

Is risky behavior associated with seatbelt (non)use?

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Preceptor: Stephen Schwartz

Introduction

Proper seatbelt use represents one of the most effective means of preventing motor vehicle crash-related mortality. Determining populations susceptible to seatbelt non-use can help direct public health campaigns. This study sought to determine if other risky behaviors, specifically alcohol, tobacco, and marijuana use are associated with seatbelt non-use.

Methods

Data were obtained from the 2018 Behavioral Risk Factor Surveillance System (BRFSS) limiting to 16 states that included the marijuana module (n=128,062). Key exposures were average alcohol use (none, moderate [females: 1-7 drinks/week, males: 1-14 drinks/week], or heavy [females: >7 drinks/week, males: >14 drinks/week], any binge alcohol use (females: ≥4 drinks on one occasion, males: ≥5 drinks on one occasion), tobacco use, and marijuana use. Seatbelt non-use was defined as use less frequent than “nearly always”. Adjusted prevalence ratios (PR) and 95% confidence intervals (CI) were calculated for each exposure-outcome relationship using Mantel-Haenszel methods and adjusted for sex, age, income, and education level where appropriate. Stratified analysis was used to assess for effect modification by state seatbelt enforcement law type (primary vs. not primary).

Results

A total of 112,354 respondents were included after exclusions with 5.7% reporting seatbelt non-use. Heavy alcohol use (PR 1.08 [95% CI: 1.01, 1.15]), binge alcohol use (PR: 1.13 [95% CI: 1.07, 1.21]), tobacco use (PR: 2.05 [95% CI: 1.95, 2.15]), and marijuana use (PR 1.24 [95% CI: 1.16, 1.34]) were all associated with seatbelt non-use. Seatbelt non-use was more prevalent in states without primary enforcement laws (9.8% vs 4.1%) however the association between any risky behavior and seatbelt nonuse did not differ by type of seatbelt enforcement law.

Discussion

Use of alcohol, tobacco and marijuana is associated with higher prevalence of seat belt non-use. Tobacco use had the strongest association with seatbelt non-use, perhaps demonstrating a group more tolerant of risky behavior. Given the limitations of cross-sectional study designs future work should investigate targeted interventions for increasing seatbelt use in these high-risk populations.

Keywords: seatbelt use, alcohol, tobacco, marijuana, seatbelt law

The association between social determinants of health and life dissatisfaction: A 2017 Behavioral Risk Factor Surveillance System analysis

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Introduction

Poor health outcomes disproportionately impact disadvantaged populations in the U.S. owing to the inequitable distribution of socioeconomic factors, termed social determinants of health (SDOH). Life dissatisfaction is associated with adverse health behaviors, psychiatric morbidity, disease, injury, and mortality. This study evaluated the association of three adverse SDOH (housing insecurity, food insecurity, and financial instability) with life dissatisfaction, as well as effect modification by emotional support and frequent mental distress.

Methods

This cross-sectional study used the SDOH and Emotional Support and Life Satisfaction modules from the 2017 Behavioral Risk Factor Surveillance System (BRFSS). Participants were from Wisconsin, Minnesota, and Ohio, the only states that included both optional modules (n = 26,659). Prevalence ratios (PRs) were calculated and Mantel-Haenszel stratified analysis was used to adjust for *a priori* confounders and assess for effect modification. PRs were adjusted for race, sex, age, state, number of children, marital status, employment status, and education level.

Results

Among the study population, 5.0% reported being dissatisfied with life. Those who reported experiencing housing insecurity (PR = 3.4; 95% CI 3.0-3.8), food insecurity (PR = 3.2; 95% CI 2.9-3.5), and financial instability (PR = 3.5; 95% CI 3.1-3.9) had higher prevalence of life dissatisfaction. Among those experiencing an adverse SDOH, prevalence of life dissatisfaction decreased with increasing levels of emotional support. For participants who reported experiencing adverse SDOH, prevalence of life dissatisfaction was higher in those with frequent mental distress compared to those without.

Discussion

The adverse SDOH we studied were found to be associated with life dissatisfaction. This relationship may also vary depending on levels of emotional support as well as frequent mental distress. These findings suggest that socioeconomic determinants may not only influence health but also impact psychological well-being and attitudes towards life.

The Association between Health Insurance Coverage and Financial Barriers to Health Care among U.S. Adults

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Introduction

Health insurance coverage is a key determinant of health; however, it is still unclear if having health insurance coverage reduces barriers to accessing health care. Few studies have investigated how health insurance coverage differentially impacts access to health care across race/ethnicity. In this study, we examined the association between lack of health insurance and financial barriers to health care, and assessed differences by race/ethnicity.

Methods

We used data from the 2018 Behavioral Risk Factor Surveillance System. Mantel-Haenszel stratified analysis was used to calculate adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs) adjusting for sex, age, race/ethnicity, annual household income, and employment status. We then examined effect modification by race/ethnicity.

Results

A total of 235,209 respondents aged 18 to 64 were included after exclusions for missing data. Overall, the prevalence of financial barriers to health care was higher among the uninsured than the insured (39.5% vs. 10.3%, aPR=2.77, 95% CI: 2.71 to 2.83). The association between lack of health insurance and financial barriers to health care is stronger among White and Black respondents (Whites: aPR =3.01, 95% CI: 2.93 to 3.09; Blacks: aPR =2.91, 95% CI: 2.75 to 3.09) compared to Hispanic and other respondents (Hispanics: aPR =2.33, 95% CI: 2.22 to 2.44; others: aPR =2.38, 95% CI = 2.22 to 2.54). Compared to insured White respondents, the prevalence of financial barriers to health care was higher among all insured race/ethnic groups except Black respondents (Hispanics: aPR=1.11, 95% CI: 1.07 to 1.16; others: aPR=1.13, 95% CI: 1.08 to 1.17).

Discussion

Our study found that among the uninsured, White and Black respondents experienced more financial barriers relative to Hispanic respondents. Furthermore, even with insurance coverage, Hispanic and other racial/ethnic respondents still experienced more financial barriers to health care than White and Black respondents, suggesting that insurance coverage alone may not be enough to ease financial burdens in health care across different racial/ethnic groups. Specific efforts may be needed to mitigate financial barriers among all uninsured groups, as well as insured Hispanic and other racial/ethnic groups.

Keywords: health insurance coverage, health care costs, racial/ethnic disparities, BRFSS

Association between binge drinking and highly effective contraceptive use among U.S. women

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Introduction

Sterilization, implant and intrauterine devices (IUDs), user-independent and highly effective contraceptives, are critical to prevent unintended pregnancy. Women engaging in binge drinking are less adherent to contraception and are therefore at high risk of unintended pregnancy. Our study evaluated the association between binge drinking and highly effective contraception use (HECU) in U.S. women and assessed how this relationship varies by age and parity.

Methods

We used data from the 2017 Behavioral Risk Factor Surveillance System. Subjects were women aged 18-49 who were at risk of unintended pregnancy (n=10,765). Binge drinking, defined as consuming 4 or more drinks on an occasion for females, were categorized into three groups (non-binge drinking, infrequent binge drinking [1-4 times in the last 30 days], frequent binge drinking [≥ 5 times in the last 30 days]). The outcome was HECU the last time couples had sex. We conducted Mantel-Haenszel analyses to evaluate the association between binge drinking and HECU, adjusting for race, marital status and income and further evaluated this association when stratified by age and parity.

Results

Two-thirds of subjects (65.4%) did not binge drink, 28.5% binged infrequently and 6.1% binged frequently in the last 30 days. Among women aged 18-24, infrequent binge drinking (prevalence ratio [PR]: 0.77, 95% confidence interval [CI]: 0.64-0.92) and frequent binge drinking (PR: 0.63, 95% CI: 0.41-0.92) were associated with lower likelihood of HECU. Among women aged 25-49, infrequent and frequent binge drinking were associated with a higher likelihood of HECU (PR: 1.14 [95% CI: 1.07-1.22] and 1.24 [95% CI: 1.10-1.40], respectively). This association is modified by parity. Among women aged 25-49 with at least one child, the prevalence of HECU is higher for women with infrequent and frequent binge drinking than non-binge drinkers (PR: 1.32 [95% CI: 1.23-1.41] and 1.41 [95% CI: 1.23-1.61], respectively). However, there was no association between binge drinking and HECU in women aged 25-49 without children.

Discussion

Young women engaging in binge drinking are less likely to use highly effective contraception compared with non-binge drinkers. This finding indicates more interventions may be needed to promote HECU among women aged 18-24 with binge drinking.

Keywords: Contraception; Binge drinking; Unintended pregnancy; Behavioral Risk Factor Surveillance System

The Relationship Between Contraceptive Method and Self-Reported Poor Mental Health Status

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Introduction

Many mental health disorders, such as anxiety and depression, are more prevalent in women. Researchers have hypothesized that use of hormonal contraception may contribute to this disparity. The association between contraceptive use and mental health is poorly characterized, despite the fact that the vast majority of women use contraception. Therefore, the purpose of this study was to compare the association between contraceptive type and contraceptive effectiveness with self-reported mental health status and to determine if age and history of depression modify this relationship.

Methods

This study was a secondary cross-sectional analysis of the 2017 Behavioral Risk Factor Surveillance System (BRFSS) survey, using the Preconception Health/Family Planning Module. We included women ages 18-49 at risk for pregnancy. Current contraceptive method was categorized by type (hormonal vs non-hormonal) and effectiveness (low, moderate, high). The outcome of poor mental health was defined as having 14+ days of “not good” mental health in the last 30 days. Survey weighting methods were used to estimate population prevalence of contraceptive use by type and effectiveness. Stratified analysis estimated prevalence ratios for both contraceptive type and contraceptive effectiveness in relation to poor mental health, controlling for race/ethnicity, education, and marital status. Age and previous diagnosis of depression were evaluated for effect modification by comparing the magnitude of difference between stratum-specific prevalence ratios.

Results

A total of 17,326 women were included for contraceptive type and 27,536 women for contraceptive effectiveness, for which overall prevalence of self-reported poor mental health was 15.3% and 15.6%, respectively. Hormonal contraceptive use was not associated with poor mental health (aPR: 0.98, 95% CI 0.93-1.03). Compared to women who used less effective contraceptives, neither moderately nor highly effective contraceptive users differed significantly in self-reported poor mental health status (aPR: 0.95 (0.90, 1.01), aPR: 1.02 (0.98, 1.05), respectively). The associations between contraceptive type or effectiveness and self-reported poor mental health did not differ by age or history of depression.

Conclusion

Neither contraceptive type nor contraceptive effectiveness were associated with prevalence of self-reported poor mental health. Future research may include prospective studies on contraceptive effectiveness and risk of developing future poor mental health outcomes.

Examination of a potential association between mental health status and influenza vaccination among older adults

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BACKGROUND

Adults 65 and older are known to have greater risk of influenza-related hospitalizations and deaths. Yet, approximately one third of this population fails to receive their influenza vaccine each year. The primary purpose of this study was to examine whether elevated depression symptoms were associated with lower influenza vaccination rates among adults 65 and older. The secondary purpose was to assess whether this association was modified by a prior clinician-based diagnosis of a depressive disorder.

METHODS

This cross-sectional study used Behavioral Risk Factor Surveillance System data from 10,168 adults aged 65 and older during the years 2015 and 2018. Participants provided self-reported data on presence of depressive symptoms and influenza vaccination status. Questions on depressive symptoms were derived from the Patient Health Questionnaire two item scale (PHQ-2), and answers were summed to identify a probable depressive disorder. A Mantel-Haenszel stratified analysis was conducted to estimate prevalence ratios and 95% confidence intervals, as well as to assess confounding. Stratified analysis, along with a Breslow-Day test, was used to assess whether prior diagnosis of a depressive disorder modified the association between probable depressive disorder and influenza vaccination rates.

RESULTS

8.7% of participants were classified as having a probable depressive disorder, and 40.9% of participants did not receive an influenza vaccination in the past 12 months. No statistically significant association was found between probable depressive disorder and lower rates of influenza vaccination (PR = 1.00, 95% CI: 0.94, 1.06). No sociodemographic characteristics appeared to confound the association between probable depressive disorder and influenza vaccination rates. There was also no evidence that prior diagnosis of a depressive disorder modified this association. The prevalence ratio was similar with (PR = 0.94, 95% CI: 0.75, 1.17) and without (PR = 1.00, 95% CI: 0.81, 1.22) prior diagnosis ($p = 0.70$).

CONCLUSIONS

Self-reported depressive symptoms consistent with a probable depressive disorder were not found to be a significant risk factor in preventing adults 65 and older from obtaining an influenza vaccine. Future studies should explore other psychological factors as potential risk factors for preventing vaccination.

Association Between State-level Voting Patterns and Prior Receipt of the HPV Vaccine, an Analysis Using Data from the Behavioral Risk Factor Surveillance System 2016 – 2018

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Background

Human papillomavirus (HPV) is the main cause of cervical, anal and oro-pharyngeal cancer worldwide. The HPV vaccine can prevent over 90% of HPV-related malignancies but vaccination rates in the United State (US) vary significantly by region. In this study, we assessed whether state-level politics is associated with receipt of HPV vaccination in the US, and if the association is modified by sex and age.

Methods

This study analyzed data from the Center for Disease Control and Prevention's (CDC) Behavioral Risk Factors Surveillance System (BRFSS) survey. Persons ages 18 to 36 years of age, who lived in 17 states that included the supplementary "Adult Human Papillomavirus (HPV)" module questionnaire in 2016, 2017 or 2018 were included. We compared self-reported receipt of HPV vaccination among persons living in Republican-leaning versus Democratic-leaning states, based on state electoral college votes in the 2016 US presidential election. Mantel-Haenszel stratified analysis was used to estimate risk ratios and to assess for effect modification and confounding.

Results

Overall, 36,334 survey respondents were included in the analysis, 22.7% of whom reported prior receipt of the HPV vaccine. When adjusted for race, living in a Democratic state was associated with a higher prevalence of prior receipt of the HPV vaccine in comparison to living in a Republican state among persons 18 – 36 years of age (RR 1.43, 95% CI: 1.37, 1.51). This association was strongest for men less than 26 years of age (RR 1.77, 95% CI: 1.58, 1.98) but remained significant for men ages 26 – 36 years (RR 1.51, 95% CI: 1.24, 1.85), women less than 26 years of age (RR 1.20, 95% CI: 1.13, 1.27), and women ages 26 – 36 years (RR 1.69, 95% CI: 1.57, 1.83).

Conclusion

Overall HPV vaccine coverage was low in adults 18-36 years of age. The strong association between state-level voting patterns and prior receipt of the HPV vaccine suggests that HPV vaccine coverage is lower in Republican states when compared to Democratic states. Further public health efforts are needed to promote HPV vaccine uptake among young men and women, particularly in Republican voting states.

Human Papillomavirus Vaccination and Contraceptive Decision-Making to Prevent Pregnancy

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Preceptor: Renee Heffron

Introduction

The human papillomavirus (HPV) vaccine is an important public health intervention to prevent cervical cancer. Previous studies have indicated a positive association between HPV vaccination and condom use, but few have examined its association with other contraceptive methods. We examined the relationship between HPV vaccination status and contraception choice among women aged 18-39 years. In our secondary analysis, we assessed if this association was modified by age and race.

Methods

We used data from the Behavioral Risk Factor Surveillance System and included states that collected information on HPV vaccination and contraception. Contraception effectiveness was categorized (low, moderate, high) using U.S. Department of Health and Human Services classification. We compared use of high, moderate, and low effectiveness contraceptive methods to no use of contraception among women aged 18-39 who received and did not receive an HPV vaccination. Mantel-Haenszel stratification was used to calculate the prevalence ratio (PR) for each effectiveness group, and stratified to assess if this relationship was modified by age and race. We excluded women trying to get pregnant, currently pregnant, those who had a hysterectomy, and those in same sex relationships.

Results

Among 1,898 women, 15.8% with HPV vaccination reported using highly effective contraceptive methods, 27.8% reported using moderately effective methods, 30.9% reported using low effectiveness methods, and 25.5% reported using no method. The prevalence ratio associated with HPV vaccination and use of highly effective methods was 1.23 (95% CI: 1.02, 1.47), moderately effective methods was 1.71 (95% CI: 1.48, 1.98), and low effectiveness methods was 1.39 (95% CI: 1.21, 1.58), when compared to no method of contraception. There was no evidence that the relationship between HPV vaccination and birth control method was modified by race.

Discussion

We found statistically significant associations between HPV vaccination status and use of any contraception. We found the strongest relationship with use of moderately effective contraceptive methods. Girls aged 9-17 should be the focus of future longitudinal research on HPV vaccination and healthy contraceptive decision-making.

Do firearm-owning households in the U.S. have access to healthcare?

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Introduction

Provider-led firearm storage counseling is a common strategy to prevent firearm suicide. Little research examines whether barriers to healthcare access for at-risk individuals would limit this intervention's impact. This study explores the relationship between household firearm presence and storage practices with healthcare access and utilization.

Methods

This cross-sectional secondary data analysis of the 2017 Behavioral Risk Factor Surveillance System used state-representative data from six states that completed the Firearm Safety and Healthcare Access Modules: California, Idaho, Kansas, Oregon, Texas, and Utah. The associations between having a firearm in the home and lacking health insurance, not having a healthcare provider, inability to afford care, and no recent annual checkup were evaluated. These associations were further examined by firearm storage practices. Mantel-Haenszel stratified analyses were conducted by age, sex, education, and presence of children in the household.

Results

Our analysis included 31,888 individuals; 44.3% reported a household firearm. Compared to those in firearm-owning households, those in non-firearm-owning households were more likely to be uninsured (RR: 1.82, 95% CI: 1.70, 1.96), not have a provider (RR: 1.30, 95% CI: 1.24, 1.36), and report cost as a barrier to care (RR: 1.44, 95% CI: 1.35, 1.54). There was no significant difference between groups in annual check-up rates (RR: 1.00, 95% CI: 0.97, 1.04). Among individuals in firearm-owning households, those with firearms stored loaded and unlocked were more likely to be uninsured (RR: 1.26, 95% CI: 1.09, 1.46) and lack a healthcare provider (RR: 1.21, 95% CI: 1.10, 1.33) compared to individuals in homes where firearms are stored unloaded. Having children in the home was an effect modifier between household firearm ownership and being uninsured (RR children 2.21, 95% CI 1.98-2.45; RR without children 1.52, 95% CI 1.38-1.68)

Conclusions

While individuals in firearm-owning households are more likely to have healthcare access, those in homes with the riskiest firearm storage practices had less access. Provider-led counseling may have limited reach for individuals in homes practicing risky firearm storage.

Influenza Vaccination Rates Among Adults with Asthma and COPD in the United States, 2015-2018: Is living in a rural setting associated with lower vaccination rates?

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Introduction

Influenza is a respiratory infection associated with significant morbidity and mortality, particularly in individuals with asthma and chronic obstructive pulmonary disease (COPD). Influenza vaccination has been shown to reduce the incidence, mitigate severity, and prevent deaths from the infection; however, fewer than half of United States (US) adults are vaccinated. Whether vaccination rates among individuals with asthma/COPD vary between urban/rural areas has not been studied, although rural areas experience well-described barriers to health care access. We hypothesize the prevalence of influenza vaccination will be lower among individuals with asthma and COPD living in rural areas, compared to those in urban areas.

Methods

We performed a cross-sectional analysis of national-level data from the 2015-2018 Behavioral Risk Factor Surveillance System (BRFSS). We restricted our sample to participants reporting COPD or current asthma, and for whom rural/urban residence was defined (urban if they lived within a metropolitan statistical area, and rural if otherwise). We estimated the prevalence ratio and 95% confidence intervals (CI) of influenza vaccination among rural participants compared to urban participants using survey-weighted generalized linear models with Poisson distribution and logarithmic link function.

Results

Of 127,694 participants, there were 84,494 (66%) urban residents and 43,196 (34%) rural residents. Baseline characteristics between rural and urban participants were similar, except fewer rural participants were non-Hispanic Black (5% vs 10%), completed college (21% vs 31%), or had an annual household income greater than or equal to \$75,000 (13% vs 23%). The unadjusted survey-weighted prevalence of receiving influenza vaccine was lower in rural residents than urban residents (50.7% vs 54.7%) with a prevalence ratio of 0.93 (95% CI 0.90, 0.95). Adjusting for age, sex, race, income, education, employment status, or measures of health care access did not significantly change the prevalence ratio.

Conclusion

Among US adults with asthma or COPD, the prevalence of influenza vaccination in individuals living in rural areas is slightly but significantly lower than individuals in urban areas. Future studies should focus on identifying other factors that could explain this difference, as well as ways to address this gap.

An assessment of the association between Coronavirus disease mortality risk factors among elderly patients and healthcare access in the United States using the BRFSS 2017 data.

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Background

The United States is the epicenter of the ongoing coronavirus disease pandemic. Approximately 60% of older adults in the U.S. possess at least two chronic conditions including those known to be risk factors for increased mortality from COVID-19. These include diabetes, chronic heart disease, chronic obstructive pulmonary disease, asthma, hypertension, and cancer. We examined the association between having at least one of these risk factors and having access to healthcare among elderly patients in the United States.

Methods

We conducted a cross-sectional study using data from the Healthcare Access Module in the 2017 Behavioral Risk Factor Surveillance System (BRFSS) survey. We included data for 23,982 adults 65 years or older from six states: Delaware, District of Columbia, Florida, New Jersey, Maine, and Wisconsin. The exposure of interest included having a chronic condition that increases COVID-19 mortality. The outcome was possessing a barrier to healthcare access defined as: inability to receive care or prescription due to cost, not having a regular care provider, or not having a routine checkup within a year. The association between exposure and outcome was evaluated using weighted log binomial regression. We assessed for effect modification by socioeconomic status, race and geographical area (rural/urban).

Results

The prevalence of healthcare access barriers among those with one or more chronic conditions was lower than those without any chronic conditions (12.6% vs 21.4% PR = 0.59, 95% CI 0.55, 0.62). The association did not vary significantly by assessed covariates. Of interest, prevalence of cost as a barrier was higher among individuals with chronic conditions when assessing individual healthcare barrier types (1.6% vs 0.72% PR=2.1, 95% CI 1.5, 3.1).

Conclusion

Although healthcare access amongst elderly Americans with chronic conditions were not found to differ by socioeconomic status, race and geographical area, the cost of care and prescriptions remains a potential barrier to healthcare access in this population amidst the COVID-19 pandemic.

Associations between consumption of sugar-sweetened beverages, 100% fruit juice, and poor mental health among U.S. adults

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Introduction

Sugar is ubiquitous in the American diet, and consumption of sugary beverages has been linked to several morbidities, including poor mental health. Sugar-sweetened beverages (SSBs) and 100% fruit juice contain similar quantities but different compositions of sugar, yet these beverages have not been separately studied in relation to mental health. We examined the associations between daily consumption of SSBs and fruit juice and poor mental health among United States adults, and whether these associations differed by physical activity (PA).

Methods

We conducted a cross-sectional study using data from the 2017 Behavioral Risk Factor Surveillance System (BRFSS) core module and optional SSB module. We estimated risk ratios (RRs) using Mantel-Haenszel stratified analysis to separately assess the associations between low, moderate, and high daily fruit juice and SSB consumption (none, >0 to <1, and 1+, respectively) and poor mental health (≥ 14 days of poor mental health in the past month), adjusting for sex, age, race, education, smoking, PA, and cross-sweet-beverage consumption. In exploratory analyses, we examined how the association between sugary beverage consumption and mental health differed by PA (<150 vs. ≥ 150 minutes/week) and whether there was an interaction between SSB and fruit juice consumption.

Results

Our analysis included 66,589 individuals, 7,491 (11.2%) of whom were classified as having poor mental health. Moderate and high SSB consumers were more likely to have poor mental health, compared to non-consumers (RR: 1.06, 95% CI: 1.01-1.12; RR: 1.51, 95% CI: 1.43-1.60, respectively). High fruit juice consumers were less likely to have poor mental health than non-consumers (RR: 0.94, 95% CI: 0.88-1.00). Associations between SSB and fruit juice consumption and poor mental health did not vary importantly when stratified by PA. The interaction between SSB and fruit juice consumption was not statistically significant.

Discussion

SSB consumption was significantly associated with poor mental health in a dose-dependent manner while fruit juice was marginally associated with lower risk of poor mental health. Longitudinal studies are needed to prospectively explore the causal effects of sugary beverage consumption on poor mental health.

Long-acting reversible contraceptive use among women in the United States, by region.

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Preceptor: Alison Drake

Introduction

Long-acting reversible contraceptive (LARC) use has increased over time in the United States, yet disparities in use may exist. Understanding regional differences in LARC use may provide insight into areas of inequalities in LARC access. We examined LARC use by geographic region, as well as by race and health care coverage.

Methods

We conducted a cross-sectional analysis of 2017 Behavioral Risk Factor Surveillance System (BRFSS) data. Women 18-49 years of age who reported modern contraceptive method use were included (n=15,484). We classified US states into four regions based on Census Bureau divisions: Midwest, Northeast, West, South. LARC methods included intrauterine devices (IUDs) and implants. Mantel-Haenszel stratified analysis was performed to assess confounding and effect modification. We then calculated risk ratios (as estimates of prevalence ratios) with Mantel-Haenszel stratified analysis and weighted prevalence ratios with log-binomial regression models to assess differences in prevalence of LARC use by region.

Results

Overall, weighted prevalence of LARC use was reported by 25.2% in the West, 25.1% in the Midwest, 21.6% in the South and 20.8% in the Northeast. Compared to the Midwest, the prevalence of LARC use was 14% lower in the South and 17% lower in the Northeast (PR=0.86, 95% CI=0.75, 0.99 and PR=0.83, 95% CI=0.73, 0.95, respectively) and similar in the West (PR=1.01, 95%CI=0.88, 1.15). Regional differences in LARC use varied by race and health care coverage, with multiracial or other races and females without health care coverage having more prominent disparities in LARC use.

Conclusion

LARC use was higher in the West and the Midwest than that in the South and the Northeast. In the four regions, whites had higher usage of LARC followed by Hispanics, blacks who had the lowest usage. Those with insurance coverage were more likely to use LARC. These results may suggest a need for more studies on whether targeted allocation and provision can show a different pattern.

Does frequency of residential moves impact healthy lifestyle behaviors? Findings from a cross-sectional study using the 2017 Behavioral Risk Factor Surveillance System (BRFSS) survey

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Introduction

Residential mobility is associated with widening health gradients in cardiovascular disease (CVD) burden. However, the mechanisms by which residential mobility impacts CVD remains unexplored. We aimed to investigate whether residential mobility was associated with fruit and vegetable (FV) consumption and physical activity and whether associations vary by gender.

Methods

Data from 109,704 adults aged 18 or older from 16 states that completed the optional residential mobility module in the 2017 Behavioral Factor Surveillance System (BRFSS) were used to investigate the association between residential mobility and meeting national recommendations for fruit consumption (≥ 2 servings/day), vegetable consumption (≥ 3 servings/day), and physical activity (≥ 150 minutes/week). We used Mantel-Haenszel stratified analyses and multivariate log-binomial regression models to obtain weighted prevalence risks (PRs) with 95% confidence intervals (CIs) for three outcomes adjusted for income, education, age, gender, race, smoking status, and then separately among men and women.

Results

15.6% of adults moved at least once in 2017 and 4.0% moved two or more times (highly-mobile). Compared to highly-mobile adults, a greater proportion of non-mobile adults earned more than \$50k/year (52.3% vs. 25.5%), and were college graduates (28.7% vs. 16.6%). After adjustment, highly-mobile adults were 1.38 times as likely to report adequate vegetable consumption compared to non-mobile adults (RR=1.38, 95%CI 1.24-1.53). This association remained significant after performing survey-weighted log-binomial regression. We found no significant adjusted association between residential mobility and fruit consumption (RR 1.03, 95%CI 0.99-1.11) and physical activity (0.98, 95%CI 0.94-1.02), using stratified analysis. Associations between residential mobility and outcomes were similar among male and female respondents.

Discussion

This study provides evidence from a nationally representative dataset that residential mobility was not associated with fruit consumption nor physical activity. Contrary to our hypotheses, greater vegetable consumption may be associated with greater residential mobility though results are likely an artifact of small sample sizes. These associations also did not differ by the gender of the mover. More sensitive instruments are needed to categorize hardship of moving and dietary outcomes.

Physical and Mental Health among U.S. Women with Military Service Compared to Civilians: BRFSS 2016-2018

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Preceptor: Alyson Littman

Introduction

Past studies have identified health disparities among women with military service compared to civilians. However, with recent expansion of female military roles, increasing numbers of younger female veterans, and the Veteran Association's efforts to provide more gender sensitive care, the association between military service and health indicators may have changed. Using recent BRFSS data, we characterized the association between military service and frequency of poor physical or mental health among women of different ages and evaluated healthcare coverage for possible effect modification.

Methods

Cross-sectional Behavioral Risk Factor Surveillance System (BRFSS) data collected via cellular and landline surveys among non-institutionalized adults in all U.S. states and territories between 2016 and 2018 yielded a sample of 16,615 women with military service and 747,882 without service. Military service was defined by self-reported past or current military service. Frequent (>14 days in the past 30) poor physical health and frequent poor mental health were primary outcomes of interest. We used Mantel-Haenszel stratified analysis to calculate unweighted adjusted relative risks (aRR) and 95% confidence intervals (95%CI) by age and current healthcare coverage status.

Results

Compared to civilian women, a greater proportion of women with military service reported frequent poor physical health. Associations were strongest among 18-44 year-olds (aRR[95%CI]= 1.51[1.38,1.64]) relative to women 45-64 (aRR= 1.19[1.14,1.25]) and 65+ (aRR= 1.16[1.08,1.24]). Compared to civilian women, a greater proportion of women with military service reported frequent poor mental health (aRRs 1.24 to 1.29). Women with military service and healthcare coverage had similar prevalence of reported frequent poor physical health compared to those without healthcare coverage, across all ages. Women with military service and healthcare coverage had lower prevalence of reported frequent poor mental health among 18-44 year-olds, but similar prevalence in other age groups compared to women with military service without healthcare coverage (18-44: prevalence 17.8% vs. 29.7%; aRR[95%CI]= 1.57[1.30,1.89] vs. 1.23[1.15,1.32]).

Conclusions

Using recent BRFSS data, our study found an increased prevalence of frequent poor physical and mental health associated with military service, consistent with previous literature. Women 18-44 years-old with military service and without healthcare coverage were most likely to have frequent poor mental health.

Association Between Sugar-Sweetened Beverage Consumption and Sleep Time Among U.S. Adults

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Preceptor: Elizabeth Kirk

Introduction

Sugar sweetened beverage (SSB) consumption is associated with an array of poor health effects, including reduced sleep duration in children and adolescents. The purpose of this study is to describe the association between SSB consumption and shortened sleep in American adults, and to determine whether socio-economic status modifies this relationship.

Methods

Our analysis used data collected from 51,556 American adults responding to the Behavioral Risk Factor Surveillance Survey in 2016. Crude and Mantel-Haenszel adjusted models (controlling for age, education, mental health status, and smoking status) were used to estimate the relative risk of an average sleep duration <7 hours per night by SSB consumption levels. Survey-weighted descriptive statistics were generated to assess for potential confounding, and adjusted models were used to analyze potential effect modification through education (as a proxy for SES) and age. Sensitivity analyses were conducted through disaggregation of SSB consumption to examine the effect of consuming soda or other SSBs alone, and through adjustment of consumption cut points to represent those consuming 0, ≤ 1 , or >1 SSB per day.

Results

The relative risk (RR) of experiencing shortened sleep increased in a dose dependent manner with the level of SSB consumed when compared to those who consume <1 SSB/per day (RR of 1-2 SSB/day: 1.13, 95% CI: (1.09, 1.17), 7.3% of respondents; RR of >2 SSB/day: 1.33, 95% CI: (1.29, 1.37), 17.1% of respondents). The observed effect held constant when stratified by age and education, though the association was diminished in those with less than a high school education (RR=0.98 vs 1.13), and the association was inconsistent for those aged 65+.

Discussion

The results of our study align with evidence collected in studies on children and adolescents that show negative associations between SSB consumption and sleep duration. While our study found similar associations, we found inconclusive evidence that this effect is modified by age or education. This study is relevant to the growing body of evidence characterizing the negative health effects of SSBs and expands on the evidence that SSB consumption has a negative association with sleep duration.

Missed Appointments: Association Between Subjective Cognitive Decline and Delayed Medical Care Among Older Adults

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Preceptor: Kristjana Ásbjörnsdóttir

Introduction

The prevalence of cognitive decline is projected to rise as the US population ages. Elderly adults with chronic diseases are particularly vulnerable to delayed care because these delays can postpone and extend treatment. This study aimed to investigate the association between subjective cognitive decline (SCD) and delayed medical care among US adults aged 45 and older, and how this association might differ by mental health status.

Methods

This cross-sectional study used data from the 2016 Behavioral Risk Factor Surveillance System. Participants from three states who responded to questions about self-reported confusion or memory loss (SCD) in the optional cognitive decline module and self-reported delayed medical care in the healthcare access module were included. Using Mantel-Haenszel stratified analyses, we calculated prevalence ratios (PRs) and 95% confidence intervals (CIs) for the association between SCD and delayed medical care. Mental health status was dichotomized into <14 or 14+ self-perceived poor mental health days in the past 30 days. Associations were adjusted for income.

Results

Among 13,534 participants, 3,236 (23.9%) delayed care. Those with SCD were more likely to report an income within \$25,000-50,000 (weighted prevalence, 53%) but less likely to report an income of \$50,000+ (29%). Compared to those without SCD, those with SCD had a higher prevalence of delayed care (SCD: 43.9% vs. no SCD: 21.5%); further, in stratified analysis (adjusted PR, 1.83; 95% CI, 1.71, 1.97). The SCD-delayed care association was stronger in individuals reporting <14 days of poor mental health (adjusted PR, 1.67; 95% CI, 1.50, 1.85) vs. 14+ days of poor mental health (adjusted PR, 1.28; 95% CI, 1.15, 1.42).

Conclusions

The prevalence of delayed medical care was higher among individuals self-reporting cognitive decline than among those without cognitive decline. Regardless of cognitive decline status, there was a higher prevalence of delayed care in those with poor mental health compared to those without poor mental health. This suggests that mental health and delayed care may have a stronger association than cognitive decline and delayed care. Future studies should investigate other potential mental health risk factors of delayed care in older adults.

Association of State-based Political Affiliation with Mental Health Morbidity following the U.S. 2016 Presidential Election

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Preceptor: Noel S. Weiss

Introduction

Prior research has documented the association between United States presidential elections and perceived stress levels of Americans. However, no study has yet looked nationally at mental health after the contentious 2016 presidential election. The purpose of this study was to examine the potential impact of the 2016 presidential election on mental health based on state-level political affiliation.

Methods

We performed an analysis of 2014-2017 data from the Behavioral Risk Factor Surveillance System. Adult participants from the 50 U.S. states and Washington D.C. surveyed during the 30-day period of December 8, 2016 - January 6, 2017 were categorized as “post-election”, while those surveyed from December 8, 2014 - January 6, 2015 were categorized as “pre-election”. States were categorized as “red” if Donald Trump won their electoral college votes in the 2016 election; the remainder of states were categorized as “blue” states. Mental health morbidity was defined as 7 or more self-reported “poor” mental health days within the past 30 days. The relative risks of mental health morbidity comparing “blue” and “red” states in the “post-election” and “pre-election” periods were calculated, as well as stratified relative risk calculations across sex and level of education.

Results

The “pre-election” cohort included 22,543 individuals and the “post-election” cohort included 36,607 individuals. Adjusting for age and race/ethnicity, there was no difference in mental health morbidity following the 2016 election between residents of “blue” and “red” states (Relative Risk = 1.01, 95% confidence interval: 0.96, 1.06). There was also no difference in mental health morbidity in the pre-election period (Relative Risk = 0.95, 95% confidence interval: 0.89, 1.02).

Discussion

Individuals from “blue” states did not have an increased risk of mental health morbidity after the 2016 election when compared to individuals from “red” states; this was consistent with the pre-election period. Future directions may include studies of subgroups of the U.S. population to identify potential groups who may require additional support.

Associations between adverse childhood experiences and cervical cancer screening in a multi-state national sample.

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Introduction

Adverse childhood experiences (ACEs) have been linked to increased risk of various adverse health outcomes in adulthood, including cervical cancer. Less is known about the association of ACEs with cancer screening behavior. This study examined associations of ACEs with cervical cancer screening.

Methods

Study population comprised of 21-65 years old women with no history of hysterectomy who participated in the 2012 Behavioral Risk Factor Surveillance System (BRFSS) in Iowa, North Carolina, Tennessee, and Wisconsin (N=7705). Exposure was ACE score (0, 1-3, 4+) computed from 11 questions in the ACE module. The outcome was ever and recent (within last 3 years) uptake of Papanicolaou (PAP) test, a cervical screening test. Stratified Mantel-Haenszel approach was used to analyze associations adjusted for age, income, and education. Effect modification by race/ethnicity was assessed using stratified analyses.

Results

About 43% of participants experienced 1-3 ACEs and 19% experienced more than 4 ACEs. 97% and 87% of women with 4+ ACE score had history of ever and recent Pap test screening respectively, while corresponding estimates for women with 0 ACE score were 95% and 91%. We found a positive association between ACE score and ever Pap test screening (RR: 1.02, 95%CI: 1.01-1.03, comparing women with ACE score of 4+ to women with ACE score of 0). We found an inverse association between ACE score and recent PAP test screening. Women with ACE score of 4+ had significantly lower prevalence of recent screening compared with women with 0 ACEs (Adjusted RR: 0.95, 95%CI: 0.93-0.98). This association was significant only among White women (RR: 0.93, 95%CI: 0.91-0.96) and not among Black (RR: 0.97, 95%CI: 0.92-1.03) or Hispanic (RR: 1.04, 95%CI: 0.96-1.14) women.

Conclusion

ACEs are associated with cervical cancer screening, particularly recent screening. This association may be race-specific. Findings support inclusion of trauma-informed care during screening for cervical cancer and possibly other preventative interventions.

Prevalence of Smoking, Healthful Nutrition and Physical Activity Among Overweight and Obese People Living with Pre-Diabetes Compared to those without in the General Population in the United States—Behavioral Risk Factor Surveillance System, United States, 2011-2018

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Preceptor: Jeffrey Stanway

Introduction

An estimated 84.1 million adults in the United States live with pre-diabetes; a known cause of type 2 diabetes mellitus and chronic cardiovascular and kidney disease. Although asymptomatic, pre-diabetes is reversible with targeted lifestyle modification. The prevalence of modifiable health behavior in those living with pre diabetes is however not well characterised.

Methods

Data from the 2011- 2018 Behavioral Risk Factor Surveillance System in obese or overweight individuals aged 45 years or older with at least one health check-up in preceding 5 years was used to compare the prevalence of physical activity, smoking cessation and non-consumption of sugar sweetened beverages (SSB) between those living with pre-diabetes and those without. Mantel Haenszel stratified analyses adjusted for age, race and gender were computed for risk of behaviour and to assess for effect modification by highest level of education attained and number of days of poor health.

Results

In this analysis, 100,311(16%) persons living with pre-diabetes and 519,256(83%) without were included. Demographic and health characteristics were similar between groups, except for higher obesity (55.3% vs 39.3%) in those living with pre-diabetes. After adjusting for age, gender and race, individuals living with prediabetes had a lower (48% vs 53%) risk of meeting recommended physical activity levels (RR 0.904, 95% CI: 0.894, 0.914), but were comparable for smoking cessation (RR 1.007, 95% CI: 1.002, 1.013) and non-consumption of SSB (RR 1.075, 95% CI 1.050, 1.100). Among study participants with at least grade school education, those with pre-diabetes were 25% more likely to not consume SSB compared to those without (RR 1.251, 95% CI 1.059, 1.479). We observed no significant effect modification by poor health days.

Discussion

Despite known benefits, individuals living with pre-diabetes were less likely to report meeting the recommended physical activity levels, and had comparable risk to those living without diabetes in the prevalence of smoking cessation and non-consumption of SSB. Even so, the cross-sectional nature of this data restricts conclusions on behaviour change after a diagnosis of pre-diabetes. Longitudinal research is recommended to assess for temporal changes in behaviour and of facilitators and barriers to lifestyle modification in this group.

Association between community support and physical and mental health status among cancer survivors living in Washington State: BRFSS 2012-2014 and 2016

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Preceptor: Holly Harris

Background

Social support is an important factor in improving health outcomes among cancer survivors. However, little research exists regarding the association between community support and poor physical or mental health outcomes in this population. The primary objective of this study is to investigate the association between the frequency of favor exchange, a novel way to understand community support, and mental and physical health outcomes among cancer survivors.

Methods

We used data from the Behavioral Risk Factor Surveillance System (BRFSS) from Washington State in 2012, 2013, 2014 and 2016. During these years, 4,986 adults over the age of 18 who had survived cancer(s) other than non-melanoma skin cancer completed the BRFSS module on community support and resilience. The primary exposure was community favor exchange, defined as how often favors were either given or received by the survey participant: "Very Often/Often", "Sometimes", "Rarely/Never". Outcomes of interest were poor mental health and poor physical health, defined as having 14 or more days over the course of the past month where mental and physical health were self-reported as "not good." Adjusted Relative Risks (aRR) and 95% confidence intervals (CI) were estimated using Mantel-Haenszel stratified analysis, and effect modification by age and marital status were examined.

Results

Individuals who reported having favor exchange "sometimes" were less likely to report poor mental health [8.1% vs 17.1%; aRR 0.47, CI: 0.47, 0.77] and poor physical health [18.3% vs 28.5%; aRR 0.77, 95% CI: 0.65, 0.91]. Effect modification was observed for age and marital status categories for the association between favor exchange and poor mental health. Those who were older than 75 [1.13(0.50, 2.57)] and those who were widowed [aRR1.45 (0.74, 2.83)] were not protected by the exposure whereas all other age and marital status categories displayed a protective association.

Conclusion

In this Washington state cross-sectional study, more frequent community favor exchange was associated with a lower prevalence of poor mental and physical health among cancer survivors. Community favor exchange should be explored as a potential intervention to address the risk of poor physical and mental health outcomes.

Association between binge drinking and suicidal ideation in a sample of Washington State adults

Emahlea Jackson, Boeun Kim, Kevin Tsai

Preceptor: Jonathan D. Mayer

Introduction

Suicidality contributes to public health burden through hospitalization, disability, and premature deaths. General alcohol consumption is one of the most frequently observed risk factors for suicide, especially among high-risk populations, including people who use illicit drugs. However, there is limited research that demonstrates a link between binge drinking behavior and suicidal ideation among the general population. This study examined the association between binge drinking and suicidal ideation among adults in Washington State.

Methods

This cross-sectional study utilized the 2018 Behavioral Risk Factor and Surveillance System survey in Washington. Individuals aged 18 years or older who self-identified as residents of Washington State and answered all alcohol- and suicide-related questions were eligible. Our exposure, binge drinking behavior, was determined by whether respondents reported consuming five or more alcoholic drinks on a single occasion for men and four or more alcoholic drinks for women in the prior 30-day period. Our primary outcome, suicidal ideation, was measured with a single question asking whether participants had considered suicide in the prior 12-month period. We calculated weighted descriptive statistics. The association between binge drinking and suicidal ideation was calculated with Cochran Mantel-Haenszel estimation, adjusted for age, sex, education, marital status, employment status, and area-level income.

Results

A total of 5,698 individuals were included in this analysis after excluding missing values ($n = 6,632$) by a listwise method. A total of 1,157 (23.3%) reported experiencing one or more binge drinking event(s) during the prior 30 days. More individuals who experienced binge drinking events were younger than 35 years of age, compared to those without binge drinking events (36.5% versus 14.9%). There was statistically significant evidence that binge drinking was associated with suicidal ideation (prevalence ratio: 1.66; 95% confidence interval: 1.17–2.34).

Discussion

This study adds to evidence that binge drinking is related to suicidal ideation among the general adult population. The link between binge drinking and suicidal ideation may be explained by the increased impulsive response and decreased inhibitory control during acute alcohol consumption. Our findings indicate that suicide prevention screening should be diligently applied to individuals with high-risk binge drinking behavior.

Associations between sexual orientation and firearm access in Washington State

Jacob E. Fong-Gurzinsky, Anna L. Harrington, Riffat Ara Shawon

Preceptor: Vivian H. Lyons

Introduction

Sexual minorities have an increased risk of suicide compared to heterosexuals. While household firearm availability and unsafe storage (i.e. having at least one firearm unlocked and loaded) are associated with increased risk of firearm suicide, little is known about firearm ownership and storage among sexual minorities, a high-risk group. Our study aimed to address this gap in the research.

Methods

Using Washington State Behavioral Risk Factor Surveillance System data from 2013, 2015, 2016, and 2018, we conducted a Mantel-Haenszel stratified analysis to investigate the association between sexual orientation and household firearm access, measured with household firearm ownership and unsafe storage, adjusting for age. We assessed this association for effect modification by sex.

Results

The study population included 1,982 sexual minorities (58% female; 72% White/non-Hispanic) and 42,259 heterosexuals (51% female; 76% White/non-Hispanic). Household firearm ownership was lower among sexual minorities than heterosexuals (24% vs. 39%, respectively). Among males, 47% of the heterosexuals reported household firearm ownership, whereas, 24% of the sexual minorities reported the same (RR=0.52 95% CI=0.46, 0.58). Household firearm ownership was higher among heterosexual females (32%) than among sexual minority females (24%) (RR= 0.75, 95% CI=0.67, 0.83). Among firearm owning homes, unsafe firearm storage was similar for sexual minorities and heterosexuals (21% and 20%, respectively). Sexual minority status was not associated with unsafe firearm storage, regardless of sex (male: RR=1.02, 95% CI=0.84, 1.24; female: RR=1.26, 95% CI=0.81, 1.97).

Discussion

The elevated risk of suicide among sexual minorities is not explained by increased household firearm ownership and less safe storage practices in contrast to heterosexuals. Nonetheless, this finding highlights the need for additional support and interventions that focus on suicide prevention for sexual minorities.

Sexual Violence and Contraception Use among American Women: A cross-sectional analysis

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Preceptor: Mary A. Kernic

Introduction

An experience of sexual violence can impact on a survivor's relationship with contraception use. Although previous studies have examined associations between other forms of violence and contraception use, the specific relationship between sexual violence and contraception use has yet to be adequately studied. The primary aim of this study is to assess the association between lifetime sexual violence experience and contraception use, with a sub-aim of ascertaining whether gynecologically-invasive contraceptive methods (GICMs) are less prevalent among women with a history of sexual violence. The secondary aim is to assess if mental health status modifies the relationship between sexual violence and contraception use.

Methods

This study used cross-sectional data from the 2017 Behavioral Risk Factor Surveillance System (BRFSS) and included four states that collected data on both sexual violence and contraception use. Survey weighting was used for all analyses. Women over 49 years old, who were currently pregnant, or for whom data on both sexual violence and contraception use were not present, were excluded. The final study sample was 2,327. Any type of intrauterine device (IUD) was classified as a GICM. Binomial log regression, controlling for age, was used to calculate prevalence ratios (PRs) for the primary aim and sub-aim. Unadjusted binomial log regression was used to assess for effect modification in the secondary aim. All point estimates were calculated using alpha levels of 0.05.

Results

Adjusting for age, use of any contraceptive method at the last sexual encounter was 12% higher among women who reported a history of sexual violence than among those who did not (PR = 1.12; 95% CI: 1.01, 1.25; $p = 0.02$). We observed no association between GICM use and sexual violence (PR=0.99; 95% CI: 0.49, 1.99). We found no evidence that mental health modified the primary relationship of interest ($p = 0.14$).

Discussion

Our findings are limited, as data were only used from four states and contraception classification only included use in the last sexual encounter. Future studies that analyze contraception use beyond a single sexual encounter may better determine the true association between sexual violence and contraception use.

The Effect of Living in Disadvantaged Zip Codes in Washington State on Mental Health and the Role of Urban or Rural Settings on the Association

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Preceptor: Anjuli Wagner

Introduction

Mental health disorders represent a substantial portion of the overall disease burden in Washington. The association between zip code level socioeconomic status (SES) and individual mental health is not known. We aimed to evaluate the association between area-level SES and individual mental health, and to determine whether individual-level SES and living in an urban vs rural setting modified this association.

Methods

We conducted a cross-sectional study using the most recent Washington State American Communities Survey data and the Washington State 2014 Behavioral Risk Factor Surveillance System (BRFSS) survey. We included individuals 18 years of age or older living in Washington state who reported their zip code and number of poor mental health days. The exposure of interest was zip code-level SES defined by a composite score including level of education, median household income and family home characteristics. The primary outcome was 14 or more days of self-reported poor mental health. We estimated prevalence ratios with 95% confidence intervals and effect modification using weighted log binomial regression analysis. Confounders were determined *a priori*.

Results

A total of 9,569 individuals were included in our study, of which 2,045 (21%) were classified as living in low SES zip codes and 7,524 (79%) as living in high SES zip codes. After adjusting for age, sex, race, education, and insurance status, individuals in low SES zip codes had a higher prevalence of poor mental health (14.4% vs 10.8%; RR 1.27; 95% CI 1.03, 1.58). Among urban areas, the prevalence of poor mental health was higher in low SES zip codes compared to high SES zip codes (14.0% vs 9.1%; RR 1.54; 95% CI 1.16, 2.05). However, among rural areas, the prevalence of poor mental health was lower in low SES zip codes compared to high SES zip codes (10.2% vs 10.5%; RR 0.97; 95% CI 0.58, 1.63). Individual income did not change the effect.

Discussion

Individuals living in disadvantaged areas have a higher burden of poor mental health than those living in advantaged areas. This effect is more prominent in urban settings and potentially highlights the importance of community factors on mental health.