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Complementary Medicine Use and Uptake of Cancer Screening Among US Adults: A Nationally Representative Cross-Sectional Survey

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Abstract

Background: Cancer screenings can considerably reduce cancer mortality. There is limited information on the association between complementary medicine use and adherence to recommended cancer screenings. In this study, the potential associations between uptake of cancer screening and consultations with complementary medicine practitioners or mind-body medicine use are examined. **Methods:** This is a cross-sectional analysis of the 2017 National Health Interview Survey of a population-based sample (n = 26 742; response rate = 80.7%). Age- and sex-related risk groups for breast cancer (women 45 years and older), cervical cancer (women 21 years and older), and colorectal cancer (45 to 85 years) were analyzed in 2018. Prevalence of complementary medicine use in the past 12 months as well as prevalence of cancer screening uptake in the past 12 months were calculated. **Results:** At least one complementary medicine approach was used by 32.4% of participants. Controlling for sociodemographic and clinical variables, individuals who consulted a chiropractor or naturopath or who used mind-body medicine approaches were more likely to take up Pap smear test (odds ratio = 1.20-1.35), mammography (odds ratio = 1.22-1.38), and/or colorectal cancer screening (odds ratio = 1.18-1.37). Those consulting a homeopath were more likely to take up Pap smear test (odds ratio = 1.33). No association was found between consultations of practitioners of chelation therapy or traditional medicine and cancer screening uptake. **Conclusion:** Complementary medicine use seems to be associated with a better adherence to cancer screening. Individuals who consulted a chiropractor or naturopath or who used mind-body medicine approaches were more likely to take up the recommended screening.

Keywords

cancer screening, complementary therapies, mind-body therapies, health survey

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Introduction

Cancer is a frequent disorder globally with a cumulative risk of 21.4% of developing cancer and 17.7% of them dying from cancer before the age of 75 years.[1] To tackle this important health care issue, the American Cancer Society (ACS) develops guidelines for cancer screenings. Screenings can have a considerable influence on cancer incidence and mortality. For breast cancer, the most common cancer in women,[1] the ACS gives a "strong recommendation that average-risk women aged 45 years and older should undergo regular mammography screening and a qualified recommendation that women aged 40 to 44 years should have an opportunity to begin screening before age 45 years."[2] The screening is recommended annually to women younger than 55 years and annually to biennially for women older than 55 years. Concerning the effectiveness of such actions, a review of European studies concluded mammography screening programs reduce breast cancer mortality by 26% among women invited for screening and followed-up for 6 to 11 years.[3]

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Another common cancer is colorectal cancer with an estimated 1.8 million new cancer cases and 881 000 deaths worldwide in 2018.[1] The ACS gives a strong recommendation for adults aged 50 years and older to undergo regular screening with either a high-sensitivity stool-based test or a structural visual examination and a qualified recommendation to start screening at age 45 years and to stop at age 85 years.[2] The above-mentioned tests are recommended annually, a flexible sigmoidoscopy every 5 years, and a colonoscopy every 10 years. It is estimated that 39 700 additional colorectal cancer cases and 37 200 deaths will be prevented through 2030 if screening prevalence remains at the 2015 level.[4]

The fourth leading cause of cancer death in women is cervical cancer.[1] The ACS recommends the screening for cervical cancer beginning at age 21 years by screening with cytology alone every 3 years up until 29 years of age, and between 30 and 65 years testing every 5 years with both the human papillomavirus test and cytology is recommended.[2] Since introducing the Papanicolaou (Pap) test the incidence rates and mortality rates of cervical cancer have declined and continue to decline.[5] A study by Landy et al[6] in 2016 estimated that in England screening prevents 70% of cervical cancer deaths and that 83% could be prevented if screening would be attended by everyone aged 25 to 79 years on a regular basis.

Considering the positive effects of screening for cancer it is crucial to study which variables influence the willingness of individuals to get screened. There is contradicting evidence concerning the association between the use of complementary medicine and cancer screening uptake. In the National Cancer Institute Dictionary of Cancer Terms complementary medicine is defined as nonstandard treatments "that are used along with standard treatments, but are not considered standard."[7] Alternative medicine is defined as nonstandard treatments "that are used instead of standard treatments."[8] While such nonstandard treatments are used by more than 1 in 3 cancer patients in the United States,[9] only 0.01% of cancer patients in a recent analysis of the National Cancer Database used those approaches instead of standard treatments.[10] Given this negligible proportion of alternative medicine users, we will use the term "complementary medicine" for the whole group of nonstandard treatments. Using complementary medicine approaches in conjunction with conventional medicine seems to be associated with increased rates of breast cancer early detection, while the use of such approaches instead of conventional medicine, that is, alternative medicine use, seems to be associated with a decrease in breast cancer screening rates.[11] Beyond that, the type of complementary medicine use seems to play a role in cancer screening behavior: in an Australian sample of women aged 62 to 67 years, consulting of a complementary medicine practitioner was associated with clinical skin examination, clinical breast examination, and colorectal screening. Fascinatingly, depending on which type of complementary medicine practitioner was consulted it was either associated with being more likely to uptake mammography (massage therapist or chiropractor) or less likely to uptake mammography (naturopath/herbalist, acupuncturist, or "other" alternative health practitioner).[12]

The literature thus shows there is contradicting evidence concerning the use of complementary medicine and the screening behavior. Therefore, the purpose of this analysis is to study a large representative sample of the US population to examine possible associations between cancer screenings and consultations with a complementary medicine practitioner or mind-body medicine use.

Methods

Study Design

In 2019, we analyzed data from the 2017 National Health Interview Survey (NHIS), a nationally representative survey of the noninstitutionalized US population conducted in 2017 by the National Center for Health Statistics (NCHS). NCHS Research Ethics Review Board approved NHIS data collection. The protocol was approved by the NCHS Ethics Review Board on June 12, 2015 (Protocol #2015-08). All participants provided informed consent to participate. More information on survey composition, sampling strategy, and administration of the NHIS is provided by the Centers for Disease Control and Prevention.[13,14] The current analysis used data from the NHIS Family File, NHIS Person File, and NHIS Sample Adult File, including data on consultations with complementary medicine practitioners in the past 12 months, specifically on consultations with chiropractors, naturopaths, practitioners of chelation therapy, practitioners of traditional medicine, and/or homeopaths; and on mind-body medicine approaches in the past 12 months, specifically on the use of mantra meditation, mindfulness meditation, spiritual meditation, guided imagery, progressive relaxation, yoga, tai chi, and qi gong. Furthermore, data on prior cancer diagnoses and on sociodemographic characteristics such as age, sex, ethnicity, region, marital status, education, employment, and health insurance coverage were used.

Statistical Analysis

Population-based estimates were calculated using weights calibrated to the 2010 census-based population. Prevalence of complementary medicine use in the past 12 months was calculated for any complementary medicine modality, consultations with chiropractors, naturopaths, practitioners of chelation therapy, practitioners of traditional medicine, and/or homeopaths, and/or use of mind-body medicine (at least one of the above-mentioned mind-body medicine modalities); as well as for cancer screening uptake in the past 12 months: Pap smear test, mammography, and/or

colon cancer screening (including blood stool tests, colonoscopy, and sigmoidoscopy). Separate analyses were conducted for the age- and sex-related respective risk groups for breast cancer (women 40 years and older), cervical cancer (women 21 years and older), and colorectal cancer (individuals from 45 to 85 years).

Independent predictors of cancer screening uptake in the past 12 months were identified by multiple logistic regression analysis using relative weights. The relevant predictors included consultations with a complementary medicine practitioner or using mind-body medicine in the past 12 months. For each complementary medicine modality and each cancer screening behavior, an analysis controlling for the following potential sociodemographic and clinical confounders was conducted: age (categories: 18-29, 30-39, 40-49, 50-64, 65 years or older), ethnicity (categories: non-Hispanic White, Hispanic, African American, Asian, other), region (categories: west, northeast, midwest, south), marital status (categories: not in relationship; in relationship), education (categories: less than college; some college or more), employment (categories: employed; unemployed), prior cancer diagnosis (categories: prior diagnosis; no prior diagnosis), and health insurance coverage (categories: coverage; no coverage). Analyses on colorectal cancer screening additionally controlled for sex (categories: female, male), while analyses on Pap smear and mammography were limited to female participants. Adjusted odds ratios with 95% confidence intervals were computed; P values of $\leq .05$ were considered statistically significant in regression analysis. All statistical analyses were performed using the Statistical Package for Social Sciences (IBM SPSS Statistics for Windows, release 25.0. IBM Corp).

Results

The survey included a total of 32 617 households, and 26 742 adults provided data (response rate = 80.7%), which were representative for a weighted total of 246 657 271 US adults. At least one complementary medicine approach was used by 32.4% of participants in the past 12 months; 10.2%, 1.6%, 0.1%, 0.5%, and 1.5% of respondents consulted a chiropractor, a naturopath, a practitioner of chelation therapy, a practitioner of traditional medicine, and a homeopath in the past 12 months, respectively. A further 23.6% used mind-body medicine in the past 12 months.

Among the respective risk group for colon cancer (n = 14 422), 22.1% underwent colon cancer screening in the past 12 months. Of those who had used any complementary medicine, 24.2% underwent colon cancer screening compared with 21.2% of those who had not used any complementary medicine.

Among the respective risk group for cervical cancer (n = 13 139) 44.4% of the included women had utilized Pap smear in the past 12 months. Among these women who had used any complementary medicine in the past 12 months, 49.5% utilized Pap smear compared with 41.4% who had not used any complementary medicine.

Among the respective risk group for breast cancer (n = 8715) 54.3% underwent mammography. Among these women using any complementary medicine 59.8% underwent mammography, while 51.4% of women who had not used any complementary medicine did.

The uptake of cancer screening procedures among individuals consulting or not consulting with different complementary medicine practitioners or using mind-body medicine is listed in Table 1.

Associations of cancer screening uptake with consultations with different complementary medicine practitioners and mind-body medicine use are shown in Table 2. In multivariate analysis, participants of the respective risk group who had consulted a chiropractor were more likely to utilize Pap smear ($P < .001$), undergo mammography ($P < .001$) and colon cancer screening ($P = .011$). Likewise, individuals consulting naturopaths more likely utilized Pap smear ($P = .022$), underwent mammography ($P = .031$), and colon cancer screening ($P = .030$). Respondents consulting homeopaths were more likely to utilize Pap smear tests ($P = .032$). Individuals using mind-body medicine approaches more likely utilized Pap smear ($P < .001$), underwent mammography ($P < .001$), and colon cancer screening ($P < .001$). Consulting practitioners of chelation therapy or traditional medicine was not significantly associated with cancer screening uptake.

Discussion

This study reports the association between complementary medicine use and participation in cancer screening in a nationally representative noninstitutionalized US population. Individuals who consulted a chiropractor or naturopath or who used mind-body medicine approaches were more likely to take up the recommended screening. No association was found between consultations of practitioners of chelation therapy or traditional medicine and cancer screening uptake. However, this finding needs to be interpreted with caution because only 0.6% of the participants reported to have been treated with 1 of the 2 therapies.

Our findings are in line with the results of an Australian survey of 9151 women.[12] Women aged 62 to 67 years who visited complementary medicine practitioners were more likely to participate in clinical skin examination, clinical breast examination, and colorectal screening.

In Australian women, mammography screening was positively associated with the consultation of massage therapist or chiropractor and negatively associated with the consultation of a naturopath/herbalist, acupuncturist, or "other" alternative health practitioner. In contrast, US women in our analyses who consulted a naturopath, were

Table 1. Cancer Screening Among Individuals Consulting or Not Consulting Complementary Medicine Practitioners or Using Mind-Body Medicine.

Complementary medicine practitioner consulted/therapy used	Cancer screening procedure		
	Pap smear[a]	Mammography[b]	Colon cancer screening[c]
Chiropractor			
Consulted	51.2%	62.5%	24.6%
Not consulted	43.5%	53.3%	21.8%
Naturopath			
Consulted	52.9%	63.1%	27.5%
Not consulted	44.2%	54.1%	22.0%
Practitioner of chelation therapy			
Consulted	42.1%	69.2%	25.9%
Not consulted	44.4%	54.3%	22.1%
Practitioner of traditional medicine			
Consulted	50.0%	49.2%	22.9%
Not consulted	44.4%	54.3%	22.1%
Homeopath			
Consulted	50.0%	60.2%	22.2%
Not consulted	44.3%	54.1%	22.1%
Mind-body medicine			
Used	52.7%	59.4%	24.1%
Not used	44.2%	52.4%	21.6%

[a]Only female participants aged 21 years and older included in the analysis.
[b]Only female participants aged 40 years and older included in the analysis.
[c]Participants aged between 45 and 85 years included in the analysis.

Table 2. Associations of Consultations Complementary Medicine Practitioners and/or Mind-body Medicine Use and Uptake of Cancer Screening[a].

Complementary medicine practitioner consulted/therapy used	Cancer screening procedure	Odds ratio (95% confidence interval)	*P*
Chiropractor	Pap smear[b]	1.28 (1.14-1.43)	**<.001**[e]
	Mammography[c]	1.38 (1.19-1.59)	**<.001**[e]
	Colon cancer screening[d]	1.18 (1.04-1.34)	**.011**[e]
Naturopath	Pap smear[b]	1.35 (1.04-1.76)	**.022**[e]
	Mammography[c]	1.41 (1.03-1.92)	**.031**[e]
	Colon cancer screening[d]	1.37 (1.03-1.80)	**.030**[e]
Practitioner of chelation therapy	Pap smear[b]	0.87 (0.33-2.32)	.776
	Mammography[c]	2.06 (0.61-7.01)	.247
	Colon cancer screening[d]	1.29 (0.54-3.05)	.569
Practitioner of traditional medicine	Pap smear[b]	1.40 (0.90-2.18)	.141
	Mammography[c]	0.83 (0.50-1.39)	.483
	Colon cancer screening[d]	1.16 (0.68-1.98)	.598
Homeopath	Pap smear[b]	1.33 (1.03-1.72)	**.032**[e]
	Mammography[c]	1.31 (0.96-1.79)	.094
	Colon cancer screening[d]	1.11 (0.79-1.55)	.545
Mind-body medicine	Pap smear[b]	1.20 (1.11-1.31)	**<.001**[e]
	Mammography[c]	1.22 (1.10-1.35)	**<.001**[e]
	Colon cancer screening	1.22 (1.10-1.34)	**<.001**[e]

[a]Analyses controlled for age, sex (colon cancer screening only), education, employment, marital status, region of origin, race/ethnicity, health insurance coverage, and prior cancer diagnoses.
[b]Only female participants aged 21 years and older included in the analysis.
[c]Only female participants aged 40 years and older included in the analysis.
[d]Participants aged between 45 and 85 years included in the analysis.
[e]Boldface indicates statistical significance (*P*).

more likely to take up the mammography screening, perhaps due to regional or age-related differences.

Patients who use complementary medicine methods as complementary treatment only might be engaged in health literacy.[15] The definitions of health literacy vary, but they all hold in common the idea that health literacy involves the need for people to understand information that helps them maintain good health.[16] Frequent use of various complementary medicine modalities before breast cancer diagnosis was associated with other health behaviors like high fruit/vegetable intake and lower body mass index in the Pathways Study.[17] In a systematic review Oldach and Katz[18] concluded that a patient's health literacy might be a contributing factor to being within the recommended cancer screening guidelines. But evidence is mixed and limited.

Predicting factors for cervical cancer screening behavior in Hong Kong women aged 50 years or above were age, educational level, marital status, family history of cancer, smoking status, use of complementary therapy, and recommendations of health professionals.[19] In Washington State insurance data from 2000 to 2003 alternative medicine use instead of conventional treatment was negatively associated with cervical cancer screening uptake, while complementary medicine use in conjunction with conventional care was positively associated with screening behavior.[20] The authors assume a high interest in various types of health-promoting behavior, including cancer screening, among complementary medicine users as a reason for the association.

Hall et al[21] also analyzed NHIS data for 2000 to 2015 and found the following factors that reduced screening rates: no contact with a doctor, no usual source of health care, and no insurance coverage. Persistent screening disparities were shown particularly among the uninsured and progress was only found for colorectal cancer screening. But rates in 2015 for colorectal cancer screening were just above 60% and still lower than for Pap tests (80%) and mammography (70%). Younger age, lower income, and fewer years of education were also consistently associated with lower prevalence of screening for both men and women.

Peterson et al[22] state in their systematic review that there should be no doubt that provider recommendations are important to patient adherence to cancer screening. They concluded that a simple provider recommendation is necessary but not sufficient for optimal adherence to cancer screening guidelines. The quality and content of the discussion surrounding the recommendation also seems to be important.

In a systematic review and meta-analysis interventions were evaluated to increase colorectal cancer screening rates in the United States.[23] Fecal blood test outreach, patient navigation, patient education, and patient reminders were associated with increased colorectal cancer screening rates. No information was found in the literature on complementary medicine use and uptake of colorectal cancer screening.

Limitations

Our results must be considered in light of several limitations. The NHIS survey relies on self-reported data and was not confirmed by medical record review. Misclassification and recall bias cannot be ruled out. Respondents might answer questions in a way they believe will please the researcher. Because the NHIS is a cross-sectional survey and the data are simultaneously accessed there is no evidence of a temporal relationship between cancer screenings and the consultation of a complementary practitioners or use of mind-body medicine. No true cause and effect relationship can be drawn. Also, we did not differentiate between complementary and alternative treatment. The conventional medical provider access in relation to cancer screening was not studied. And finally, the survey queries the past 12 months. Some cancer screenings are recommended less than annually and the screening might therefore be under- or over-reported. And we did not adjust for women after hysterectomy who do not need a cervical cancer screening.

Looking at the results of the presented data, use of complementary medicine therapies seems to be associated with a better adherence to cancer screening, whereas based on findings of prior studies, alternative treatment should be discouraged not only for cancer patients[24] but also in primary care. Data from the NHIS from 2015 show that cancer screening rates in the United States are still unacceptably low.[2] Recommendations for cancer screening through doctors and complementary medicine providers are important and might improve the adherence to cancer screening. Also, patient navigation and education, the communication between patient and physician, as well as the health insurance status are important factors, which seem to influence the cancer screening uptake.

Conclusions

Complementary medicine use seems to be associated with a better adherence to cancer screening. Individuals who consulted a chiropractor or naturopath or who used mind-body medicine approaches were more likely to take up the recommended screening.

Author Contributions

VP and MDH interpreted the data, were major contributors in writing the manuscript, and participated in data analysis. HC analyzed the data, was a major contributor in writing the manuscript, and participated in interpretation of the data. All authors read and approved the final manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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References

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2018;68:394-424.
2. Smith RA, Andrews KS, Brooks D, et al. Cancer screening in the United States, 2018: a review of current American Cancer Society guidelines and current issues in cancer screening. *CA Cancer J Clin*. 2018;68:297-316.
3. Njor S, Nystrom L, Moss S, et al. Breast cancer mortality in mammographic screening in Europe: a review of incidence-based mortality studies. *J Med Screen*. 2012;19(suppl 1): 33-41.
4. Siegel RL, Miller KD, Fedewa SA, et al. Colorectal cancer statistics, 2017. *CA Cancer J Clin*. 2017;67:177-193.
5. Howlader N, Noone A & Krapcho M, et al, eds. SEER cancer statistics review, 1975-2014. Published April 2017. Accessed July 6, 2020. https://seer.cancer.gov/csr/1975_2014/
6. Landy R, Pesola F, Castanon A, Sasieni P. Impact of cervical screening on cervical cancer mortality: estimation using stage-specific results from a nested case-control study. *Br J Cancer*. 2016;115:1140-1146.
7. National Cancer Institute. Complementary medicine. Accessed June 16, 2020. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/complementary-medicine
8. National Cancer Institute. Alternative medicine. Accessed June 16, 2020. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/alternative-medicine
9. Clarke TC. The use of complementary health approaches among US adults with a recent cancer diagnosis. *J Altern Complement Med*. 2018;24:139-145.
10. Johnson SB, Park HS, Gross CP, Yu JB. Use of alternative medicine for cancer and its impact on survival. *J Natl Cancer Inst*. 2018;110(1), 121-124.
11. Dale LC, Gotay CC. The relationship between complementary and alternative medicine use and breast cancer early detection: a critical review. *Evid Based Complement Alternat Med*. 2012;2012:506978.
12. Frawley JE, McIntyre E, Sibbritt D, et al. Associations between cancer screening behavior and complementary medicine use: results of a national cross-sectional survey of 9151 Australian women. *Integr Cancer Ther*. 2018;17:979-985.
13. Centers for Disease Control and Prevention; US Department of Health and Human Services. 2017 National Health Interview Survey (NHIS): public use data release. Published June 2018; Accessed April 23, 2019. ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHIS/2017/srvy-desc.pdf
14. Centers for Disease Control and Prevention. National Center for Health Statistics. About the National Health Interview Survey. Accessed April 23, 2019. http://www.cdc.gov/nchs/nhis/about_nhis.htm
15. Bains SS, Egede LE. Association of health literacy with complementary and alternative medicine use: a cross-sectional study in adult primary care patients. *BMC Complement Altern Med*. 2011;11:138.
16. Hernandez LM. *Health Literacy: Improving Health, Health Systems, and Health Policy Around the World: Workshop Summary*. National Academies Press; 2013.
17. Greenlee H, Kwan ML, Ergas IJ, et al. Complementary and alternative therapy use before and after breast cancer diagnosis: the Pathways Study. *Breast Cancer Res Treat*. 2009;117: 653-665.
18. Oldach BR, Katz ML. Health literacy and cancer screening: a systematic review. *Patient Educ Couns*. 2014;94:149-157.
19. Chan CW, Choi KC, Wong RS, et al. Examining the cervical screening behaviour of women aged 50 or above and its predicting factors: a population-based survey. *Int J Environ Res Public Health*. 2016;13:1195.
20. Downey L, Tyree PT, Lafferty WE. Preventive screening of women who use complementary and alternative medicine providers. *J Womens Health (Larchmt)*. 2009;18:1133-1143.
21. Hall IJ, Tangka FKL, Sabatino SA, Thompson TD, Graubard BI, Breen N. Patterns and trends in cancer screening in the United States. *Prev Chronic Dis*. 2018;15:E97.
22. Peterson EB, Ostroff JS, DuHamel KN, et al. Impact of provider-patient communication on cancer screening adherence: a systematic review. *Prev Med*. 2016;93:96-105.
23. Dougherty MK, Brenner AT, Crockett SD, et al. Evaluation of interventions intended to increase colorectal cancer screening rates in the United States: a systematic review and meta-analysis. *JAMA Intern Med*. 2018;178:1645-1658.
24. Johnson SB, Park HS, Gross CP, Yu JB. Complementary medicine, refusal of conventional cancer therapy, and survival among patients with curable cancers. *JAMA Oncol*. 2018;4:1375-1381.