

# The Reduction in Suicide Among Israeli Soldiers During their First Year of Service due to The Suicide Prevention Program (SPP)

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## ABSTRACT

**Background:** First year of military service is a risk factor for suicide. The aim of this study was to examine the effect of the Suicide Prevention Program (SPP) on the rate of suicide over the first year of service.

**Method:** A nested case control retrospective study based on gathered medical and HR data between 1992 and 2016 (N=1,462,882; 491 suicide cases). The data was divided into two periods, before the SPP's implementation (1992–2005) and after (2009-2016).

**Results:** Female soldiers' suicide rates per 100,000 decreased from 4 to 3 in the first year of service. Male soldiers decreased from 37 per 100,000 to 13 in the 1st year of service. The decrease in annual prevalence (per 100,000) of suicide was 3.56 (R2=0.8185;  $p < 0.001$ ).

**Conclusion:** The SPP showed an overall success in lowering suicide rate in soldiers regardless of gender and service year. The success, however, did not decrease the risk factor posed by the 1st year of service. Since it is difficult to effect dispositional risk factors. Further modification is needed in order to further lower suicide rate in that year.

## Keywords

Suicide prevention, Suicide rate, Israeli Defense Force, Risk factors.

## Introduction

Suicide is an important public health issue all over the world among civilians [1], as well as among U.S. soldiers [2] and Israeli soldiers [3]. This remains the case despite the worldwide decline in suicidality [1] and the decline in Israel [4]. It is contrary to suicide rate in U.S. where there is an increase in the suicide rate among adults and adolescents among civilian [5,6], and among military personal [2].

Since IDF service is compulsory, with eligible soldiers being obligated to serve by law, the army must assume legal and moral responsibility for the soldiers' physical and mental health [7]. The Suicide Prevention Program (SPP), was introduced in 2006 and included several components such as reducing weapon accessibility, educating commanders and soldiers to serve as "gate

keepers" and reduction of the stigma associated with help-seeking behavior by integrating Mental Health Professional in various army units [7].

Another important component was the identification of specific periods during the military service, who represent elevated risk, and addressing that risk using different interventions. One such period was found in the first year of military service. As we know from several studies among Israeli soldiers, the first year of service is characterized with initial adjustment to military service and represent a very stressful event for some, thus posing an increased risk for suicide [8-11].

It was found that the first year is particularly stressful for those who had been exposed to combat event or more specifically, those who were exposed to situations representing prolonged stress. Stress exposure predicts subsequent changes in a variety of psychological processes that are associated with suicidal behavior, including emotional reactivity [12], Emotion regulation [13],

and the feeling of hopelessness [14]. Certain types of stressful life events, including interpersonal loss, are associated with heightened impulsivity in regards to suicide attempts [15]. To summarize, the stress that characterizes the military setting and the initial enlistment, is a factor that may lead to the consequences mentioned.

Several studies among American soldiers, further support said conclusion and could have implications on suicide prevention programs. The notable of these was significantly elevated suicide rate (69.6–80.0 suicides per 100,000 person-years compared with 18.5 suicides per 100,000 person-years in the total Army) among enlisted soldiers deployed during their first year of service or with less than expected (based on time in service) junior enlisted rank.

In another study of 9,650 enlisted soldiers who attempted suicide, across deployment status, suicide attempts were more likely among soldiers in their first 2 years of service (currently deployed: OR, 1.9; 95% CI, 1.5-2.3; previously deployed: OR, 2.2; 95% CI, 1.9-2.7; and never deployed: OR, 3.1; 95% CI, 2.7-3.6) [16]. One study found that enlisted soldiers accounted for 98.6% of all suicide attempts (9,650 attempters; overall rate, 377.0 [95% CI, 369.7-384.7] per 100,000 person-years). In multivariate models, suicide attempts among enlisted soldiers were predicted (data reported as odds ratio [95% CI]) by being in the first 4 years of service (1-2 years, 2.4 [2.2-2.6]; 3-4 years, 1.5 [1.4-1.6]). These findings reveal unique risk profiles for enlisted soldiers and officers and highlight the importance of research and prevention focused on enlisted soldiers in their first Army tour [17].

As part of an ongoing research, the SPP efficiency was assessed in regard to several variables. Since the enlistment and the first year following it, are shown to be significant risk factor, it is imperative to assess how the SPP influence soldiers during that time, as well as other stages of their military service.

### The present study

In the current study the research aim is to examine the effect of the Suicide Prevention Program (SPP) on the rate of suicide over the service years, especially the first year of service and the risk factor it poses.

### Methods

#### Design and settings

Nested case control (NCC) study in which cases and controls are drawn from the population in a fully enumerated cohort.

Based on data from 5/1/1992 to 31/12/2016. The data was divided

into two period of time. The first includes soldiers that were drafted to military service from 1992 to 2005. The second period includes the soldiers drafted from 2009 to 2016. Soldiers drafted during 2006-2008 were not included because the SPP was only partially implemented in those years.

### Measurements

**Independent variables:** Gender, first and second years of service follow up for female and third years for male.

**Dependent variable:** a. Soldiers who died by suicide during military service.

b. The Suicide Prevention Program implementation.

### Statistical analysis

The data we used included 1,526,853 soldiers that were drafted in the relevant period. Of which, 17 soldiers who were drafted to professional and not mandatory service were excluded, leaving us with 1,526,836 soldiers. Soldiers recruited in the time the application of the SPP started but was not fully implemented (2006-2008) were excluded, leaving us with a cohort of 1,462,882 from which our data was derived.

From the aforementioned cohort we refined the number of deaths by suicides in those years which concluded in 525 cases. In order to establish a numerator of suicides occurring in mandatory service we excluded all suicides of male soldiers who served more than 1,100 days and female soldiers who served more than 735 days in the time of suicide, as well as soldiers who for some other reason entered professional service earlier. The result was a cohort consisting of 491 deaths by suicide in the aforementioned years. The calculation was by gender. Another segmentation was done afterwards in which the suicide cases were segmented per year of mandatory service for male soldiers, female soldiers and the total amount of service.

### Ethics approval

The Institutional Review Board of the IDF Medical Corps approved the study and waived the requirement for informed consent on the basis of preserving participants' anonymity.

### Results

The distribution of female soldier suicide by the first year of military service was 59.1% (n = 26) and 40.9% (n = 18) by the second year of military service. The distribution of male soldier suicide by the first year of military service was 53.5% (n = 239), 27.1% (n = 121) by the second year and 19.5% (n = 87) in the third year of military service (Table 1).

	1 <sup>st</sup> year		Rate <sup>#</sup>	2 <sup>nd</sup> year		Rate <sup>#</sup>	3 <sup>rd</sup> year		Rate <sup>#</sup>	Total		Rate <sup>#</sup>
	N	%		N	%		N	%		N	%	
Female soldiers	26	59.1	4	18	40.9	3	-	-	-	44	8.9	7
Male soldiers	239	53.5	29	121	27.1	16	87	19.5	13	447	91.1	54
Total	265	54.0	18	139	28.3	10	87	17.7	13	491	100.0	34

**Table 1:** Distribution of suicide by gender, year of service and suicide prevalence per 100,000.

Gender	Implementation of the SPP	Parameter	1st year	2nd year	3rd year	Total
Female	#Before	N	428,022	410,244	-	428,022
		Suicide	19	16	-	35
		Per 100,000	4	4	0	8
	∞After	N	203,358	193,898	-	203,358
		Suicide	7	2	-	9
		Per 100,000	3	1	0	4
Male	#Before	N	552,907	503,074	455,097	552,907
		Suicide	202	104	82	388
		Per 100,000	37	21	18	70
	∞After	N	278,595	258,733	214,687	278,595
		Suicide	37	17	5	59
		Per 100,000	13	7	2	21
Total		Per 100,000	18	10	13	34

**Table 2:** Suicidal prevalence per 100,000 recruited soldiers by service year and gender, before and after the implementation of the SPP.  
 Note: #Before: 1992-2008; ∞After: 2009-2016.

Mean average of deaths per year (22 for female soldiers, 149 for male soldiers) was calculated and analysis was done using chi square to evaluate by that mean whether the decline per year is significant. The results showed no significance in regard to female soldiers ( $p=0.521$ ) but a meaningful significance ( $p<0.001$ ) for male soldiers.

When comparing changes in suicide rate before and after the SPP, the difference between genders persist. Table 2 shows female soldiers' suicide rates per 100,000 decreased from 4 to 3 in first year of service and from 4 to 1 in the second, following the SPP's implementation. The change from first year to the second is still not significant with  $p=0.737$  after the SPP. Male soldiers' decrease, on the other hand, was shown to be from 37 per 100,000 to 13 in the first year of service, from 21 per 100,000 to 7 in the second and from 18 to 100,000 to 2 in the third year with overall decrease from 70 per 100,000 to 21 throughout the entire service. Using Chi square to calculate this decline's significance, it proved significant with  $p<0.001$  both before and after the SPP. The decrease in annual prevalence (per 100,000) of suicide was 3.56 ( $Y=-3.5633x+101.19$ ;  $R^2=0.8185$ ;  $p < 0.001$ ).

### Discussion

Over the last couple of years, it has become apparent that the IDF's Suicide Prevention Program has succeeded in lowering suicide rates in the Israeli army. This has been demonstrated in several published articles [17,18], as well in summarizes deaths by suicide per year in the current study. The reduction in suicide is much more pronounced than the reduction in the overall Israeli population, especially when considering it as a "high risk" population due to stress and weapon availability. It was also shown that the SPP changed demographic characteristics of those who died by suicide. However, while the SPP succeeded in reducing risk of suicide in situational factors (such as support unit soldiers), dispositional risk factors (such as psychiatric diagnosis at recruitment) were

not affected by the SPP. The researchers' conclusions were that the OR decreased in critical masses and rose in unique and smaller groups [20]. Since suicide is a leading cause of death in peacetimes [3], the said reduction signifies a major success in a critical public health issue.

The program's influence is manifested both in the first year of service in actions such as reducing weapon accessibility and screening for high risk populations, and later years of service by allowing more accessibility to mental health professional and educating soldiers and commanders. However, even though the first year of service is more emphasized in the SPP implementation, we can clearly see its affect is spanning throughout the service in male soldiers. This is manifested by the fact that the reduction in suicide rate per year of service from year to year, remains significant before and after the SPP implementation in males, and remains insignificant in female. The rate of decline per year is also similar between the years.

This finding is both a demonstration of the SPP effects and weaknesses and an opportunity. It is clear even after the reduction following the SPP's success, that the first year of service remains a significant risk factor in comparison to the following years. Further action should be taken and focused on soldiers during that time period in order to lower the sum of suicides in the IDF.

### Limitations

We should take into account the fact that the number of suicides we have data on, is relatively small (491), especially when considering the broader soldier population which includes 472,795 soldiers. Further Data should be collected in the following years.

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