# **Focus on Suicide**

## Primary Health Care Utilization Prior to Suicide: A Retrospective Case-Control Study Among Active-Duty Military Personnel

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## ABSTRACT

**Objective:** About 45% of civilians who died by suicide had contact with a doctor within 1 month of death. Thus, educating primary care physicians (PCP) to detect and mitigate depression is an important suicide-prevention strategy. However, the PCP consulting rate before suicide has not been examined in a military population. We investigated the utilization of primary health care and mental health services by active-duty military personnel suicide cases prior to death in comparison to matched military controls.

**Method:** All suicides (N = 170) were extracted from a cohort of all active-duty Israeli military male personnel between 2002 and 2012. Applying a retrospective, nested case-control design, we compared primary care services utilization by suicide cases with demographic and occupationally matched military controls (N = 500).

**Results:** Whereas 38.3% of suicide cases contacted a PCP within the last month before death, only 27.6% of suicide cases contacted a mental health specialist during their entire service time. The PCP contact rate within 1 month before death or index day did not differ between suicide cases and military controls (38.3% vs 33.8%,  $\chi^2_1 = 1.05$ , P = .3). More suicide cases contacted a mental health specialist within service time than did military controls (27.6% vs 13.6%,  $\chi^2_1 = 10.85$ , P = .001).

**Conclusions:** Even though PCP contact rate by military personnel who died by suicide is slightly lower than that reported for civilians who died by suicide prior to their death, it is higher than mental health specialist contact rate and higher than that by age-matched civilians who died by suicide. These results imply that PCPs education is a viable approach to suicide prevention in a military setting.

J Clin Psychiatry 2014;75(8):e817–e823 © Copyright 2014 Physicians Postgraduate Press, Inc.

Submitted: October 4, 2013; accepted March 6, 2014 (doi:10.4088/JCP.13m08823). Corresponding author: Eldar Hochman, MD, PhD, Geha Mental Health Center, PO Box 103, Petach-Tikva, 49100 Israel (hochmaneldar@gmail.com). **S** uicide is a major cause of death in most armies during peacetime.<sup>1,2</sup> Whereas in the past, suicide rate in military-serving personnel was below the rate in the age- and sex-matched general population,<sup>3</sup> in recent years, there has been a dramatic rise in US and UK military suicide rates, exceeding the civilian rate.<sup>4,5</sup> The reasons for this rise in suicide rates is unclear, but psychiatric illness, military-imposed stressors, drug use, alcoholism, social and financial stressors of deployment, and prolonged service and lethal weapon accessibility all may contribute to suicide risk among active duty personnel.<sup>6–8</sup> The rise in suicide rates has focused attention on suicide prevention in the military, and most approaches have been borrowed from civilian studies without sufficient verification that these approaches are likely to be effective in a military setting.<sup>5</sup>

The Israeli Defense Force (IDF) is a population-based army that utilizes mandatory induction to draft all 18- to 21-year-old males. The suicide rate in the IDF was higher than that in the general Israeli population aged 15-24 years. Thus, suicide prevention became a major priority of the IDF Mental Health Department, and considerable efforts have been made to detect populations at high risk for suicide by implementing screening tools.<sup>6,9–12</sup> A review<sup>13</sup> of specific suicide-preventive interventions found that the best evidence-based interventions that reduced suicide rate were restriction of access to lethal methods and physician education in depression recognition and treatment. Following these findings, in 2006, the IDF, as a part of its suicide prevention program, changed its policy, requiring soldiers to deposit their weapons at their base when going home for weekend leave. Implementation of this policy was associated with a 40% decrease in the total suicide rate, mainly accounted for by fewer suicides using firearms during weekends.<sup>14</sup> However, the potential role of primary care physician (PCP) education in IDF suicide-prevention program has not yet been determined.

Civilians who died by suicide have utilized primary health care ambulatory services, in close temporal proximity to their suicide, in rates much higher than mental health services.<sup>15</sup> It is estimated that 45% of civilians who die by suicide have a contact with a doctor within 1 month of death by suicide, but only 20% seek mental health services, and two-thirds of all suicides see a PCP within 1 year of death.<sup>15</sup> In fact, civilians who died by suicide were more frequent users of primary health care, in close temporal proximity to their suicide, compared with age- and sex-matched healthy controls or accidental death victims.<sup>16–18</sup> Taken together, these findings indicate an important role for the PCP in suicide prevention by detection of a high-risk population and application of appropriate intervention.<sup>13,15,19</sup> In practice, since about 60% of all suicides suffer from a depression, mostly untreated, the intervention that most consistently reduces civilian suicide rates is training PCPs in the diagnosis and treatment of depression.<sup>13</sup> The importance of mood disorders and alcoholism in military personnel who died by suicide is highlighted in a recent study<sup>8</sup> of the US military that also found a minimal role for deployment. In military culture, soldiers may be resistant to seeking mental health care, and, consequently, a higher proportion of them may contact

- Primary care physician contact rate before death by military personnel who died by suicide is higher than mental health specialist contact rate.
- Educating primary care physicians to detect and mitigate depression is an important suicide-prevention strategy in a military setting.
- Patients presenting with somatic complaints that culminated in a nonspecific diagnosis or nonphysical etiologies should be considered a high-risk population for mental health disorder.

a PCP instead compared with age-matched civilians.<sup>20,21</sup> Thus, we hypothesized that in military populations, primary health care services may serve as an important "gate keeper" to detect and treat mental health issues that contribute to suicide risk.<sup>7</sup>

Studies on PCP and mental health service encounter rates prior to suicide in active-duty military personnel are lacking. Of relevance to military populations, civilians show relatively lower contact rates with PCPs before suicide when aged 35 years or younger.<sup>15</sup> The aim of this study was to compare the primary health care and mental health service utilization rates of active-duty military suicide cases before suicide with those of matched military controls to evaluate this potential suicide intervention opportunity.

## **METHOD**

## Population

Suicide cases were determined in a population-based, retrospective military cohort comprising all active-duty military male personnel in the IDF between 2002 and 2012. In Israel, military service is mandatory for all young Jewish and Druze men aged 18 years, and the service period is 3 years. During the study period, 205 suicide cases of activeduty military male personnel were determined based upon extensive official investigation of cause of death by the IDF legal corps. A retrospective, nested case-control study was conducted comparing primary health care and mental health services utilization data between suicide cases and military controls. Thirty-five suicide cases were excluded from the study as a result of missing demographic or occupational data, making it impossible to match them with a control, leaving a final sample of 170 suicide cases. For the purpose of matching, the time from recruitment to suicide was paralleled to an index date in the control group, representing the same period from recruitment.<sup>17</sup> Military controls were randomly chosen on an individual basis of age, year of recruitment, service length prior to suicide, country of birth, country of origin, intellectual rating scale, physical health fitness rating, and type of military occupation (combat duty or not). In order to increase the statistical power of the study, a ratio of 1:3 for suicide cases:military controls was used (except for 10 cases for which only 2 controls per case could be found). This strategy is in accordance with studies demonstrating increased statistical power by using up to 4 controls per case.<sup>22</sup> Thus, 500 military controls were included in the

study. The institutional review board of IDF Medical Corps approved the study and waived the requirement for informed consent on the basis of preserving participants' anonymity.

## Measures

Demographic, occupational, and primary health care utilization data were retrieved from IDF computerized databases, including Israeli draft board registry<sup>23,24</sup> and suicide cases' and military controls' military electronic medical records. Israeli law requires that all adolescents between the ages of 16 and 17 years undergo preinduction assessment to determine their intellectual, physical health, and psychiatric eligibility for military service. The draft board assessment consists of (1) a physical examination: a review of systems and a medical history, all conducted by a physician; (2) a cognitive test battery; and (3) an interview assessing personality and behavioral traits, administered by a psychometrician.<sup>25</sup>

Data included gender, age (at the time of suicide or index day), year of recruitment, service duration prior to suicide or index day, country of birth, country of origin, intellectual rating scale score (low [10-30], average [40-60], and high [70-90],<sup>25</sup> physical health fitness rating scale score,<sup>25</sup> and type of military occupation (combat duty or not). Matching was based on the above variables. Additional demographic and occupational variables that were retrieved included education level (high school graduate or not), combat psychosocial suitability score (low [8-23], average [24-31], and high [32-40]),<sup>25</sup> mental health diagnoses prior to recruitment, whether overweight and obese (body mass index groups were classified according to the US Centers for Disease Control and Prevention's age- and sex-matched percentile grading: underweight [<5%], normal weight  $[5\% - \langle 85\% ]$ , overweight  $[85\% - \langle 95\% ]$ , and obese  $[\geq 95\% ]^{26}$ ) and absenteeism and detention during service time (days). Primary health care utilization variables included last contact with a PCP within the last week, month, and 3 months before suicide or the index day for controls (yes/no); the number of PCP contacts within the last month, 3 months, and 6 months before suicide or the index day; the reason for the last contact with the PCP (based on the PCP electronic medical records diagnosis, can be more than 1, and included [1] general medical condition [subcategories: pain in limb, upper respiratory infection, low back pain, headache, and skin disease]; [2] administrative, general examination, and other purposes; [3] mental health problems; or [4] trauma); mean number of letters in the medical history files (for all contacts with the PCP during the military service); and whether there was a contact with mental health care professional during the military service (these data were available only for years 2005–2012, N = 98 suicide cases and 367 military controls). Additional variables retrieved were change in military physical health fitness rating scale during the service (yes/no); sick leaves within service time (yes/no); number of referrals to laboratory, imaging, or emergency room by the PCP; and number of drug prescriptions during service time.

	Suicides Cases	Military Controls	
Baseline Characteristic	(n = 170)	(n = 500)	P Value
Age at the time of suicide, mean $\pm$ SD, y	$20.1 \pm 1.2$	$20.2 \pm 1.2$	.51
Service length prior to suicide or index day, mean ± SD, d	$405.0 \pm 304.6$	$397.8\pm302.9$	.87
Born in Israel, n (%)	106 (62.4)	313 (63.0)	.99
Country of origin—Israel, n (%) <sup>a</sup>	24 (14.1)	67 (13.6)	1.00
High school graduate, n (%)	151 (88.8)	469 (93.8)	.03 <sup>b</sup>
Intellectual rating score, mean ± SD <sup>c</sup>	$51.6 \pm 21.3$	$53.7 \pm 20.6$	.26
Physical health fitness—fit for combat duty, n (%)	144 (84.7)	422 (84.4)	.99
Combat psychosocial suitability score, mean ± SD	$23.5 \pm 5.4$	$23.9 \pm 5.2$	.85
Mental health diagnoses prior to recruitment, n (%)	6 (3.5)	5 (1.0)	.03 <sup>b</sup>
Overweight and obese, n (%)	20 (12.5)	53 (10.8)	.54
Combat duty, n (%)	76 (44.7)	227 (45.4)	.98
<sup>a</sup> According to father or grandfather (if father was bor	n in Israel) birth p	place.	

Table 1. Demographic and Occupational Characteristics of Military Suicide Case	s
and Controls	

P < .05

<sup>c</sup>Scores of 10-30 are considered low; 40-60, average; and 70-90, high.

### **Statistical Analysis**

Summary statistics were expressed as mean ± SD or number of participants and percentage in case of categorical variables. Univariate analyses comparing continuous variables between suicide case and military control groups involved a 2-tailed Student *t* test. The  $\chi^2$  test and Fisher exact test (for  $2 \times 2$  tables) were used to assess the relationship between categorical variables and groups. Multivariate analysis was conducted using a binary logistic regression model to evaluate the association between suicide cases and variables that were found to be significantly different between suicide cases and military controls on the univariate analysis. Odds ratios (ORs), 95% confidence interval (CI), and statistical significance are presented. Analyses were done with IBM SPSS, version 21.

## RESULTS

Matched and unmatched demographic and occupational characteristics of the participants (170 suicide cases and 500 military controls) are presented in Table 1. Differences between suicide case and military control groups were limited to a lower high school graduation rate in suicide cases  $(\chi^2_1 = 4.55, P = .03)$  and higher rate of mental health diagnoses recorded at recruitment in the suicide case group ( $\chi^2_1 = 3.58$ , P = .03) (Table 1), compared with military controls.

Whereas 38.3% (n = 62) of suicide cases and 33.8%(n = 161) of military controls contacted a PCP within the last month before death, only 27.6% (n = 27) of suicide cases and 13.6% (n = 50) of military controls contacted a mental health specialist within the entire service time (mental health specialist contact rate was available only for the years 2005-2012). The PCP contact rate within 1 month before death or index day did not differ between suicide cases and military controls (38.3% [n = 62] vs 33.8% [n = 161],  $\chi^2_1 = 1.05, P = .3$ ). Furthermore, no group differences were found in rates of last contact with a PCP within the last week, last month, and 3 months before death (Table 2). The contact rate with mental health specialist within service time for the suicide case group was about twice that of the military control group  $(27.6\% [n=27] \text{ vs } 13.6\% [n=50], \chi^2_1 = 10.85, P = .001).$ 

Suicide cases had a higher rate of "administrative, general examination, and other purposes" diagnosis in the last contact with the PCP as compared with the military control group. There was no group difference in the rates of other reasons for the last contact with the PCP as recorded by the PCP (Table 2). In the suicide case group, there was no record of a change in military health fitness rating during military service, whereas a change was recorded in 8.6% (n=43) of military control cases ( $\chi^2_2 = 15.62$ , *P*<.001). Furthermore, suicide cases had a lower rate of sick leave during service than military controls (33.5% [n=57] vs 42.6% [n=213], $\chi^2_1 = 4.33, P = .03$ ) and fewer referrals for laboratory tests and imaging studies ( $t_{431} = -2.54$ , P = .01; and  $t_{392} = -2.38$ , P = .01; respectively). There was no group difference in number of all drug prescriptions (Table 2).

In a logistic regression model, when adjusting for demographic and occupational covariates that were significant in univariate analyses (mental health diagnoses prior to recruitment and educational level), a higher rate of diagnosis of "administrative, general examination, and other purposes" in the last visit with the PCP and higher mental health specialist contact rate within the entire service time predicted suicide cases, with OR = 1.69 (95% CI, 1.18-2.43; *P*=.004) and OR=1.68 (95% CI, 1.01–2.78; *P*=.04), respectively, whereas sick leaves and referrals to imaging studies carried reduced risk for suicide cases, with OR = 0.67(95% CI, 0.46–0.96; *P*=.03) and OR=0.83 (95% CI, 0.7–0.99; P = .04), respectively (Table 3).

In an exploratory analysis, demographic and occupational characteristics were compared between suicide cases who contacted a PCP within the last month before suicide and suicide cases who did not (Table 4). Noncombat type of duty and shorter service period were found to differentiate suicide cases who contacted a PCP within the last month before suicide from those who did not.

## DISCUSSION

We found that the rate of PCP contact in the month before suicide is modestly lower in the Israeli military than generally reported for civilians who died by suicide (38%

Table 2. F	Primary Health Care	Utilization by	Military Suicide (	Cases and <b>N</b>	latched
Controls					

	Suicide Cases	Military Controls	
Characteristic	(n = 170)	(n = 500)	P Value
Last contact with the PCP, n (%)			
Within the last week before suicide/index day	23 (13.6)	54 (10.9)	.33
Within the last <b>month</b> before suicide/index day	62 (38.3)	161 (33.8)	.30
Within the last <b>3 months</b> before suicide/index day	88 (63.3)	245 (60)	.49
More than 2 contacts with the PCP, n (%)			
Within the last <b>month</b> before suicide/index day	27 (16.7)	74 (15.5)	.73
Within the last <b>3 months</b> before suicide/index day	60 (43.2)	166 (40.7)	.60
Within the last <b>6 months</b> before suicide/index day	74 (62.7)	211 (61.2)	.76
Reason for last contact with the PCP, n (%)			
General medical condition	104 (61.2)	301 (60.2)	.82
Pain in limb	21 (12.4)	61 (12.2)	1.00
Upper respiratory infection	18 (10.6)	57 (11.4)	.88
Low back pain	10 (5.9)	44 (8.8)	.25
Headache	3 (1.8)	9 (1.8)	1.00
Skin disease	3 (1.8)	5 (1.0)	.42
Administrative, general examination, and other	105 (61.8)	238 (47.6)	<b>.002</b> <sup>a</sup>
purposes			
Mental health problems	0 (0)	2 (0.4)	.40
Trauma	13 (7.6)	34 (6.8)	.70
Mean no. of letters in the medical history files for all	63 (37.1)	170 (34.0)	.68
contact with the PCP >150 (letters), n (%)			
Contact with mental health care professional during	27 (27.6)	50 (13.6)	<b>.001</b> <sup>a</sup>
military service, n (%) <sup>b</sup>			
Military health fitness, n (%)			
Change in military physical health fitness rating	0 (0)	43 (8.6)	<.001 <sup>a</sup>
scale during service			
Sick leave within service time	57 (33.5)	213 (42.6)	<b>.03</b> <sup>a</sup>
Referral, mean $\pm$ SD			
Laboratory tests (per person)	$0.7 \pm 2.0$	$1.26 \pm 3.0$	<b>.01</b> <sup>a</sup>
Imaging studies (per person)	$0.4 \pm 0.9$	$0.69 \pm 1.2$	<b>.01</b> <sup>a</sup>
Emergency room (per person)	$0.6 \pm 1.2$	$0.69 \pm 1.5$	.61
Drug prescriptions during service time (per person),	$7.7 \pm 9.0$	$8.71 \pm 11.7$	.35
mean±SD			
Absenteeism and detention, mean $\pm$ SD, d <sup>c</sup>	$12.1 \pm 41.5$	$6.90 \pm 26.7$	.12
<sup>a</sup> P < .05.			
<sup>b</sup> This variable was calculated only for 2005–2012.			
<sup>c</sup> Within service time.			

Abbreviation: PCP = primary care physician.

Table 3. Odds Ratios (ORs) for Suicide Among Active-Duty Military Personnel

	Adjusted OR <sup>a</sup>	
Characteristic	(95% CI)	P Value
Diagnosis of "administrative, general	1.69 (1.18-2.43)	.004
examination, and other purposes" in the		
last visit with the PCP		
Contact with mental health care	1.68 (1.01-2.78)	.04
professional during military service <sup>b</sup>		
Sick leave within service time	0.67 (0.46-0.96)	.03
Referral to laboratory tests	0.92 (0.85-1.00)	.05
Referral to imaging studies	0.83 (0.70-0.99)	.04
<sup>a</sup> Controlled for mental health diagnoses prio educational level.	or to recruitment and	d
<sup>b</sup> This variable was calculated only for 2005-	2012.	
Abbreviation: PCP = primary care physician		

versus 45%).<sup>15</sup> Nevertheless, PCP contact rate by Israeli military personnel who died by suicide was higher than the contact rate with mental health specialists. The contact rate of military personnel who died by suicide with a mental health specialist was twice that of a matched military control group during the entire service time (27.6% versus 13.6%), and this difference remained statistically significant

even after controlling for mental health diagnoses prior to recruitment and educational level. No differences were found between suicide case and military control groups in the rate of last contact with the PCP within the last week, month, 3 months, or 6 months before suicide among activeduty military personnel. Suicide cases who contacted a PCP within the last month before suicide had more noncombat duty and shorter service period prior to suicide compared with suicide cases who did not see the PCP.

In a meta-analysis<sup>15</sup> of 40 studies of civilians who died by suicide, contact with primary care providers in the month before suicide averaged 45% across all age groups but was only 23% for civilians aged 35 years and younger. In our sample, which consisted of a total of 670 active-duty military personnel with an average age of 20 years, 38% of suicide cases contacted a PCP in the month before death. Thus, although the rate of PCP contact in the month before suicide in the Israeli military is lower than generally reported for all age groups in civilians, it is higher than the civilian rate when considering age.

In male civilians aged 15–39 years, Stanistreet et  $al^{18}$  found that 38% of suicide cases contacted a PCP in the

Table 4. Demographic and Occupational	Characteristics of Suicide Cases	According to Primary Care Physician
(PCP) Contact Status		

	PCP Contact Within the Last	No PCP Contact Within the Last	
Characteristic	Month Before Suicide $(n = 62)$	Month Before Suicide $(n = 100)$	P Value
Born in Israel, n (%)	40 (65.6)	61 (61.0)	.79
Intellectual rating score, mean $\pm$ SD	$48.8 \pm 20.3$	$53.9 \pm 21.5$	.14
High school graduate, n (%)	55 (88.7)	88 (88.0)	.89
Combat psychosocial suitability score, mean ± SD	$23.2 \pm 6.4$	$23.9 \pm 4.5$	.84
Overweight and obese, n (%)	8 (13.8)	12 (12.6)	.83
Combat duty, n (%)	21 (33.9)	55 (55.0)	.01 <sup>a</sup>
Physical health fitness—fit for combat duty, n (%)	50 (80.6)	86 (86.0)	.45
Absenteeism and detention, mean $\pm$ SD, d	$10.8 \pm 34.3$	$13.9 \pm 46.9$	.65
Service length prior to suicide, mean $\pm$ SD, d	$325.1 \pm 263.7$	$485.7 \pm 304.6$	<.001 <sup>a</sup>
Mental health diagnoses prior to recruitment, n (%)	3 (4.8)	3 (3.0)	.67
Contact with mental health care professional during military convice $n \left(\frac{0}{2}\right)^{b}$	10 (29.4)	17 (28.3)	.91
$^{a}P < .05.$			
This variable was calculated only for 2005–2012.			

month before death compared with 30% of accidental death victims. Mesec Rodi et al<sup>17</sup> found that 38% of civilian suicide cases contacted a PCP in the month before death compared to 20% of healthy military controls (P < .05). In our sample, 38% of suicide cases and 33% of military controls contacted a PCP in the month before death or index day for military controls (P = .3). Although active-duty military suicide cases contacted a PCP at a similar rate to the rate reported for civilian suicide cases in these studies (38%), they did not contact a PCP at a higher rate than military controls. Consistent with our findings, others report that active-duty military personnel, as a group, contact a PCP at a higher rate than age-matched civilians.<sup>20,21</sup>

Individuals who are at high risk for suicide may have barriers to accessing mental health care.<sup>7</sup> The stigma associated with seeking mental health care, which exists in the general population, appears to be greater in military culture, where help-seeking behavior is considered weakness, and a potential impediment to soldiers' career and peer respect.<sup>27,28</sup> In the meta-analysis<sup>15</sup> cited above, about 20% of all civilians who died by suicide had contact with a mental health professional in the month before death and 32% within the last year before death. Contact with a mental health professional was only 24% for persons aged 35 years and younger within the last year before death.<sup>15</sup> In male civilians aged 15-39 years, suicide cases had higher contact rate with a mental health professional at some time before suicide as compared to accidental death victims (27% versus 13%, respectively).<sup>18</sup> In our sample, suicide cases were more likely to contact a mental health specialist within service time than military controls (27.6% versus 13.6). Since about 90% of civilians who died by suicide suffered from a psychiatric illness, mostly untreated,<sup>13</sup> it is understandable and helpful that, despite the reluctance of military personnel to seek psychiatric help, the rate of such help seeking in suicide cases is double that of the military control group (28% versus 14%). Nevertheless, this rate is well below the 38% rate found for PCP contact within the 30 days before suicide. The similarity of our results to those found with young civilians may reflect a change in military culture toward acceptance of mental health care treatment for active-duty personnel. In line with

this hypothesis, since the IDF suicide prevention program was implanted in 2006, there has been a gradual increase in rate of suicide cases seeking mental health specialist consulting (IDF unpublished data).

Unlike data in the civilian population, data on PCP encounter rate among active-duty military personnel suicide cases are scarce. According to US Department of Defense Suicide Event Report, one-quarter of service members who die of suicide see a mental health professional within 30 days prior to death.<sup>29</sup> Recently, US Armed Forces Health Surveillance Center has published data regarding health care experiences of US service members prior to suicide or self-inflicted injury.<sup>30</sup> The US military data include a total of 1,939 suicide cases, with 174 under the age of 20 years. Forty-five percent of the suicide cases and 75% of those who injured themselves had outpatient encounters within 30 days prior to death/self-harm. Primary care was the most frequently visited clinical service prior to suicide/self-harm. As compared to their counterparts, service members with suicidal behavior had higher outpatient visit rates within, but not prior to, 60 days of their deaths/injuries.<sup>30</sup> Taken together, US military data and Israeli military data, presented in this study, support high rate of contact with a PCP before death in military service personnel who died by suicide.

As mentioned above, it is estimated that 60% of all suicides suffer from a depression, mostly untreated.<sup>13</sup> Depression has been linked with somatic complaints, which are defined as physical sensations infrequently associated with organic disease.<sup>31</sup> Indeed, previous studies found higher rates of depression among primary care services patients presenting with somatic complaints that culminated in a nonspecific diagnosis or nonphysical etiologies.<sup>31–33</sup> In our study, military suicide cases had a higher rate of diagnosis of administrative, general examination, and other purposes as the reason for the last contact with the PCP as compared with the military control group. Furthermore, suicide cases had lower rates of sick leave, less change in health fitness rating, and fewer imaging studies referrals during military service compared to military controls. We hypothesize that a diagnosis under the category of administrative, general examination, and other purposes, as recorded by the PCP,

reflects a nonspecific diagnosis or absence of physical findings or etiologies by the physician, leading to lower rates of referrals to complementary test, sick leave, and change in health fitness rating.

Although two-thirds of all people who die by suicide see a PCP within 1 year before death, implying an important role for the PCP in suicide prevention by detection of high risk population, depression and other psychiatric disorders are underrecognized and undertreated in the primary care setting.<sup>13</sup> Suggested barriers for detection and treatment of depression in primary care services include PCPs' lack of knowledge, conceptualization of depression as a normal response to negative life events, high workload, and a focus on what PCPs perceived as their primary mission, thus giving short shrift to importuning from their mental health colleagues.<sup>13,34</sup> While some studies suggest that educating PCPs to recognize and manage depression improved patients' outcome, other studies fail to demonstrate positive results.<sup>13,34,35</sup> Indeed, Israeli military primary care services face a high volume workload in the range of around a million visits to PCPs annually in which the military suicide cases visits are imbedded. Thus, the task of identifying active-duty military personnel with depression and increased suicide risk presents a challenge. Specific recommendations for PCPs to improve detection of active-duty military personnel with increased suicide risk can be supported by the results of our study. First, suicide cases with noncombat type of duty and shorter service period were more likely to visit a PCP within the last month before suicide compared to suicide cases who did not visit a PCP during this period. Hence, this subgroup of military suicide cases should be a focus of primary care intervention programs. Second, patients presenting with somatic complaints culminating in a nonspecific diagnosis or nonphysical etiologies, as mentioned above, should be considered a high risk population. Thus, educating PCPs to screen for mental health disorder when facing a nonspecific diagnosis or absence of physical findings may increase depression diagnosis rate. Furthermore, while PCPs' education and mental health screening alone do not seem to improve depression outcome, if combined with additional implementation of guidelines and collaborative care models, they are more likely to improve depression care.13,34,35 Importantly, implementation of PCPs' educational program should be considered a part of IDF suicide prevention program, which includes preinduction mental health screening, education of active-duty personnel on suicide, "gatekeepers" training, and restriction of accesses to lethal means.

Our study is limited by lack of data on suicide cases and military control contacts with a PCP or mental health professional outside the military health system, since it is not registered in the electronic medical records. Another limitation is the concern that matching suicide cases and military controls for preinduction physical health fitness resulted in an overmatching effect. Thus, no significant difference in accessing primary care prior to the suicide between groups and lower rate of sick leave and referrals

among suicide cases was found. Although this confounding effect cannot be completely excluded, several facts argue against it. First, preinduction physical health fitness is determined a year and a half before recruitment to IDF, and it is influenced only by chronic physical conditions with permanent physical limitations<sup>25</sup> and not by transient, nonspecific somatic complaints typical to people suffering from mental health disorders. Second, as shown in Table 1, around 85% of the suicide case and military control groups had physical health fitness fit for combat duty, ie, without any significant physical health problem. Third, as shown in Table 4, preinduction physical health fitness did not differ between suicide cases who contacted a PCP within the last month before suicide and those who did not, suggesting that this parameter has less influence on PCP contact rate among suicide cases. The strengths of our study include a military cohort that is population based (therefore representative of the IDF) and well-matched military controls, minimizing confounding effects.

In conclusion, the PCP contact rate before death by military personnel who died by suicide is comparable to same age civilians who died by suicide, and much higher than mental health specialist contact rate during military service. This finding indicates that the potential suicide prevention impact of a program targeting PCPs in the military will meet comparable success in the civilian sector and is a meaningful prevention strategy. Given the recent report<sup>8</sup> on the importance of mood disorders and alcoholism in US military personnel who died by suicide, such a program should emphasize detection and treatment of these disorders.

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*Editor's Note*: We encourage authors to submit papers for consideration as a part of our Focus on Suicide section. Please contact Maria A. Oquendo, MD, at moquendo@psychiatrist.com.