Do depression and anxiety impact people's interest in cancer screening uptake? Cross-sectional analysis of the Health Information National Trend Survey (HINTS) 6 cycle

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Abstract

Cancer screening leads to reduced cancer mortality. Depression and anxiety impact decision-making and may result in less interest in cancer screening (ICS), which is one of the motivators of cancer screening uptake. We examined the association between depression and anxiety and ICS. We analyzed the data of 4,512 respondents in the Health Information National Trend Survey (HINTS) 6 cycle 3. Multivariable logistic regressions were fitted to calculate for the adjusted odds ratios and 95% confidence intervals on the association between depression, anxiety, and respondents' ICS. Overall, depression and anxiety were not significantly associated (OR=1.17, 95% CI: 0.81-1.70) with interest in cancer screening. However, among people 40 – 60 years of age, those who reported moderate/severe depression and anxiety were 33% (OR=0.67, 95%CI: 0.46-0.99) significantly less likely to be interested in cancer screening compared to those with normal/mild depression and anxiety. The study suggests the need for intentional efforts to improve ICS in people aged 40-60 years who report depression and anxiety.

Keywords: Cancer, screening, depression, anxiety, psychosocial, interest

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Introduction

Cancer screening leads to early detection of cancer, subsequently improved survival, and reduced mortality for most cancers. The success of many screening programs has been evaluated (Duffy et al., 2020; Luu et al., 2022; Peirson et al., 2013; Tyne & Nygren, 2009). For example, mammogram screening has led to reduced breast cancer mortality (Duffy et al., 2020; Tyne & Nygren, 2009) whilst regular screening with Pap smear has reduced cervical cancer mortality (Luu et al., 2022; Peirson et al., 2013). Despite evidence of the success of cancer screening programs, the target of Healthy People, which focuses on the health of the United States population and the promotion of evidence-based cancer screening and prevention strategies for many cancers, was not met in 2020 (Ma & Richardson, 2022; Sabatino et al., 2023). The target, which was to increase screening in breast, colorectal, and cervical cancers to 81.1%, 70.5%, and 93%, respectively, fell short by double percentage points according to data from the Behavioral Risk Factor Surveillance System (Dennis et al., 2021; Sabatino et al., 2023). Previously reported screening percentages for breast, colorectal,

and cervical cancers were 61.4–72.4%, 16.3–66.9%, and 46.6–82.9%, respectively, between 2014 and 2019 (Dennis et al., 2021; Sabatino et al., 2021). These percentages reduced further in 2020 (Dennis et al., 2021; Sabatino et al., 2023). It has been speculated that this reduction was due to the coronavirus pandemic (Dennis et al., 2021). The higher target cancer screening goals of Healthy People 2030 raise many concerns as to what strategies need to be in place to achieve these targets.

Previous studies have evaluated factors that are associated with cancer screening uptake (Magai et al., 2007; Sabatino et al., 2023; Smith et al., 2021). Psychosocial factors including depression and anxiety may facilitate higher risk perception, a known facilitator of screening uptake. Thus, evidence is emerging on the relationship between depression and anxiety and cancer screening (Ludman et al., 2010; Niedzwiedz et al., 2020; Pirraglia et al., 2004). However, studies on the relationship between depression and cancer screening have reported inconsistent findings (Aggarwal et al., 2008; Calderwood et al., 2013; Kaida et al., 2008; Ludman et al., 2010; Niedzwiedz et al., 2020; Pirraglia et al., 2004; Vigod et al., 2011). Whilst some studies have reported lower uptake of cancer screening among people who are depressed (Aggarwal et al., 2008; Ludman et al., 2010; Niedzwiedz et al., 2020; Pirraglia et al., 2004), other studies have reported higher uptake of cancer screening (Calderwood et al., 2013; Kaida et al., 2008), prompting the need to further evaluate this research question, particularly with larger samples and population representative data. Additionally, in a recent systematic review, general anxiety showed no consistent relationship with cancer screening uptake (Goodwin et al., 2023).

Reports on higher levels of depression and anxiety (Kupcova et al., 2023; Santomauro et al., 2021; World Health Organization, 2022) following the outbreak of the SARS COVID-19 pandemic in 2020 further strengthens the need to assess how depression and anxiety impacts preventive programs. Thus, the study examined the association between depression/anxiety and interest in cancer screening using a nationally representative dataset.

Methods

The study was conducted using data from the Health Information National Trends Survey (HINTS) 6 cycle 3, a nationally representative survey undertaken routinely by the National Cancer Institute. HINTS 6 was implemented between March 7, 2022, and November 8, 2022. The sampling procedures and methodologies applied are previously published (National Cancer Institute, 2023a). The instrument for HINTS 6 utilized the sampling frame provided by the Marketing Systems Group (MSG) of addresses in the United States to mail the questionnaires to participants. Following the modified Dillman approach (Dillman et al., 2014), all selected households received a total of four mailings (an initial, reminder, two follow-ups). Due to an unexpected low response, a third follow-up mailing was sent to a subsample of non-respondents. A total of 6,252 people responded, representing 4,611 in the concurrent group and 1,641 in the sequential group. The overall response rate was 28.1%. The current study included respondents who have never been diagnosed with any type of cancer and were between the ages of 18 and 75 years. Respondents who were up to date with their cancer screening and would not need a cancer screening in the next year were excluded. A total of 4,512 respondents were included in this study after applying the inclusion and exclusion criteria.

Outcome variable

Interest in cancer screening was defined as the interest of respondents in getting any type of cancer screening test. The variable was assessed by one question: "How interested are you in having a cancer screening test in the next year?" The responses were categorized as "not at all," "a little," "somewhat," and "very". The results were dichotomized as "not interested" (responses of "not at all" or "a little") and "Interested" (responses of "somewhat" or "very").

Main explanatory variable

The independent variable was a brief measure of depression and anxiety using the Patient Health Questionnaire for Depression and Anxiety (PHQ-4) (Kroenke et al., 2009). PHQ-4 consists of four items related to a general stem: "Over the last two weeks, how often have you been bothered by the following problems?": 1) feeling nervous, anxious or on edge; 2) not being able to stop or control worrying; 3) feeling down, depressed, or hopeless; and 4) little interest or pleasure in doing things. The responses to each item were on a four-point Likert scale: 1) not at all (0); 2) several days (1); 3) more than half the days (2); and 4) nearly every day (3). A score for each respondent was calculated by adding the scores of each of the four items with a range of scores between 0-12. Depression/anxiety levels of respondents were categorized as normal (0-2), mild (3-5), moderate (6-8), and severe (9-12) (Kroenke et al., 2009). We examined the internal consistency of the PHQ-4 in our data and found a Cronbach's alpha of 0.8645 (86.45%), implying that the scale has good reliability for assessing depression/anxiety.

Covariates

The covariables that were assessed included: age (reported as continuous and recategorized as "18–<40," "40–60," and ">60"); birth gender ("male" and "female"); education status ("≤high school," "some college," and "≥bachelor"); race and ethnicity ("Non-Hispanic White," "Non-Hispanic Black," "Hispanic," and "Non-Hispanic other"); income (coded as "<35,000," "35,000– <50,000," "50,000–75,000," and ">75,000); marital status (coded as "married or with partner," "separated or divorced or widowed," and "single or never married"); family history of cancer ("yes" and "no"); whether they perceived to be supported by their families or not (family support) ("yes" and "no"); cigarette smoking status ("never," "former," and "current"); and trust information from physicians (trust in physicians) ("yes" and "no").

Data Analysis

All analyses conducted were weighted. The replication procedure based on repeated sampling that allows for accurate computation of standard errors for the statistical methods was used. The jackknife replication variance method was used to generate the replicate weights. Details of the replication procedure were previously published (National Cancer Institute, 2023b).

Descriptive statistics were stratified by the interest in cancer screening ("yes" vs "no"). The association between the respondents' characteristics and interest in cancer screening (herein cancer screening) was assessed using Chi-square statistics. The association between the respondents' characteristics and depression/anxiety categories was also examined (Supplementary Table 1A) to determine which variables were potential confounders.

Variables that were associated with both depression/anxiety and cancer screening, and were conceptually not on the pathway between the two variables (outcome and explanatory variables), were considered confounders. These variables were adjusted for in the models in the subsequent logistic regression analyses. All the covariates were assessed, and the following variables were added to the final multivariable models as confounders: age, cigarette smoking, household income, family history of cancer, marital status, trust in physician, family support, race, and educational status. Univariable and multivariable logistic regressions were fitted with depression/anxiety as the independent variable and cancer screening as the dependent variable. Subgroup analyses by age groups, birth gender, and race and ethnicity were performed. Crude and adjusted odds ratios with 95% confidence intervals were computed. All analyses were conducted in SAS/STAT® software version 9.4.

Results

Most respondents identified as Non-Hispanic White (58.14%). The overall male to female ratio was comparable. The majority attended some college (38.61%), were married (59.03%), and had a household income greater than U.S. $75,000 (45.34%). Respondent characteristics were stratified by cancer screening (see Table 1). Most respondents (40.42%) were between the ages of 18 and 40 years, and age differed significantly between respondents interested in cancer screening and those not (p-value=0.009). Among the respondents interested in cancer screening, only 36.69% were between 18 to 40 years compared to 45.06% of respondents in the no cancer screening group and in the same age group. Regarding birth gender, 44.09% of respondents in the cancer screening group were males compared to 59.12% of respondents in the no cancer screening group (p-value<0.001). Among respondents interested in cancer screening, the majority had attended some college (40.34%), followed by earning a bachelor's degree or more (34.39%). A similar distribution was found among those not interested in screening. Significantly more married respondents were found among those interested in cancer screening compared to those who were not (61.78% vs 55.57%; p-value=0.0092).

Overall, 72.02% and 78.34% had trust in physicians and family support, respectively. Respondents that had an interest in screening were more likely to trust physicians than those not interested (75.41% vs. 67.83%; p-value=0.009). Likewise, respondents interested in screening were more likely to endorse family support (82.36% vs 74.57%; p-value=0.003).

The prevalence of moderate to severe depression and anxiety among respondents was 14.40%. Age (p-value<0.001), marital status (p-value<0.001), household income (p-value<0.001), and smoking status (p-value =0.043) in those with normal or mild depression and anxiety were significantly different from respondents with moderate/severe levels (Table 2).

After adjusting for age, cigarette smoking, household income, family history of cancer, marital status, trust in physician, family support, race, and educational status, respondents who reported moderate/severe depression/anxiety were 15% (adjusted odds ratio (AOR)=1.15; 95% CI: 0.79–1.57) more likely to be interested in cancer screening even though this association was not statistically significant. In a subgroup analysis stratified by birth gender among females, the odds of interest in cancer screening in the respondents with moderate/severe depression/anxiety were 34% (AOR=1.34; 95% CI: 0.89–2.03) more

Table 1

Characteristics of the sample respondents used in the analysis stratified by interest in cancer screening

Variables	TOTAL Frequency [a] (Weight percentage)	No Cancer Screen Frequency [a] (Weighted percentage)	Cancer Screen Frequency [a] (Weighted percentage)	p-value
PHQ4				
Normal-Mild	3795 (85.53)	1454 (86.28)	2341 (84.93)	0.5134
Moderate-severe	612 (14.47)	220 (13.72)	392 (15.07)	
Age (years)				
18 – <40	1325 (40.42)	569 (45.06)	756 (36.69)	**0.0091**
40 – 60	1655 (39.53)	580 (35.97)	1075 (42.39)	
>60	1502 (20.05)	544 (18.97)	958 (20.92)	
Birth Gender				
Male	1781 (50.80)	790 (59.12)	991 (44.09)	**<0.0001**
Female	2667 (49.20)	891 (40.88)	1776 (55.91)	
Race and ethnicity				
Non-Hispanic White	2288 (58.14)	968 (64.25)	1320 (53.21)	**<0.0001**
Non-Hispanic Black	741 (11.87)	208 (8.94)	533 (14.24)	
Hispanics	868 (18.54)	280 (15.01)	588 (21.40)	
Non-Hispanic others	407 (11.45)	167 (11.80)	240 (11.16)	
Marital status				
Married	2720 (59.03)	1024 (55.57)	1696 (61.78)	**0.0092**
Single	993 (37.04)	395 (41.31)	598 (33.64)	
Separate	386 (3.93)	124 (3.12)	262 (4.58)	
Education				
≤ High school	1040 (28.19)	418 (32.00)	622 (25.17)	**0.0256**
Some college	1274 (38.61)	483 (36.43)	791 (40.34)	
≥ Bachelors	2139 (33.20)	779 (31.57)	1360 (34.39)	
Household Income ($)				
<35000	1244 (25.10)	457 (24.88)	787 (25.27)	0.9623
35000 – <50000	549 (11.71)	208 (11.30)	341 (12.02)	
50000 – 75000	720 (17.85)	253 (17.76)	467 (17.92)	
>750000	1744 (45.34)	671 (46.06)	1073 (44.79)	
Body Mass Index (kg/m^2)				
Underweight	145 (3.99)	58 (4.70)	87 (3.42)	0.1739
Normal weight	1262 (28.57)	528 (31.19)	734 (26.47)	
Overweight	1445 (32.77)	522 (30.03)	923 (34.97)	
Obese	1630 (34.66)	585 (34.07)	1045 (35.14)	
Cigarette smoking				
Never	2941 (67.40)	1101 (65.13)	1840 (69.21)	0.0793
Former	975 (20.25)	362 (20.09)	613 (20.37)	
Current	520 (12.36)	211 (14.78)	309 (10.41)	
Trust in physicians				
No	1241 (27.98)	520 (32.17)	721 (24.59)	**0.0092**
Yes	3189 (72.02)	1154 (67.83)	2035 (75.41)	
Family support				
No	903 (21.66)	413 (25.43)	490 (18.64)	**0.0032**
Yes	3562 (78.34)	1277 (74.57)	2285 (81.36)	
Family history of cancer				
No	1017 (24.19)	440 (26.39)	577 (22.44)	0.1199
Yes	2985 (63.63)	1058 (60.45)	1927 (66.15)	
Not sure	439 (12.18)	183 (13.16)	256 (11.41)	

[a] Frequencies for variables are different due to unknowns and missing observations which were not used in computing the percentages

Table 2

Characteristics of the sample respondents used in the analysis stratified by their depression and anxiety level

Variables	TOTAL Frequency [a] (Weighted percentage)	Normal/Mild Depression and Anxiety Frequency [a] (Weighted percentage) N= 3817(85.60)	Moderate/Severe Depression and Anxiety Frequency [a] (Weighted percentage) N= 614(14.40)	p-value
Cancer screening (Interest)				
No	1674 (44.67)	1454 (45.06)	220 (42.38)	0.5134
Yes	2733 (55.33)	2341 (54.94)	392 (57.62)	
Age (years)				
18 – <40	1317 (40.57)	1053 (38.25)	264 (54.33)	**<0.0001**
40 – 60	1637 (39.62)	1398 (40.04)	239 (37.08)	
>60	1477 (19.82)	1366 (21.71)	111 (8.59)	
Birth Gender				
Male	1764 (50.87)	1558 (51.80)	206 (45.33)	0.0965
Female	2639 (49.13)	2232 (48.20)	407 (54.67)	
Race and ethnicity				
Non-Hispanic White	2267 (58.10)	1976 (58.72)	291 (54.44)	0.3103
Non-Hispanic Black	730 (11.75)	633 (11.62)	97 (12.52)	
Hispanic	856 (18.49)	709 (17.66)	147 (23.41)	
Non-Hispanic other	407 (11.66)	353 (12.00)	54 (9.64)	
Marital status				
Married	2684 (58.90)	2390 (62.08)	294 (40.00)	**<0.0001**
Separated	381 (3.91)	322 (3.69)	59 (5.24)	
Single	988 (37.19)	789 (34.23)	199 (54.76)	
Education				
High school or less	1023 (28.22)	846 (27.32)	177 (33.55)	0.1455
Some college	1254 (38.57)	1055 (38.59)	199 (38.50)	
Bachelor or more	2128 (33.21)	1892 (34.10)	236 (27.95)	
Household Income ($)				
<35000	1226 (25.00)	963 (22.58)	263 (39.04)	**<0.0001**
35000 – <50000	544 (11.59)	460 (11.37)	84 (12.86)	
50000 – 75000	717 (18.12)	625 (18.12)	92 (18.10)	
>75000	1734 (45.29)	1580 (47.93)	154 (30.00)	
Body Mass Index (kg/m^2)				
Underweight	130 (3.88)	106 (3.80)	24 (4.33)	0.6182
Normal	1260 (28.89)	1096 (29.17)	164 (27.21)	
Overweight	1422 (32.62)	1248 (33.04)	174 (30.11)	
Obese	1619 (34.62)	1367 (33.99)	252 (38.35)	
Smoking				
Never	2904 (67.30)	2544 (68.01)	360 (63.07)	**0.0434**
Former	964 (20.21)	841 (20.39)	123 (19.11)	
Current	513 (12.49)	387 (11.60)	126 (17.82)	
Trust in physician				
No	1227 (28.11)	1026 (27.14)	201 (33.86)	0.1050
Yes	3152 (71.89)	2747 (72.86)	405 (66.14)	
Family support				
No	891 (21.64)	741 (20.78)	150 (26.77)	0.1735
Yes	3525 (78.36)	3063 (79.22)	462 (73.23)	
Family history of cancer				
No	1005 (24.24)	875 (25.00)	130 (19.72)	0.3651
Yes	2957 (63.50)	2547 (63.01)	410 (66.38)	
Not sure	429 (12.26)	358 (11.99)	71 (13.90)	

[a] Frequencies for variables are different due to unknowns and missing observations which were not used in computing the percentages

Table 3

Association between depression and anxiety and interest in cancer screening for sample respondents

	Crude Odds Ratio	Adjusted Odds Ratio [a]
All respondents		
Normal/Mild	1 .00	1.00
Moderate/Severe	1.12 (0.79 – 1.57)	1.17 (0.81 – 1.70)
Birth Gender		
Male		
Normal/Mild	1 .00	1
Moderate/Severe	0.90 (0.49 – 1.64)	0.96 (0.46 – 2.00)
Female		
Normal/Mild	1 .00	1
Moderate/Severe	1.28 (0.93 – 1.78)	1.35 (0.89 – 2.05)
Age Group		
18 – <40		
Normal/mild	1.00	1.00
Moderate/severe	1.59 (0.98 – 2.59)	1.80 (0.95 – 3.39)
40 – 60		
Normal/mild	1.00	1.00
Moderate/severe	0.81 (0.55 – 1.18)	**0.67 (0.46 – 0.99)**
>60		
Normal/mild	1.00	1.00
Moderate/severe	1.01 (0.48 – 2.14)	1.05 (0.44 – 2.50)
Race		
Non-Hispanic White		
Normal/mild	1	1
Moderate/severe	1.05 (0.70 – 1.58)	1.31 (0.83 – 2.06)
Non-Hispanic Black		
Normal/mild	1	1
Moderate/severe	2.38 (1.01 – 5.60)	1.99 (0.69 – 5.75)
Hispanic		
Normal/mild	1	1
Moderate/severe	0.64 (0.28 – 1.48)	0.57 (0.25 – 1.32)
Non-Hispanic others		
Normal/mild	1	1
Moderate/severe	1.61 (0.53 – 4.83)	1.61 (0.40 – 6.52)

[a] Adjusted for age, cigarette smoking, household income, family history of cancer, marital status, trust in physician, family support, race, educational status

compared to those with normal to mild depression/anxiety. The odds were comparable among males. In terms of age, among respondents who were between 40 and 60 years, those who were moderately/severely depressed/anxious were 33% (AOR=0.67; 95% CI: 0.46–0.99) significantly less likely to be interested in cancer screening compared to those who were normal/mildly depressed and anxious. In other age groups (i.e., ≤40 years and above 60 years), there was no significant association between depression/anxiety and interest in cancer screening. In respondents 40 years and below, those who endorsed moderate/severe depression/anxiety were 80% (AOR=1.80; 95% CI: 0.95–3.39) more likely to be interested in cancer screening. When the association is examined across different racial groups, the odds of interest in cancer screening among Non-Hispanic Black respondents who had moderate/severe depression were 1.12 times more (AOR=2.12; 95%CI: 0.82–7.25) compared to Non-Hispanic Black respondents who had normal/mild depression/anxiety. Among Non-Hispanic White respondents, those with moderate to severe depression were 30% (AOR=1.30; 95%: 0.82–2.05) more likely to be interested in cancer screening compared to those with normal/mild depression (Table 3).

Discussion

This study investigated the association between depression and anxiety, and interest in cancer screening. Respondents who reported moderate to severe depression and anxiety had 17% nonsignificant higher odds of interest in cancer screening compared to those with normal to mild depression and anxiety. Age was a significant modifier of the relationship between depression and anxiety, and interest in cancer screening. Respondents between the ages of 40 and 60 years who experienced moderate to severe depression and anxiety had significantly lower odds of interest in cancer screening compared to the respondents who experienced mild or less depression and anxiety.

Depression and anxiety significantly reduced the interest in cancer screening with participants who were between 40 – 60 years, but not in other age groups in our study. These findings were comparable with previous studies (Kaida et al., 2008; Ludman et al., 2010; Niedzwiedz et al., 2020; Pirraglia et al., 2004). For example, Kaida and colleagues found middle-age, depressed women (40 – 59 years) were significantly less likely (OR=0.72; 95% CI: 0.54–0.96) to report Pap smear testing compared with their nondepressed counterparts (Kaida et al., 2008). Kaida et al also found an 8% nonsignificant increase in the odds of Pap smear testing among depressed women compared to nondepressed women. Whilst Kaida et al utilized a population-based cross-sectional study design much like the current study, the findings were consistent despite depression being measured using the Short-Form scale of items from the Composite International Diagnostic Interview (CIDI-SF), which assesses behavior, and the study was conducted in Canada, which uses socialized healthcare compared to privatized healthcare in the United States. In an earlier prospective cohort study of American women between 42 and 52 years at baseline, Pirraglia et al reported significantly lower odds of mammography and pap smear testing among women with high depressive symptoms compared to women with low depressive symptoms (Pirraglia et al., 2004).

Depression and anxiety can lead to functional impairment, such as making unhealthy decisions (McLaughlin, 2011). In the current study, it is unclear why depressed respondents in the 40 to 60 age range were less interested in cancer screening. It is possible that individuals in this age range feel healthy and do not worry about the possibility of cancer. Alternatively, depression may have reduced motivation for self-care. Although the participants who identified as females at birth and had moderate to severe depression and anxiety had a higher interest in cancer screening (34%), this finding was not statistically significant. Additionally, the odds of cancer screening were comparable across the depression and anxiety levels in participants who identified as males at birth. Further studies are

needed to examine this association among younger people.

The study highlighted age as a significant modifier of the association between depression and anxiety, and interest in cancer screening, with low odds of interest in cancer screening among people between 40 – 60 years. Among people over the age of 50 years, there may be competing interests. Beyond the need to screen for cancers such as colorectal, breast, prostate, and cervical cancers, people in this age group battle with taking preventive measures against other chronic conditions and adapting to physiological changes (e.g., women adapting to menopausal changes) that come with age. Health professionals attending to people over the age of 50 years seeking mental health services may be less likely to encourage women to undergo cancer screening given the plethora of competing health conditions in this age group that require care. Thus, through self-neglect, which is reported in people with depression (Pavlou & Lachs, 2006), depression and anxiety may lead to lower interest in cancer screening in people within this age group.

Limitations

The study has some limitations that need highlighting. We recognize cancer screening and recommendations are different. Hence, an analysis stratifying by site-specific cancers will be invaluable. Interest in cancer screening is a proxy measure of future cancer screening uptake and does not imply the respondents will undergo the cancer screening as per their interest. A study design that assesses actual cancer screening practice will better address this research question. The information on both depression and anxiety, and interest in cancer screening were collected at the same time, so we cannot establish whether depression/anxiety preceded the interest in cancer screening or the reverse. A prospective cohort study will be needed to address this limitation. Although depression and anxiety may have different mechanisms by which they impact preventive care, we were unable to conduct decomposition analysis for depression and anxiety subscales due to the nature of the data. Future research should explore the independent association between depression and cancer screening interest, and between anxiety and cancer screening interest. The study has strengths, including making use of a nationally representative sample, and hence affords good generalizability to the US population.

Conclusion

Depression and anxiety are conditions that have both direct and indirect impact on individuals and their decision making processes (Pirraglia et al., 2004). One of those indirect consequences is healthcare seeking behaviors that include underutilization of preventive services. Despite the limitations in our study, we found that among people 40 – 60 years, depression and anxiety were associated with significantly lower interest in cancer screening.

Implications for Health Behavior Research

The study highlights the importance of addressing psychological and social factors that influence health behaviors. In particular, the findings suggest the need to develop intentional programs tailored toward raising awareness that re-enforce uptake of public health preventive services among people between 40 – 60 years who are depressed. Such programs should include policies that ensure physicians and other health professionals pass cancer screening related information to patients they attend to. Additional research is needed to examine the complex relationship between psychosocial factors and social drivers of health such as healthcare access, income, education, neighborhood, and built environment, which are known non-medical factors influencing health behaviors.

Discussion Questions

Depression and anxiety in people 40 – 60 years were found to be associated with lower interest in cancer screening and indicates the need to raise awareness on cancer preventive measures among this at-risk population. What best approaches

could be adapted to address this concern? Which group of professionals could be at the frontline of raising awareness among the at-risk population?

Ethical considerations: The HINTS cycle 6 was designated as "exempt research" under the rule 45 Code of Federal Regulations 46.104 and approved with project number 6632.03.51 with a subsequent amendment number 3597. HINTS was also declared a "Not Human Subjects Research". No further ethical review was required. The data were obtained in de-identified form and presented in an aggregated format in this study.

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