived Benefits	2.75 (0.85)		2.77 (0.84)	
Perceived Barrier-Time Constraint	2.18 (0.61)		2.11 (0.64)	
Perceived Barrier-Motivation	1.75 (0.59)		1.77 (0.59)	
Perceived Barrier-Reasons	1.85 (0.58)	*	1.76 (0.51)	
Perceived Barrier-Worries	1.90 (0.67)	***	1.74 (0.57)	

<sup>1</sup> Standard deviations are indicated in parentheses.

\* Indicates groups are significantly different at the univariate level;  $p(1, 1,054) < .05$ .

\*\* Indicates groups are significantly different at the univariate level;  $p(1, 1,054) < .01$ .

\*\*\* Indicates groups are significantly different at the univariate level;  $p(1, 1,054) < .001$ .

In a test of gender differences in health-care utilization, a chi-square test of significance indicated that shipboard women report health-care utilization significantly more than do men (women = 69%, men = 31%; chi-square = 40.85, df = 1,  $p < .001$ ). Due to these significant gender differences, analyses of the remaining demographic variables were performed separately for women and men. Results for separate female and male chi-squared analyses indicated no significant differences in health-care utilization due to race or marital status.

Due to significant gender differences on health-care utilization, separate MANOVA analyses were conducted for women and men on HBM variables. For women, results indicated statistically significant differences between groups at the multivariate level (Wilks Lambda = .93, df = 14, 519,  $p < .001$ ). Subsequent examination of univariate F-ratios indicated significant differences between the health-care user and nonuser groups in health value, health comparison

(more perceived illness than others their age), and "reasons" barriers ("I might be told off," "I'm already seeing the doctor a lot," "I don't know enough about it"). For men, results indicated no statistically significant differences between groups at the multivariate level (Wilks Lambda = .94, df = 14, 519, ns.). Subsequent examination of univariate F-ratios indicated significant differences between the health-care user and nonuser groups in health value and perceived barriers due to motivation (see Table 3).

In an analysis of health-care utilization for women, results indicated a single discriminant function (canonical correlation = .27, Wilks Lambda = .92; chi-square = 33.58, df = 15,  $p < .01$ ). Three significant discriminating variables emerged as significant discriminators of health-care utilization: health value, health comparison, and "reasons" barriers (see Table 4). For men, a single, nonsignificant discriminant function (canonical correlation = .21, Wilks Lambda = .95; chi-square = 18.36, df = 15, ns.) was derived. Four significant discriminating variables emerged from this analysis: health-care satisfaction, motivation barriers, "reasons" barriers, and "worries" barriers. Group centroids for separate female and male discriminant functions appear in Table 5 (see Table 5). Multivariate omega squared indicated that the proportion of variance accounted for by the function is attributable to group differences. For shipboard women and men, 7% and 4% of the variance is attributable to group differences, respectively.

For shipboard women, correct group classification occurred for 63% (280/442) of the cases from the derivation sample. This exceeded the proportion of correct classifications expected by chance (45%),  $z = 7.55$ ,  $p < .001$ . For the cross-validation sample, correct group classifications occurred for 53% of the cases (47/89). This also exceeded the proportion of correct classifications expected by chance (35%),  $z = 3.56$ ,  $p < .001$  (see Table 6).

Table 3.  
Univariate F-tests: Means and standard deviations<sup>1</sup> of Health Belief Model subscales between health-care users and health-care nonusers.

Variable	Female HC		Male HC	
	User Mean (st dev)	Nonuser Mean (st dev)	User Mean (st dev)	Nonuser Mean (st dev)
Age	25.63 (6.01)	25.49 (6.01)	26.46 (5.99)	25.75 (6.64)
Medical-care Avoidance	1.47 (0.50)	1.41 (0.49)	1.25 (0.44)	1.26 (0.44)
Health-care Satisfaction	3.42 (0.96)	3.37 (0.87)	3.76 (0.86)*	3.57 (0.84)
Health Value	3.32 (0.62)*	3.17 (0.68)	3.20 (0.65)	3.10 (0.72)
Health Comparison	1.53 (0.85)*	1.36 (0.66)	1.28 (0.68)	1.25 (0.60)
Illness Activities	2.11 (0.64)	2.02 (0.70)	2.05 (0.74)	1.98 (0.67)
Perceived Susceptibility to Health Problems	1.93 (0.75)	1.84 (0.69)	1.59 (0.72)	1.63 (0.63)
Perceived Susceptibility to Serious Conditions	1.57 (0.60)	1.52 (0.58)	1.44 (0.55)	1.49 (0.60)
Perceived Severity to Health Problems	2.65 (0.84)	2.53 (0.91)	2.55 (0.92)	2.47 (0.84)
Perceived Severity to Serious Conditions	3.13 (1.02)	2.97 (1.15)	3.14 (1.12)	3.10 (1.06)
Perceived Benefits	2.67 (0.88)	2.77 (0.82)	2.72 (0.85)	2.76 (0.84)
Perceived Barrier-Time Constraint	2.17 (0.62)	2.21 (0.59)	2.09 (0.69)	2.13 (0.59)
Perceived Barrier-Motivation	1.73 (0.57)	1.76 (0.58)	1.66 (0.56)	1.83 (0.60)*
Perceived Barrier-Reasons	1.92 (0.59)*	1.75 (0.52)	1.69 (0.52)	1.79 (0.49)
Perceived Barrier-Worries	1.93 (0.67)	1.85 (0.64)	1.62 (0.52)	1.79 (0.60)

<sup>1</sup> Standard deviations are indicated in parentheses.

\* Indicates groups are significantly different at the univariate level;  $p(1,440) < .05$  for females;  $p(1,399) < .05$  for males.

Table 4.

Standardized canonical discriminant function coefficients and function correlations for females (n = 442) and males (n = 399).

Variable	Coefficient for Females	Correlation to Function	Coefficient for Males	Correlation to Function
Age	0.18	0.06	-0.17	-0.24
Medical-care Avoidance	0.21	0.22	-0.06 *	0.04
Health-care Satisfaction	0.44	0.08	-0.45	-0.47
Health Value	0.34 **	0.41	-0.16	-0.30
Health Comparison	0.21 *	0.38	-0.16	-0.09
Illness Activities	0.03	0.23	-0.07	-0.21
Perceived Susceptibility-Health Problems	0.15	0.23	-0.02	0.11
Perceived Susceptibility-Serious Conditions	-0.10	0.12	0.20	0.20
Perceived Severity-Health Problems	0.04	0.25	-0.19	-0.20
Perceived Severity-Serious Conditions	0.20	0.26	0.17	-0.07
Perceived Benefits	-0.27	-0.20	0.31	0.09
Perceived Barrier-Time Constraint	-0.28	-0.13	-0.34	0.13
Perceived Barrier-Motivation	-0.28	-0.10	0.49 **	0.64
Perceived Barrier-Reasons	0.92 **	0.56	0.03 *	0.45
Perceived Barrier-Worries	-0.17	0.20	0.45 **	0.64

\* Coefficients are significant ( $p < .05$ )\*\* Coefficients are significant ( $p < .01$ )

Table 5.

Group centroids for separate discriminant functions for females and males.

Group	Centroids for Females	Centroids for Males
Health-care User	0.25	-0.30
Health-care Nonuser	-0.33	0.16

Table 6.

Predicted group membership for derivation and validation samples for the female discriminant function.

Actual Group Membership	Predicted group membership	
	Health-care User	Health-care Nonuser
Derivation Sample		
Health-care User	<b>201</b>	51
Health-care Nonuser	111	<b>79</b>
Cross-validation Sample		
Health-care User	<b>25</b>	11
Health-care Nonuser	31	<b>22</b>

Note: Correct predictions are in **boldface**. The percentage of cases correctly classified for the derivation sample is  $280/442 = 63.35\%$ . Classification rate for the validation sample is  $47/89 = 52.81\%$ .

For the men, correct group classification occurred for 66% (265/399) of the cases from the derivation sample. This exceeded the proportion of correct classifications expected by chance (62.15%),  $z = 1.76$ ,  $p < .05$ . For the cross-validation sample, correct group classifications occurred for 58% of the cases (74/128). The predictive accuracy of the cross-validation sample was not significantly greater than chance (56%;  $z = 0.04$ , ns.; see Table 7).

Table 7.

Predicted group membership for derivation and validation samples for the male discriminant function.

Actual Group Membership	Predicted group membership	
	Health-care User	Health-care Nonuser
Derivation Sample		
Health-care User	<b>17</b>	120
Health-care Nonuser	14	<b>248</b>
Cross-validation Sample		
Health-care User	<b>02</b>	48
Health-care Nonuser	06	<b>72</b>

Note: Correct predictions are in **boldface**. The percentage of cases correctly classified for the derivation sample is  $265/399 = 66.42\%$ . Classification rate for the validation sample is  $74/128 = 57.81\%$ .

### Discussion

This research study sought to identify and examine HBM variables that may discriminate between shipboard Navy personnel who utilize health-care and those who do not. Findings from this study suggested that women report significantly more health-care utilization than men do. This supports the findings of Nice and Hilton (1994) in which female Navy personnel utilized health-care significantly more than did males. Although men appear to be significantly more satisfied with shipboard health-care and women claim that they have avoided health-care utilization within the past 30 days when they needed it, women may see the need to use health-care more than men do. Women reported significantly greater ratings of health value, greater ratings of perceived illness (compared to people their own age), greater perceived susceptibility to health problems, and greater perceived susceptibility to serious illness than do men.

Among women, the HBM appears to be an effective theoretical model for predicting health-care use. Although the amount of variance accounted for by the variables in the analysis is low (7%), it is somewhat comparable to the amount of variance (16%) accounted for by another examination of HBM variables among women seeking mammography screening (Aiken, West, Woodward, & Reno, 1994). Additionally, the HBM's predictive value in categorizing the cross-validation or "hold-out" sample in the present study is significantly better than chance.

Items measuring the perceived "reasons" barriers to health-care use appear to discriminate between health-care use groups among women, yet they may not be indicative of a barrier. An examination of mean scores indicated that items may lack predictive validity since elevated scores of barriers to health-care use should appear among nonusers. That, coupled with having to exclude one of the original items due to low item-total correlations, suggests that further psychometric work is needed on this subscale.

Among shipboard men, the HBM did not appear to be an effective theoretical model for predicting health-care use. Group differences between health-care users and nonusers at the univariate level indicate that significant barriers to health-care utilization consist of motivational barriers ("I'm too lazy," "I'm uninterested").

Two notes of caution might be sounded concerning the generalizability of these results. The dependent measure of health-care utilization was a self-report of their health-care during a 30-day period prior to the survey administration. A dependent measure that included actual health-care utilization (eg, sickcall visits) might more accurately characterize health-care attendance behavior. Also, this study examined an exclusively military population. Although military and civilian health-care utilization have been shown to be comparable (Nice & Hilton, 1994), the dynamics of health-care utilization among military personnel may be very different.

In addition, subject attention and motivation might be an uncontrolled source of variance. The HBM instrument was a part of a much larger research effort in which survey forms ranged from 22 to 25 pages (70-73 items, respectively). A great deal of medical, psychological, and sociological information was requested from study participants. Since the HBM examines motivational aspects of health-care utilization, any feature of the study that might cause more highly motivated participants to complete the questionnaire while causing less motivated subjects to decline participation would be a concern.

This study supports the HBM in explaining behavior among shipboard female personnel, although additional research is needed to better explain male health-care utilization behavior. These findings indicated aspects of health-care where medical program implementors could collaborate among their specializations (physicians, nurses, health-care administrators, program evaluators) to form a health-care utilization education program. Such a program could educate the end user about health-care of the availability and benefits of military health-care while reducing utilization barriers. Meanwhile, military medical departments could examine the

utilization barriers and determine what institutional changes could be altered to enhance health-care utilization.

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## Appendix 1

### Health Beliefs Model Questionnaire Items and Constructs

Health Beliefs Model Questionnaire (Norman & Fitter, 1989; Norman & Fitter, 1991). All items are answered on a scale of 1-4, from very extremely negative, negative, positive, very positive (e.g., "1 = not at all often, 2 = not often, 3 = often, 4 = very often."

#### **General Health Beliefs.**

##### *Health Value*

1. How often do you think about your health?
2. How concerned are you about your health?
3. How important do you think it is that people take special care of their health?
4. How likely is it that you will try to do a better job of taking care of your health in the future?

##### *Health Comparison*

5. Compared to other people of your age, would you say you get ill much more/less (neg keyed) often?
6. Compared to other people of your age, when you do get ill would you say you get much more/less (neg keyed) often?
7. I seem to resist illness better than other people.

##### *Illness Activities*

8. In general, when you get ill, how much does it interfere with your usual activities?
9. When I'm ill I try to keep going on as usual.
10. When I'm ill I cut back on whatever I'm doing in order to get well.

**Perceived Susceptibility.** How likely do you feel, it is that you will develop any of the following problems in the next 12 months?

##### *Health Problems*

11. Weight problems
12. High blood pressure

##### *Serious Conditions*

13. Cancer
14. Heart disease
15. Stroke
16. Heart attack

**Perceived Severity.** How serious a health problem do you think the following would be if you were to develop them?

##### *Health Problems*

17. Weight problems

18. High blood pressure

*Serious Conditions*

19. Cancer

20. Heart disease

21. Stroke

22. Heart attack

**Perceived Benefits.**

23. How effective do you think health screening is in reducing your chances of getting a serious illness?

**Perceived Barriers.** Which of the following reasons would stop you from attending a screening appointment?

*Time Constraints*

24. It would take up a lot of my spare time.

25. I would have problems getting to an appointment.

26. It would be too much effort.

27. I have other more important things to do.

*Motivation*

28. I'm uninterested.

29. I'm too lazy.

*Reasons*

30. I might be "told off."

31. I already feel healthy.

32. I don't know enough about it.

33. I'm already seeing the doctor a lot.

*Worries*

34. Fear of the results of screening -- of what they might find.

35. It would be embarrassing.

36. Would you be worried about any aspects of a screening appointment?

**Health-care Satisfaction**

37. If your most recent medical-care visit was aboard ship, how satisfied were you with the: Quality of medical services provided.

38. If your most recent medical-care visit was aboard ship, how satisfied were you with the: Amount of privacy you had during the visit.

39. If your most recent medical-care visit was aboard ship, how satisfied were you with the: Amount of time you waited at the facility to see a health-care provider.

40. If your most recent medical-care visit was aboard ship, how satisfied were you with the: Availability of medications.
41. If your most recent medical-care visit was aboard ship, how satisfied were you with the: Availability of medical supplies.

**Medical-care Avoidance**

42. Have you avoided going to the medical department aboard this ship during the past 30 days when you have felt you needed medical-care or advice?

**Medical Visits**

43. During the past 30 days, how many times did you visit sickcall, a medical doctor, or other health-care provider to obtain care for your self?

\_\_\_\_\_ I did not visit sickcall or a health-care provider during the past 30 days.

\_\_\_\_\_ I visited sickcall or a health-care provider(s): \_\_\_\_\_ time(s) during the past 30 days.

# REPORT DOCUMENTATION PAGE

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13. ABSTRACT (Maximum 200 words) A matched sample of men and women in the U.S. Navy (N=1,064) were examined in a study of shipboard health-care utilization. The instrument used in this study is theoretically based on the Health Beliefs Model (HBM). The HBM attempts to explain health-seeking behavior by describing the antecedent conditions within the individual. Preliminary chi-square results indicate statistically significant gender differences in health-care utilization. MANOVA results indicated that women reported significantly greater ratings of health value, greater ratings of perceived illness (compared to people their own age), greater perceived susceptibility to health problems, and greater susceptibility to serious illness than do men. Separate discriminant function analyses were employed for males and females. Results for each separate discriminant function analysis yielded a single statistically significant function for females only. Implications of these findings and the efficacy of the HBM will be discussed.			
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