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Gubata, Marlene E.; Urban, Nadia; Cowan, David N.; and Niebuhr, David W., "A prospective study of physical fitness, obesity, and the subsequent risk of mental disorders among healthy young adults in army training" (2013). *US Army Research.* Paper 197.
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Journal of Psychosomatic Research 75 (2013) 43–48

Contents lists available at SciVerse ScienceDirect

Journal of Psychosomatic Research

A prospective study of physical fitness, obesity, and the subsequent risk of mental disorders among healthy young adults in army training☆

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ARTICLE INFO

Article history:
Received 18 September 2012
Received in revised form 3 April 2013
Accepted 9 April 2013

Keywords:
Mental disorders
Obesity
Physical fitness
Screening

ABSTRACT

Objective: Mental health disorders contribute substantially to medical and occupational morbidity. The role of fitness and physical activity in the prevention of mental health disorders is not well established, but epidemiologic data suggest that physical activity can protect against anxiety and depression.
Method: The analyses presented in this report, from a prospective cohort study, evaluate the association between fitness (as measured by a 5-minute step test), and being overweight (defined as exceeding weight and body fat allowances) at military entrance, with subsequent onset of mental disorder diagnosis in the first year of service. The association between risk factors and mental disorder diagnosis was analyzed using multivariate Poisson regression with the adjusted incidence rate ratio (aIRR) as the measure of association.
Results: Among weight-qualified participants, factors associated with increased incidence of mental disorder included failing the physical fitness test (aIRR: 1.36, $p < 0.0001$), female sex (aIRR: 2.17, $p < 0.0001$), and smoking (aIRR: 1.49, $p < 0.0001$). Among fit participants, being overweight was not significantly associated with mental disorder (aIRR: 1.11, $p = 0.1540$).
Conclusions: This test has potential military utility as an adjunct part of the medical examination process. Additional research is needed among civilians to determine if similar associations exist. If so, intervention studies should be conducted to determine if improving physical fitness reduces subsequent psychiatric disorder risk, particularly among young adults entering into stressful situations.

Published by Elsevier Inc.

Introduction

Nearly half of U.S. adults are diagnosed with mental disorders in their lifetime [1]. Multiple adverse occupational outcomes, including absenteeism, reduced productivity, unemployment, disability and high health care utilization, have been linked to mental disorders [2–5]. In the U.S. military, mental disorders are the most common cause of hospitalizations among military men and second among women (following normal delivery) [6], and are associated with subsequent discharge from service for medical disability, misconduct/legal problems, and unauthorized work absences [7–9]. In addition, military recruits who report a history of a mental health diagnosis generally require a medical waiver prior to entrance into service [10].

The role of exercise and physical activity in the prevention of mental disorders is not well established, but epidemiologic studies suggest that physical activity can protect against symptoms of anxiety and depression [11–13], and prevent the development of these disorders [12–14]. Preliminary data indicates that exercise added to traditional mental disorder treatment regimens reduces symptoms and improves function [12–14] and helps treat anxiety in patients with chronic diseases [13]. Regular exercise is commonly recommended as an adjunct mental disorder treatment modality based on expert consensus [13], but without uniform guidelines for implementation [12]. These studies relied heavily on self-reported physical activity in their measurement. The literature is less complete regarding the association between measured physical fitness and mental health. However, if exercise is a pathway towards physical fitness, then directly measured physical fitness may be an important area of study without reliance on self-reported activity, which is susceptible to over- or underreporting [15].

Obesity has been found to be associated with psychiatric disorders in various studies [16–24]. Specifically, obesity has been observed to be associated with an increased risk of mood and anxiety disorders in several cross-sectional studies [16–18,21]. Some longitudinal studies found an increased risk of incident depressive disorders among the overweight or obese [19,21–23]. However, two prospective studies found no association [19,24] or a negative association between overweight or obese and anxiety disorders [23]. Kasen et al., 2008 did find a positive association between obesity and overweight and generalized anxiety disorder, but the association among the overweight disappeared after adjustment for other significant risk factors. Analysis of the relationship between obesity and substance use disorders has

☆ Previous presentation: none.

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0022-3999/$ – see front matter. Published by Elsevier Inc.
http://dx.doi.org/10.1016/j.jpsychores.2013.04.003

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yielded conflicting results [16–20,23,24]. Longitudinal studies found either no association [23,24] or a negative association between overweight/obese and substance abuse disorders [19]. However, none of the epidemiologic research examining obesity and mental disorders measured or controlled for fitness in study participants [16–24].

The analyses presented in this report, utilizing existing data from a previously conducted prospective cohort study, evaluate the association between fitness (as measured by a 5-minute step test), and being overweight or obese (defined as exceeding weight and body fat allowances) at military entrance, with subsequent onset of mental disorder diagnosis in the first year of service. Analyses controlled for sex, smoking and education. This study aims to add to the literature assessing measured physical fitness and overweight/obesity as predictors of mental disorders. Because physical fitness is required and measured during military service [25] and both mental disorders and obesity are generally medically disqualifying for service [26], this study is designed to examine the potentially complex relationship between fitness, obesity and new-onset mental disorders in a military recruit population.

Methods

These analyses, from a prospective cohort study of U.S. Army trainees, were conducted to determine whether fitness, measured by performance on a step test is associated with mental disorder diagnosis in the first year of service. As part of a secondary analysis, the association between exceeding body fat standards and mental disorder diagnosis was evaluated among those who passed the step test. This study was approved by the Walter Reed Army Institute of Research Institutional Review Board. Data sources and methods have been previously described [27–33].

ARMS fitness test

In 2004 the U.S. Army Accessions Command directed that all Army applicants at six Military Entrance Processing Stations (MEPS) take a physical fitness test that included a minimum number of pushups and a 5-minute step test. The Assessment of Recruit Motivation and Strength (ARMS) study was implemented at these MEPS between February 2005 and September 2006.

The ARMS fitness test included a 5-minute modified Harvard Step Test [34–39] to a cadence of 120 beats per minute at a step height of 16 in. for males and 12 in. for females, and number of push-ups completed within one minute. A complete step was defined as stepping up on the platform with both feet and stepping down on the floor. Accordingly, 120 beats per minute corresponded to 30 steps per minute. Passing the step test was defined as completing the step test for five minutes at the proper pace. For this study only step test results were considered because less than 4% of subjects failed the pushups.

Applicants meeting a two-tiered screen for accession weight and body fat standards for their gender-specific height and age group were 'weight qualified' (WQ) [25]. Applicants exceeding weight-for-height and body fat percent standards, up to 30% for men and 36% for women, (limit set to the maximum allowable to subjects greater than or equal to 40 years) as defined in Army Regulation 40-501 were 'exceeds body fat' (EBF) [25]. Body fat percentage was measured using circumference taping methodology as outlined in Army Regulation 600-9, The Army Weight Control Program [10]. For men, neck and waist circumferences were measured and for women, neck, waist, and hip circumferences were measured, then compared with allowed body fat percentages tabularized in the Army regulation [10]. EBF subjects were required to pass the step test before being allowed to enlist. Upon passing the step test, they were granted a waiver for accession into the Army. While WQ applicants were required to take the test, the results did not impact their ability to enlist.

Study population

Study subjects included U.S. Army active duty members who completed the step test and entered the military for the first time between February 2005 and September 2006. After complete description of the study to the subjects, written informed consent was obtained. Subjects were at least 18 years of age and followed for one year after entry into service. Excluded individuals included those with no valid weight, height, or date of birth recorded (N = 8) or EBF subjects who failed the step test but entered the Army at a later time (N = 9). Individuals with neither an ambulatory health care record in a military medical treatment facility or a matching accession date within 30 days of the ARMS study entry date were also excluded (N = 82).

Data sources

Accession

Individuals who completed the step test and met inclusion and exclusion criteria were selected (N = 11,369) and matched to accession data provided by the Center for Accession Research, U.S. Army Accession Command. The U.S. Military Entrance Processing and the Defense Manpower Data Center provided other enlistment data, including education level and the Armed Forces Qualification Test (AFQT) percentile score (a math and verbal cognitive test score).

Morbidity

The Patient Administration Systems and Biostatistics Activity provided ambulatory health care encounter data from the Standard Ambulatory Data Record for all visits at military treatment facilities. Mental disorder incident cases were defined as at least one ambulatory encounter resulting in any diagnosis with International Classification of Diseases, Ninth Revision (ICD-9) codes between 290 and 319 in any diagnosis position, excluding 305.1 (tobacco use disorder). Mental disorders were divided into the following diagnostic categories, reflecting Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition grouping [7]: adjustment disorders, substance use disorders, mood disorders, anxiety disorders, personality disorders, psychoses, somatoform disorders, and other non-psychotic conditions. Major depression disorder (ICD-9 codes: 296.2, 296.3), as a subset of the more general mood disorder category, was further analyzed as a distinct outcome.

Statistical analysis

In the primary analysis, physical fitness which was determined by performance on the step test (pass/fail) was analyzed as a predictor of mental disorder diagnosis. In this analysis, only subjects meeting weight-for-height and body fat standards (WQ) were included. In the secondary analysis, EBF status was analyzed as a predictor of mental disorder diagnosis, comparing EBF subjects granted an accession waiver and WQ subjects who had passed the step test.

All mental disorder diagnoses occurring within the first year of service were counted. With the exception of major depression, which was included as a subset of the mood category and evaluated separately, all mental disorder categories were mutually exclusive (i.e., each diagnostic code appears in only one category). However, a study subject may be included in more than one disorder category if s/he was diagnosed with disorders from more than one category. Only individuals who did not have any mental disorder diagnoses were compared with cases in each specific mental disorder category.

Chi-square and Fisher's exact tests were used to describe categorical data. Crude incidence rates (IR) of outcomes were defined as the number of cases per 1000 person-days of military service. Person-time accrued until the first mental disorder medical encounter or the individual left the Army. Crude and adjusted incidence rate ratios (IRRs) were calculated using Poisson regression for all outcomes. Variables in the regression models included step test result, body fat status (i.e., EBF vs. WQ), sex, age, body mass index (BMI), smoking status, education and AFQT score.

Age categories (18–19 years, 20–24 years and 25 years and over) were used based on results from previous ARMS studies which showed increased risk of musculoskeletal injuries and stress fractures by age group [24,27,28]. AFQT scores were divided into percentile categories which are used by the military to determine eligibility for enlistment [40]. Normal weight was defined as BMI < 25 kg/m^2, overweight as BMI 25 to 30 kg/m^2 and obesity as BMI > 30 kg/m^2 according to the classification system outlined by the Centers for Disease Control [41]. However, BMI and body fat status were not used in the same regression model. Potential confounders included in all multivariable analyses included sex, smoking status and education. All statistical analyses were performed using SAS version 9.2 (SAS Institute, Cary, NC).

Results

Demographics

There were 10,216 weight-qualified and 1153 EBF study participants (Table 1). Among WQ participants, all reported and measured characteristics differed significantly between the step test passers and step test failers. Among those who passed the step test, sex, smoking status, BMI, education, and AFQT score differed significantly between WQ and EBF groups. Obese subjects accounted for 17.3% (1970) of the study population; mean BMI of this category was 32.8 ± 2.1 kg/m^2.

Mental disorder diagnosis

There were 2295 cases with at least one mental disorder diagnosis. Table 2 summarizes counts and percentages for specific mental disorder diagnostic categories. The most common diagnoses were adjustment disorder, mood disorder, substance abuse and anxiety disorder.

Table 1
Characteristics of ARMS study participants (N = 11,369)

	WQ: passed step test		WQ: failed step test		P[a]	EBF: passed step test		P[b]
Total	N	%	N	%		N	%	
	7713		2503			1153		
Sex								
Male	6646	86.2	1976	78.9	<0.0001	834	72.3	<0.0001
Female	1067	13.8	527	21.1		319	27.7	
Age (years)								
18–19	3600	46.7	1045	41.7	<0.0001	518	44.9	<0.1290
20–24	3161	41.0	1068	42.7		507	44.0	
>25	952	12.3	390	15.6		128	11.1	
Smoker								
No	5661	73.4	1888	75.4	<0.0001	899	78.0	<0.01
Yes	1941	25.2	613	24.5		241	20.9	
Missing	111	1.4	2	0.1		13	1.1	
BMI								
Underweight (x < 18.5)	282	3.7	83	3.3	<0.0001	0	0.0	<0.0001
Normal weight (18.5 < x < 25)	4463	57.9	1157	46.2		23	2.0	
Overweight (25 < x < 30)	2155	27.9	873	34.9		363	31.5	
Obese (>30)	813	10.5	390	15.6		767	66.5	
Education								
HS diploma or equivalent	7347	95.3	2424	96.8	<0.001	1117	96.9	<0.05
Bachelor and above	365	4.7	79	3.2		36	3.1	
Unsure/missing	1	0.0	0	0.0		0	0.0	
AFQT percentile								
65–99	3048	39.5	865	34.6	<0.001	428	37.1	<0.05
50–64	1789	23.2	624	24.9		309	26.8	
11–50	2857	37.0	1007	40.2		416	36.1	
Unsure/missing	19	0.2	7	0.3		0	0.0	

ARMS, Assessment of Recruit Motivation and Strength; WQ, Weight Qualified; EBF, Excess Body Fat; BMI, Body Mass Index; AFQT, Armed Forces Qualification Test.
[a] Comparisons made between WQ step test passers and WQ step test failers.
[b] Comparisons made between WQ step test passers and EBF step test passers.

Table 2
Mental disorder diagnostic categories among weight-qualified and excess body fat subjects

Description	WQ: passed step test (N = 7713)		WQ: failed step test (N = 2503)		P[a]	EBF: passed step test (N = 1153)		P[b]
	N	%	N	%				
Adjustment	658	8.5	303	12.1	<0.0001	133	11.5	<0.001
Mood	381	4.9	173	6.9	<0.001	77	6.7	<0.05
Substance	404	5.2	150	6.0	0.15	47	4.1	0.09
Anxiety	184	2.4	92	3.7	<0.001	48	4.2	<0.001
Personality	100	1.3	54	2.2	<0.01	23	2.0	0.06
Psychotic	26	0.3	11	0.4	0.46	3	0.3	1.00
Somatoform	7	0.1	4	0.2	0.48	4	0.3	<0.05
Other	609	7.9	291	11.6	<0.0001	121	10.5	<0.01
Major depression[c]	98	1.3	42	1.7	0.13	20	1.7	0.20
Any mental disorder	1430	18.5	616	24.6	<0.0001	249	21.6	<0.05

[a] Comparison between weight qualified (WQ) step test passers and weight qualified (WQ) step test failers.
[b] Comparison between weight qualified (WQ) step test passers and exceeds body fat (EBF) step test passers.
[c] ICD-9 codes used are subset of mood category.

Physical fitness as predictor of mental disorder diagnosis among weight qualified individuals

There were approximately 3,160,000 person-days of follow-up among WQ subjects yielding 2046 mental disorder cases (Table 3). Failing the step test was significantly associated with mental disorder diagnosis (adjusted IRR: 1.36, 95% CI: 1.23–1.49). In the multivariable model, sex, smoking status and education were significantly associated with mental disorders. Those with BMI categories of overweight or obese did not have increased incidence. Those who failed the step test had significantly elevated incidence for all but one category of measured mental disorder diagnosis (Fig. 1), highest for personality disorder (adjusted IRR: 1.75, 95% CI: 1.25–2.44) followed by anxiety disorder (adjusted IRR: 1.57, 95% CI: 1.22–2.01).

Body fat status as predictor of mental disorder diagnosis among fit individuals

There were approximately 2,780,000 person-days of follow-up among subjects who passed the step test, yielding 1103 mental disorder diagnosis cases (Table 4). The crude incidence rate ratio for mental disorder, comparing EBF to WQ, was 1.22 (95% CI: 1.07–1.40). However, body fat status was not significantly associated with mental disorder in the final multivariable model (adjusted IRR: 1.11, 95% CI: 0.96–1.27). In the multivariable model, sex, smoking status and education were significantly associated with mental disorders. Multivariable analysis of specific types of mental disorders showed incidence was significantly higher only for adjustment disorders (adjusted IRR: 1.22, 95% CI: 1.01–1.48) and anxiety disorders (adjusted IRR: 1.54, 95% CI: 1.12–2.13).

Discussion

In this prospective cohort study of healthy young adults, individuals with poor physical fitness measured by step test failure had 36% higher incidence of mental disorder diagnosis in the first year of service. These findings were robust in that they were found among both men and women (data not shown). Adjustment disorder diagnosis was the most common mental disorder diagnosis across all study groups. After adjusting for sex, smoking status and education, of the seven specific disorders including the categories other and major depression, unfit individuals had a higher incidence of all but major depression. In the adjusted analysis, recruits who exceeded maximum allowable body fat percentages and were physically fit did not have a significantly higher overall incidence of mental disorders but had increased incidence of anxiety disorders and adjustment disorders. Risk of mental disorder diagnosis was consistently elevated in women and smokers, with decreased risk in those with at least a bachelor's degree.

To the best of our knowledge, this is the first study to document an association between measured physical fitness and subsequent onset of mental disorders. The primary goal of this analysis was to assess measured physical fitness as part of the pre-enlistment medical examination process as a predictor of mental disorder diagnosis. While a significant

Table 3
Crude and adjusted incidence rate ratios for mental disorder diagnosis among weight-qualified ARMS subjects (N = 10,216)

	Number with mental disorder diagnosis	1000 person-days	Crude IRR		Adjusted[a] IRR	
			Value	95% CI	Value	95% CI
Step test status						
Pass	1430	2433.4	REF		REF	
Fail	616	731.4	1.43	1.30–1.58	1.36	1.23–1.49
Sex						
Male	1530	2733.0	REF		REF	
Female	516	431.7	2.13	1.93–2.36	2.17	1.97–2.40
BMI						
Underweight	78	109.4	1.06	0.85–1.34		
Normal	1167	1741.9	REF			
Overweight	570	943.6	0.90	0.82–1.00		
Obese	231	369.8	0.93	0.81–1.07		
Age (years)						
18–19	944	1451.2	REF			
20–24	835	1304.4	0.98	0.90–1.08		
≥25	267	409.1	1.00	0.88–1.15		
Smoker						
No	1389	2361.1	REF		REF	
Yes	642	767.0	1.42	1.30–1.56	1.49	1.36–1.64
Education						
HS Diploma and equivalent	1994	3036.9	REF		REF	
Bachelor and above	51	127.9	0.61	0.46–0.80	0.62	0.47–0.82
AFQT percentile						
65–99	707	1219.7	0.87	0.77–0.97		
50–64	499	745.0	REF			
11–50	832	1192.8	1.04	0.93–1.16		

ARMS, Assessment of Recruit Motivation and Strength; BMI, body mass index; AFQT, Armed Forces Qualification Test.
[a] IRRs adjusted for sex, smoking status and education.

Table 4
Crude and adjusted incidence rate ratios for mental disorder diagnosis among subjects who passed the step test (N = 8866)

	Number with mental disorder diagnosis	1000 person-days	Crude IRR		Adjusted[a] IRR	
			Value	95% CI	Value	95% CI
EBF						
No	1430	2433.4	REF		REF	
Yes	289	346.4	1.22	1.07–1.40	1.11	0.96–1.27
Sex						
Male	1249	2391.2	REF		REF	
Female	430	388.6	2.12	1.90–2.36	2.21	1.98–2.47
Age (years)						
18–19	782	1301.8	REF			
20–24	697	1144.0	1.01	0.92–1.12		
≥25	200	334.0	1.00	0.85–1.16		
Smoker						
No	1129	2074.1	REF		REF	
Yes	530	666.2	1.46	1.32–1.62	1.54	1.39–1.71
Education						
HS diploma and equivalent	1636	2661.2	REF		REF	
Bachelor and above	42	118.6	0.58	0.42–0.78	0.58	0.42–0.78
AFQT percentile						
65–99	583	1098.8	0.84	0.74–0.95		
50–64	415	654.2	REF			
11–50	676	1021.5	1.04	0.92–1.18		

ARMS, Assessment of Recruit Motivation and Strength; WQ, weight qualified; EBF, excess body fat; BMI, body mass index; AFQT, Armed Forces Qualification Test.
[a] IRRs adjusted for sex, smoking status and education.

association was observed in the unadjusted model, when adjusted for covariates no significant association was found for exceeding body fat standards. The null findings for EBF were supported by the lack of any

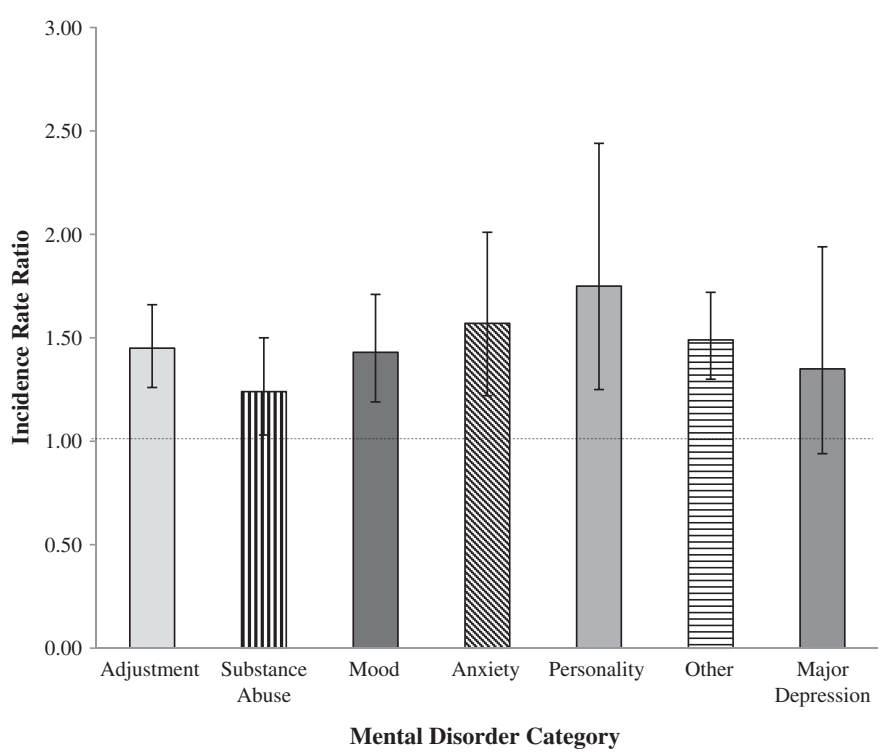

Fig. 1. Adjusted (incidence rate ratios were adjusted for sex, smoking status and education) incidence rate ratios and 95% confidence intervals for specific mental disorder diagnoses in the first year of service by step test status (ratio: fail/pass).

association between overweight and obese BMI categories and mental health disorder among those who were weight qualified. The generally null findings between the EBF and FQ and across the range of BMI are encouraging, however, providing evidence that young people who are overweight based on body fat percentage and BMI but who are not morbidly obese are not at increased risk of mental disorders.

Strengths of this study include the prospective cohort design in which fitness and body fat were objectively measured prior to military entrance, the large study population, and robust data captured on a variety of clinical and demographic factors. A potential weakness may be limited generalizability because this study population includes only active duty Army recruits undergoing military training. Army basic training is a unique physically and mentally demanding experience that has no exact analog in civilian life. Thus, the incidence of psychiatric disorders could potentially be higher than in any age-comparable cohort in the civilian population. In addition, no information was available on study subjects' medical or mental disorder diagnoses prior to military service or for those who were not eligible to enlist (i.e., those who exceeded body fat allowances and failed the step test). This study also did not examine self-reported physical activity or exercise, but only directly measured physical fitness at military entrance. A previous study of a subset of the ARMS study population who self-reported leisure and school physical activity on a questionnaire administered as part of the ARMS study found that physical activity was moderately predictive of passing the fitness test (odds of passing ranged from 1.42 to 1.57 comparing weight qualified and exceeds body fat subjects separately by sex) [33]. However, when the activity questionnaire results were included in preliminary analyses for this report, no statistically significant association was found between physical activity and diagnosis of mental disorder. Therefore, self-reported physical activity was not reported in the final analysis.

Although the Army training population may differ in the proportions of some demographic subgroups, it is broadly representative of the young adult civilian population. Military members are generally healthier than age-specific civilians, as all applicants provide a medical history (which specifically inquires about mental health problems) and are given a medical examination prior to entry [25]. Applicants with overt mental health problems or who reported a history of mental disorders generally require a medical waiver prior to entrance into the Army [25]. Nonetheless, the stigma associated with accessing mental health care or the desire to deal with mental illness independent of mental health care may still affect military personnel similar to a civilian population. Interpretation of our findings is facilitated through our multivariable analyses of IRR controlling for sex, smoking status and education, and any limitations due to accessing mental health care are likely to have affected each study cohort similarly. Also, due to lack of morbidly obese study subjects, the null findings between obesity and mental disorder diagnosis may be limited in applicability to the overweight and slightly obese young adult population.

In general, the etiology of mental disorders is poorly understood and assumed to be multifactorial. The mechanism of action for the observed relationship between fitness and mental disorder is not known, but there are at least two potential modes. One could be via brain derived neurotrophic factor (BDNF), a genetically regulated protein that may limit or repair damage caused by stress [42]. Studies have shown higher levels of BDNF are associated with lower risks of some psychiatric disorders [42–44], and there is some evidence that exercise and fitness increase the level of BDNF [42–48]. Another mode could be related to vitamin D levels, which appear to be associated with activity and fitness [49–53], and may also be associated with psychiatric disorders [54–57]. Studies similar in concept to the current work, but which include serial collections of blood for testing may offer the potential to better understand the fitness, exercise, BDNF, vitamin D, and psychiatric disorder hypotheses.

Although exercise may be an important connection between fitness and mental disorders explaining the associations observed in this and other studies, the purpose of this analysis was to assess measured physical fitness as a potential addition to the pre-enlistment physical examination process as a predictor of mental disorder diagnoses early in military training and career. Other findings in this study, specifically that smoking, female sex, and lower educational status are associated with mental disorders, are not of primary interest in these analyses, but are consistent with current medical literature [1,58–60].

More than two-thirds of the U.S. adult population is overweight or obese, and about one-quarter is physically inactive [61]. About half of U.S. adults are diagnosed with a mental disorder within their lifetime, with a 12-month prevalence of approximately 26% [1,62]. Civilian population trends in obesity, inactivity, and mental health directly impact the military's ability to recruit personnel who are fit to serve. Exceeding weight and body fat allowances is the leading cause of disqualification from military service, with psychiatric conditions the third most common [63]. A review of temporal trends in U.S. Army recruits showed that trends differed depending on the physical fitness measure [64]. However, aerobic fitness measured by 1 and 2 mile run times have been declining and body fat percentages among men have increased [64]. Clearly mental disorders, obesity, inactivity and poor physical fitness in the civilian sector pose a significant challenge to the recruitment and sustainment of a healthy and formidable military force. Nonetheless, the impact of fitness, activity and obesity on mental health is not well understood.

Conclusions

This prospective study of healthy young adults entering the U.S. Army has shown that a simple and easily administered step test is predictive of subsequent psychiatric disorders among weight qualified applicants, and that exceeding weight for height and body fat allowances was not a significant predictor. This study's findings are primarily hypothesis-generating and the fitness test should not be used alone to screen in or out individuals applying for military service. However, a pre-enlistment step test has potential utility to the military as an adjunct part of the medical examination, similar to its use during the ARMS study, to identify military applicants who are likely to succeed in military service. Additional research and evaluation is required to determine if and how such a test could be best utilized. Based on our design and findings, additional studies could be conducted in other populations to determine if similar associations are observed. If so, it may be possible to develop intervention studies to ascertain if improving physical fitness reduces the risk of subsequent mental disorders, particularly among young adults entering into stressful situations.

Competing interest statement

The views expressed are those of the authors and should not be construed to represent the positions of the Department of the Army or Department of Defense. None of the authors have any associations, financial or otherwise, that may present a conflict of interest.

Acknowledgments

The authors are grateful for Ms. Janice Kay Gary, Walter Reed Army Institute of Research, Preventive Medicine Branch staff for administrative support in preparation of this manuscript.

This study was funded by the US Army Accession Command.

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