Effects of Deployment on Risky Health-Related Behaviors Among US Marines

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EXECUTIVE SUMMARY

Background

Service members returning from deployment undergo an adjustment period notable for recovery from service injuries, poor mental health, and social reintegration. Recent findings suggest deployment may also influence risk taking and health-related behaviors.

Purpose

The objective of this study was to determine the effects of deployment and combat experiences on risky health-related behaviors among US Marines.

Methods

The study population consisted of 1042 participants from the Recruit Assessment Program who completed a baseline survey at enlistment and a follow-up survey 3 years later regarding several health-related behaviors. Using separate multivariable logistic regression models, changes in 8 health behaviors were examined among nondeployed and deployed Marines.

Results

Combat deployers were significantly more likely to initiate binge drinking, newly screen positive for alcohol dependence, initiate smoking, and decrease seat belt use compared with nondeployers. Deployers without combat experience were less likely to decrease fast-food consumption compared with nondeployers.

Conclusions

Previously deployed Marines, especially those who experienced combat, have increased odds of several adverse health-related behaviors postdeployment and should be targeted for prevention programs.

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BACKGROUND

Returning home from deployment is a time of great transition for many service members. This adjustment period is often marked by service-related injuries,[1] poor mental health,[2,3] and difficulties with social reintegration.[4] Additionally, recent findings suggest deployment may also influence risk taking[5,6] and other health-related behaviors.[4] Despite the growing realization of the importance of the postdeployment phase as a time for individual adjustment, our understanding is limited and narrowly focused regarding the long-term impact of the reintegration process.[7,8]

While most research focusing on the health of returning service members has been dedicated to clinically significant diagnoses, such as posttraumatic stress disorder (PTSD) and depression,[9] there is some evidence suggesting deployment negatively affects subclinical health behaviors as well. High rates of motor vehicle accidents, aggressive driving, and limited seat belt use have been reported among recently returning service members.[10] Deployment has also been shown to be a risk factor for binge drinking[11] and initiation of cigarette smoking.[12] Furthermore, health-promoting behaviors, such as eating a healthy diet[4] and getting an adequate amount of quality sleep,[13] tend to decrease upon return from deployment. Additional research is needed to better understand the impact of deployment on behavioral health and well-being. Furthermore, given that the intensity and frequency of combat have been found to be main determinants of postdeployment health,[14] research specifically examining postcombat health behaviors is warranted.

Using baseline and follow-up data from the Recruit Assessment Program (RAP), in the current study, we investigated changes in 8 health-related behaviors among Marines postdeployment. Based on previous findings, we hypothesized that compared with nondeployers, deployed personnel and combat deployers would report a decrease in health-promoting behaviors and an increase in potentially risky health behaviors. Limited research has specifically focused on Marine personnel, and even less research is available regarding health prior to enlistment and during the initial years of military service.[15] This study is one of the first to prospectively examine the effects of deployment and combat on health behaviors among Marines early in their careers.

METHODS

Participants and Procedures

The RAP was initiated in 2001 to collect comprehensive preservice health data,[16] including demographic and behavioral information.[17] Data are collected through a self-administered questionnaire during the first week of boot camp at US Marine Corps Recruit Depot, San Diego, California, from male Marine recruits who voluntarily consent to the study.[15] Between 2004 and 2006, a follow-up study, RAP II, was designed as a one-time survey by mail to assess the health and combat experiences in a subset of the original cohort. Of the 19,089 participants enrolled between October 2001 and October 2002, 11,640 addresses were obtained from the Defense Manpower Data Center (DMDC), and 1498 completed the RAP II survey. While a 13% response rate is considerably lower than average for mailed surveys (49%),[18] the high mobility of a military population and an external source for contact information must be considered. Additionally, compared with RAP II nonresponders, the current population was found to be of comparable age, race, and educational achievement. Furthermore, the study population was found to have similar proportions of ethnic groups and be only slightly younger, on average, than the general Marine population compared with enlisted Marines (E1–E4) in 2004.[19] The present study included participants with complete covariate and deployment data who completed both the RAP and RAP II questionnaires, resulting in a final study sample of 1042 Marines. This study was approved by the Institutional Review Board at the Naval Health Research Center.

Measures

Study outcomes examined the changes in 8 health behaviors. Each outcome was examined at the 2 survey time points; an increase or decrease was defined as at least a 1-level change. The number of participants within each outcome model varied due to missing values at one of the time points. Outcome categories in some of the models were combined for analyses because of small cell sizes.

Sleep duration categories were created from participant responses to the question, “About how many hours do you sleep on most nights?” Limited sleep was defined as an average of <7 hours of sleep per night, and optimal sleep was defined as 7–8 hours of sleep.[20]

Average daily television watching was evaluated by the question, “About how many hours do you watch TV (television) on an average day?” Possible responses included none, 1 hour or less, 2 to 3 hours, and 4 or more hours.

Average weekly fast-food consumption was assessed by the question, “About how many times each week do you eat from a fast-food restaurant (like hamburgers, tacos, or pizza)?” Limited consumption was defined as eating fast food 0–1 times per week, moderate consumption was defined as 2–7 times, and excessive consumption was defined as 8 or more times per week. These categories were based on the average frequency of fast-food consumption among the general US population.[21,22]

Typical seat belt use was evaluated by the question, “How often do you wear a seat belt when driving or riding in a car?” Response categories included never, intermittent (response: sometimes or usually), and regular (response: always).[23]

Condom use during the previous sexual encounter was assessed by asking, “Did you use a condom the last time you had sex?” Response options included no, yes, and I have not had sex. Married participants and those who reported they had not had sex at baseline or follow-up were excluded from analyses.

Binge drinking was assessed by 2 questions from the Alcohol Use Disorders Identification Test.[24] A review of this test found a median reliability of 0.83 and high sensitivity (0.72) and specificity (0.88).[25] Participants were considered binge drinkers if they endorsed drinking 6 or more drinks at one sitting at least once a year, or if they reported drinking 5 or more drinks on a typical day of drinking. Binge drinking is typically defined solely by the latter (5 or more drinks); however, due to different response options in the RAP and RAP II surveys, the present study used an adapted definition.[26] Participants who were not classified as binge drinkers at baseline but met the criteria at follow-up were classified as newly reported binge drinkers. Conversely, those who were classified as binge drinkers at baseline but not at follow-up were classified as resolved binge drinkers.

Participants who positively endorsed at least 2 of the 4 CAGE (Cutting down, Annoyance, Guilty, Eye-openers) items within the past year were defined as having potential alcohol dependency.[27] This questionnaire has been found to have high test–retest reliability (0.80–0.95),

sensitivity (0.71), and specificity (0.90).[28] Those who were not classified as potential alcoholics at baseline but met the criteria at follow-up were defined as having newly reported potential alcohol dependence. By contrast, those who met the criteria at baseline but not at follow-up were considered to have resolved potential alcohol dependence.

On both surveys, participants were asked, "In the past year, did you smoke cigarettes?" Those who selected not at all for this item were classified as nonsmokers at baseline. Those who answered some days or every day were classified as smokers at baseline. Baseline nonsmokers who responded positively to this question at follow-up were considered new smokers, while baseline smokers who responded not at all at follow-up were considered past smokers. Persistent smokers were not included in the analyses.

Deployment data were obtained from DMDC. Three items on the RAP II survey identified combat deployers: "During deployment, were you engaged in direct combat where you discharged your weapon?", "During deployment, were you ever shot or seriously injured?", and "During deployment did you personally see anyone wounded, killed, or dead?" Participants who positively endorsed at least 1 of these items were classified as combat deployers.

Covariates included age, race, hometown location, education level, life stressors, physical and mental health, and military pay grade. All covariates were assessed at baseline except pay grade, which was assessed at follow-up. For regression analyses, hometown location was defined by the question, "Where did you live most of the time as a child?" Rural hometowns were those with less than 10,000 people, while urban hometowns were those with at least 10,000 people.[29] A dichotomous education variable was created: high school diploma or less and more than a high school education. The life stressors variable categorized participants as experiencing none or at least 1 stressful event within the past year, including marriage, divorce, loss of job, death of a loved one, and having children. Using an adapted scoring method to account for revised response options for 2 items, the 12-Item Short-Form Health Survey Physical Component Summary (PCS) and Mental Component Summary (MCS) scores were utilized to assess functional health.[30] Both scales have been found to be reliable (PCS 0.89, MCS 0.76) and valid (PCS 0.67, MCS 0.97) measures.[30] Pay grade was dichotomized: junior enlisted (E1–E3) and noncommissioned officers (E4 and E5).

Data Analysis

Descriptive and univariate analyses examined the unadjusted associations between each health-related behavior and deployment status. Preliminary analyses were completed using a variance inflation factor of 4 or more to detect the presence of multicollinearity among the independent variables. Full models, including all covariates, were created for each outcome. A manual backward elimination approach was used to reduce these models to retain only significant covariates ($p < 0.05$) and confounders (defined as variables that changed the measure of effect for combat experience by >10% upon removal).[31] Multivariable logistic regression models were used to compare the adjusted odds of changing health behaviors among participants who deployed with combat experiences, deployed without combat experiences, and nondeployers. Nondeployers were used as the reference group in all models. All models were tested for goodness of fit, utilizing a $p > 0.10$ cutoff in the Hosmer-Lemeshow test. Data management and analyses were performed using SAS statistical software, version 9.2 (SAS Institute Inc., Cary, NC, USA).

RESULTS

Of the 1042 participants, 244 (23%) deployed with combat, 216 (21%) deployed without combat, and 582 (56%) did not deploy between baseline and follow-up (mean time between surveys = 33 ± 4.8 months). At baseline, the majority of participants (79%) were 17–20 years old, 68% were white, 73% had a high school education or less, and 66% were from urban hometowns. In the year prior to completing the baseline survey, 23% experienced at least 1 life stressor. At baseline, 70% had a PCS score of 50 or greater, and 79% had an MCS score of 50 or greater; 50 was the average score among the US population. At follow-up, 57% were junior enlisted personnel (E1–E3), and 43% were noncommissioned officers (E4 and E5).

At baseline, the majority of participants reported limited sleep (<7 hours/night), moderate television watching (0–3 hours/day), moderate fast-food consumption (2–7 times/week), regular seat belt use, and condom use during last sexual encounter (Table 1). Nearly half (46.4%) met the criteria for binge drinking, 6% for possible alcohol dependence, and 32.2% were smokers at baseline. At follow-up, more participants reported limited sleep (72.5%), excessive fast-food consumption (5.2%), regular seat belt use (84.5%), binge drinking (83.5%), and potential alcohol

dependence (17.2%) compared with baseline. Additionally, fewer participants (53.5%) used condoms at follow-up, 27.4% became new smokers, and only 3.2% quit smoking (Table 1).

The prevalence of each health behavior change at follow-up is shown in Table 2. Among combat deployers, 67.2% decreased sleep duration from optimal to limited sleep, while only 5.8% increased average nightly sleep. Nearly one quarter (22.2%) of combat deployers reported an increase in watching television, 13.4% decreased their seat belt use, and 47.1% decreased condom use. Newly reported binge drinking rates were high among all deployment groups, but most noticeable among combat deployers, with 88.5% reporting new-onset binge drinking at follow-up. Similarly, a higher proportion of those deployed with combat had newly identified screens for potential alcohol dependence (19.4%) and were new smokers at follow-up (50.3%) compared with those deployed without combat and nondeployers.

In the 8 separate multivariable models for each health behavior (Table 3), combat deployers had significantly increased odds of binge drinking (odds ratio [OR] = 4.73; 95% confidence interval [CI], 1.92–11.65), potential alcohol dependence (OR = 2.35; 95% CI, 1.53–3.61), and initiating smoking (OR = 1.70; 95% CI, 1.17–2.47) at follow-up compared with nondeployers. In addition, combat deployers were significantly more likely to decrease seat belt use (OR = 1.90; 95% CI, 1.15–3.16). Marines deployed without combat were significantly less likely to decrease fast-food intake than nondeployed personnel (OR = 0.43; 95% CI, 0.25–0.73, Table 3). Statistically significant covariates in the multivariable models for combat deployers included older age, which was negatively associated with smoking initiation (OR = 0.52; 95% CI, 0.34–0.79), and non-white race, which was positively associated (OR = 1.45; 95% CI, 1.06–1.99). Additionally, those with lower PCS scores were less likely to have a new positive screen for potential alcohol dependence at follow-up (OR = 0.58; 95% CI, 0.36–0.93), while those with lower MCS scores were more likely to have a new positive screen for potential alcohol dependence at follow-up (OR = 1.57; 95% CI, 1.12–2.44) (data not shown).

DISCUSSION

This study demonstrated that certain health-related behaviors are significantly affected by deployment, especially among those exposed to combat. Marines deployed with combat were significantly more likely to initiate binge drinking, screen positive for potential alcohol dependence, initiate smoking, and decrease seat belt use at follow-up compared with

nondeployers. Additionally, noncombat deployers were significantly less likely to decrease fast-food consumption at follow-up than nondeployers. These data illustrate that Marines exposed to combat are at significantly greater odds of exhibiting risky health behaviors postdeployment.

While the increased odds of alcohol misuse among combat deployers within this cohort concur with previous reports, the rate of newly reported binge drinking (88.5% of combat deployers) in the current study is noticeably higher than in previous research. This finding may be due, in part, to the fact that 2 items were used to identify binge drinking, which may have increased the sensitivity of this measure. When we utilized a single assessment of ≥5 drinks on a typical day of drinking, we found that 54.5% met these criteria. A study among Army personnel found that nearly 20% of deployed personnel had 5 or more drinks per day, and 16% continued this behavior upon returning from deployment.[32] Similarly, a recent study found that over 27% of soldiers who had returned from a deployment within the previous year screened positive for alcohol misuse.[33] It is notable that newly reported binge drinking was highest among combat deployers, but also substantial among Marines in our study, including those who never deployed. Along with the adverse health outcomes related to excessive drinking within the general population,[34] service members may be at risk of additional career-specific consequences. Within the military, alcohol-related problems have been associated with poor job performance,[35] early attrition,[36] and elevated injury rates including motor vehicle crashes.[37]

Smoking initiation was also associated with combat deployment in this study. The stress of occupational experiences, especially combat deployments, within the military has been found to be associated with cigarette smoking[3,38]; such findings suggest smoking initiation may be a coping mechanism.[39] In addition, the military culture may contribute to smoking initiation given that 38% of nondeployers also became new smokers at follow-up. As the leading preventable cause of death among Americans[40] and a risk factor for premature military discharge,[41] elevated smoking rates could negatively impact military readiness, underlining the importance of intensive prevention programs within this population.[12]

We also found that deployment with combat exposure was associated with decreased seat belt use. Fear et al. found that UK service members previously stationed in Iraq were significantly less likely to wear seat belts upon returning from deployment.[42] Higher rates of motor vehicle crashes have also been reported,[10] accounting for nearly one third of annual fatalities and the

leading cause of deaths within the US military.[43] For this reason, the current findings are particularly concerning because decreased seat belt use may put combat deployers at increased odds for potentially fatal outcomes associated with a motor vehicle crash.

Although previous studies have found significant associations between deployment and sleep disturbances, no significant findings related to sleep were found in the current study. However, it is noteworthy that the majority (60–67%) of participants in our study had decreased sleep duration from optimal to limited sleep. It is possible that with a larger sample size, significant findings could have been identified or that the lifestyle of a Marine does not allow for the same amount of sleep reported prior to enlistment.

Among deployers without combat, one significant change in health behavior was found: they were less likely to decrease their fast-food consumption at follow-up compared with nondeployers. Chronic stress has been associated with diets high in fat and sugar.[44] While the precise effect of deployment history on fast-food consumption is unknown, it is likely that stress associated with deployment and combat experiences may affect eating habits and/or preferences. These data are especially important since nearly 57% of active duty service members are overweight or obese,[45] and retention in the service is dependent on the ability of members to meet weight standards. Adding a component on healthy eating to postdeployment reintegration programs could be a potential strategy for mitigating poor dietary habits postdeployment.

Our study has limitations that should be noted. We could only determine if deployment experiences caused the observed behavior changes if an association existed. Since the surveys relied on self-reported data, the information may be subject to recall bias, including the underestimation and/or overestimation of behaviors. Additionally, the low response rate to the RAP II survey may have resulted in a response bias; however, the study population was found to have similar demographic characteristics as RAP II nonresponders and enlisted (E1–E4) Marines at the time of data collection. The use of single-item outcome measures may have resulted in less sensitive findings. Because of item missingness, it was not possible to investigate both increases and decreases for each health-related behavior; instead, only behavior change in an unhealthy direction was evaluated in some models. Also, given the small cell sizes, there may not have been enough statistical power to detect changes in condom use. Since RAP II was conducted over a 2-year period, follow-up times varied among participants, as did the time between

deployment and survey submission. Lastly, since participants completed follow-up assessments <5 years into their military careers, the study sample consisted of younger, lower ranking personnel and may not be representative of the entire US Marine Corps population.

Despite these limitations, the study has several strengths. The longitudinal study design allowed for prospective data collection and examination of the temporal sequence of events. Deployment data were collected from DMDC and were, therefore, unaffected by the limitations of self-reported data. All analyses used a 3-level exposure variable to compare nondeployed personnel and those who deployed with and without combat. Eight different health-related behaviors were evaluated, 3 of which (television watching, fast-food consumption, and condom use) were largely unstudied behaviors within a military population. Finally, few studies have specifically focused on Marines, and even fewer have collected baseline data on behaviors prior to enlistment. By using the prospectively collected data from baseline and follow-up RAP surveys, this study is one of the first to examine the association of deployment experiences and health-related behaviors among young Marines early in their military careers.

Overall, this study demonstrated that several risky health-related behaviors increased after deployment among Marines who experienced combat. It is possible these associations are a result of combat-related PTSD or depression. Although outside the scope of the current paper, future studies should examine the relationship between mental health (pre- and postdeployment) and behavioral health. It would also be important to evaluate the persistence of adverse health behaviors over time and the associated impact on force readiness. Additionally, branch-specific research is necessary to better understand the specific exposures and outcomes experienced by each military service branch while deployed.

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Table 1. Prevalence of Health Behavior Outcomes at Baseline and Follow-up

	Baseline	Follow-up
Health Behavior	n (%)	n (%)
Sleep duration[a]		
Limited	316 (69.9)	755 (72.5)
Optimal	725 (30.4)	286 (27.5)
Television watching[b]		
None	51 (4.9)	216 (20.7)
1 hour or less	429 (41.3)	459 (44.1)
2–3 hours	470 (45.2)	332 (31.9)
4+ hours	89 (8.6)	34 (3.3)
Fast-food consumption[c]		
Limited	407 (39.1)	420 (40.3)
Moderate	607 (58.3)	568 (54.5)
Excessive	27 (2.6)	54 (5.2)
Seat belt use[d]		
Never	26 (2.5)	24 (2.3)
Intermittent	294 (28.2)	138 (13.2)
Regular	711 (68.2)	880 (84.5)
Condom use[e]		
No	31 (16.8)	86 (46.5)
Yes	154 (83.2)	99 (53.5)
Binge drinking[f]		
No	267 (53.6)	172 (16.5)
Yes	231 (46.4)	868 (83.5)
Potential alcohol dependence[g]		
No	965 (94.0)	861 (82.8)
Yes	61 (6.0)	179 (17.2)
Cigarette smoking status[h]		
Nonsmoker	704 (67.8)	419 (40.4)
Smoker	335 (32.2)	301 (29.0)
Past smoker		33 (3.2)
New smoker		284 (27.4)

The sample varies slightly due to missing data.

[a] Limited sleep defined as <7 hours; optimal sleep defined as 7–8 hours.

[b] Self-reported hours of television watched on an average day.

[c] Limited consumption defined as eating fast food 0–1 times per week; moderate consumption defined as 2–7 times per week; excessive consumption defined as 8 or more times per week.

[d] Self-reported use of seat belts when driving or riding in a car.

[e] Self-reported condom use during most recent sexual intercourse.

[f] Binge drinking defined as having 6 or more drinks in one sitting at least once in the past year, or 5 or more drinks on a typical day of drinking.

[g] Alcohol dependence defined by a score of 2 or more on the CAGE.

[h] Self-reported smoking status within the past year.

Table 2. Prevalence of Health Behavior Change at Follow-up by Deployment Status

Outcome	Total n	Nondeployed n (%)	Deployed Without Combat n (%)	Deployed With Combat n (%)
Sleep[a]				
Maintained optimal sleep	200	122 (33.4)	41 (30.4)	37 (27.0)
Decreased from optimal to limited	396	223 (61.1)	81 (60.0)	92 (67.2)
Increased from limited to optimal	41	20 (5.5)	13 (9.6)	8 (5.8)
Television watching[b]				
Maintained no television/decreased hours	472	265 (76.1)	88 (71.5)	119 (77.8)
Increased hours	152	83 (23.9)	35 (28.5)	34 (22.2)
Fast-food consumption[c]				
Maintained limited	203	103 (27.7)	49 (37.1)	51 (29.1)
Decreased	231	142 (38.2)	29 (22.0)	60 (34.3)
Increased	245	127 (34.1)	54 (40.9)	64 (36.6)
Seat belt use[d]				
Regular	640	363 (67.5)	144 (71.6)	133 (59.4)
Decreased	81	43 (8.0)	8 (4.0)	30 (13.4)
Increased	242	132 (24.5)	49 (24.4)	61 (27.2)
Condom use[e]				
Persistent/increased	209	116 (62.4)	47 (64.4)	46 (52.9)
Decreased	137	70 (37.6)	26 (35.6)	41 (47.1)
Binge drinking[f]				
Maintained no/resolved binge	91	71 (38.2)	14 (31.1)	6 (11.5)
Newly reported binge drinking	192	115 (61.8)	31 (68.9)	46 (88.5)
Potential alcohol dependence[g]				
Maintained no/resolved dependence	893	511 (90.0)	191 (91.4)	191 (80.6)

Newly reported alcohol dependence	121	57 (10.0)	18 (8.6)	46 (19.4)
Smoking status[h]				
Persistent nonsmoker/past smoker	452	263 (62.3)	111 (70.7)	78 (49.7)
New smoker	284	159 (37.7)	46 (29.3)	79 (50.3)

[a] Limited sleep defined as <7 hours; optimal sleep defined as 7–8 hours.

[b] Self-reported hours of television watched on an average day.

[c] Limited consumption defined as eating fast food 0–1 times per week; moderate consumption defined as 2–7 times per week; excessive consumption defined as 8 or more times per week.

[d] Self-reported use of seat belts when driving or riding in a car.

[e] Self-reported condom use during most recent sexual intercourse.

[f] Binge drinking defined as having 6 or more drinks in one sitting at least once in the past year, or 5 or more drinks on a typical day of drinking.

[g] Alcohol dependence defined by a score of 2 or more on the CAGE.

[h] Self-reported smoking status within the past year.

Table 3. Unadjusted and Adjusted Odds of Change in Health Behaviors From Baseline to Follow-up

	Univariate Findings				Multivariable Findings	
	Deployed Without Combat		Deployed With Combat		Deployed Without Combat	Deployed With Combat
Outcome	n	OR (95% CI)	n	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sleep[a]						
Maintained optimal sleep	41	1.00	37	1.00	1.00	1.00
Decreased from optimal to limited	81	0.99 (0.64–1.54)	92	1.25 (0.80–1.95)	1.05 (0.67–1.64)	1.30 (0.83–2.03)
Increased from limited to optimal	13	1.78 (0.81–3.89)	8	1.21 (0.49–2.98)	1.90 (0.86–4.21)	1.35 (0.54–3.37)
Television watching[b]						
Maintained no television/decreased hours	88	1.00	119	1.00	1.00	1.00
Increased hours	35	1.27 (0.79–2.02)	34	0.91 (0.58–1.44)	1.32 (0.82–2.11)	0.86 (0.54–1.36)
Fast-food consumption[c]						
Maintained limited	49	1.00	51	1.00	1.00	1.00
Decreased	29	0.43 (0.25–0.73)**	60	0.85 (0.54–1.34)	0.43 (0.25–0.73)**	0.86 (0.55–1.37)
Increased	54	0.89 (0.56–1.42)	64	1.02 (0.65–1.59)	0.86 (0.53–1.38)	0.99 (0.63–1.58)
Seat belt use[d]						
Regular	144	1.00	133	1.00	1.00	1.00
Decreased	8	0.47 (0.22–1.02)	30	1.90 (1.15–3.16)*	0.47 (0.22–1.02)	1.90 (1.15–3.16)*
Increased	49	0.94 (0.64–1.37)	61	1.26 (0.88–1.81)	0.92 (0.62–1.37)	1.21 (0.83–1.77)
Condom use[e]						
Persistent/increased	22	1.00	17	1.00	1.00	1.00
Decreased	11	0.79 (0.34–1.81)	13	1.21 (0.53–2.77)	0.88 (0.38–2.05)	1.29 (0.56–3.02)
Binge drinking[f]						
Maintained no/resolved binge	14	1.00	6	1.00	1.00	1.00

Newly reported binge drinking	31	1.37 (0.68–2.74)	46	4.73 (1.92–11.65)**	1.37 (0.68–2.75)	4.73 (1.92–11.65)**
Potential alcohol dependence[g]						
Maintained no/resolved dependence	191	1.00	191	1.00	1.00	1.00
Newly reported alcohol dependence	18	0.84 (0.48–1.47)	46	2.16 (1.42–3.29)**	0.88 (0.50–1.54)	2.35 (1.53–3.61)**
Smoking status[h]						
Persistent nonsmoker/past smoker	111	1.00	78	1.00	1.00	1.00
New smoker	46	0.69 (0.46–1.02)	79	1.68 (1.16–2.42)*	0.69 (0.46–1.02)	1.70 (1.17–2.47)*

Reference group is nondeployed participants.

CI, confidence interval; OR odds ratio.

[a] Maintenance of optimal sleep from baseline to follow-up was considered the reference group.

[b] Maintenance of no television watching at both time points and decreased television watching were combined into a single reference group.

[c] Maintenance of limited consumption from baseline to follow-up was considered the reference group.

[d] Maintenance of regular seat belt use from baseline to follow-up was considered the reference group.

[e] Persistent condom use at both time points and increased condom use at follow-up were combined into a single reference group.

[f] Persistent non-binge drinkers and resolved binge drinkers were combined into a single reference group.

[g] Maintenance of no alcohol dependence from baseline to follow-up and resolved dependence were combined into a single reference group.

[h] Persistent nonsmokers and past smokers were combined into a single reference group.

*$p < 0.05$, **$p < 0.01$.