

Use of Army Weapons and Private Firearms for Suicide and Homicide in the Region of Basel, Switzerland

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Abstract: *Objectives:* Switzerland has one of the highest rates of firearm suicides in the world. International studies show a positive correlation between the rate of households with guns and femicides with guns. Because its defense system requires a militia to keep personal firearms at home, Switzerland has a high rate of households with a gun. *Methods:* Records of suicides in the region of Basel between 1992 and 1996 were reviewed. Suicides with either army weapons or private firearms and suicides by other means were compared. Methods and types of homicides that occurred in the region at the same time were also analyzed. *Findings:* Firearm suicides were clearly the most frequent means of suicide. They were also used in 30.0% of domestic homicides, although other means were used at similar rates. Firearms for suicide were mainly used by men, especially army weapons. These men were younger, professionally better qualified, and fewer had ever been treated in one of the local state psychiatric services. *Discussion:* The use of firearms for suicide, rather than homicide, and particularly of army weapons by young, well-educated men, requires more attention in debates and informed policy regarding access to firearms and suicide prevention in Switzerland.

Keywords: suicide, homicide, army weapon, firearm, suicide prevention

Introduction

The rate of suicides with firearms varies considerably among countries with comparable economic levels (Krug et al., 1998). It is related to the availability of firearms in a given region or country, expressed either by a more strict or liberal firearm-legislation (Conner & Zhong, 2003) or by the rate of households with a gun (Killias, 1993; Killias, van Kesteren, & Rindlisbacher, 2001). The rates of spouse femicide and households with a gun have also been found to be positively related. Access to guns in a domestic setting may contribute to both kinds of mortality (Killias et al., 2001).

Although not as high as in some nations in Eastern Europe or in Baltic countries, the rate of suicide in Switzerland is high (Levi et al., 2003). The rate of suicides with a firearm in Switzerland, however, is relatively higher, and it ranks third in the world, behind the USA and Finland (Krug et al., 1998).

The high rate of households with a gun, 35% in a 2000 census, is a direct result of Switzerland's national defense system (Killias & Haas, 2001). The Swiss Army highly relies on militia. Despite adaptations to the improving level of security in Middle-Europe and the reduction of the Swiss Army, conscripts still must keep a personal weapon and ammunition

at home, which they bring when reporting for military service, a requirement fulfilled by, at the time of the study, 10 three-week periods before the age of 40. Until the 1960s, the personal weapon was a carbine (rifle) for privates and low-ranking officers, and a pistol for officers. Subsequently, a semiautomatic assault rifle replaced the carbine. After age 40, the conscript may keep this personal weapon at home. Apart from these army weapons, the rate of households with a gun was only 13% in Switzerland (Census, 2000).

In 1998 there were 1371 completed suicides in Switzerland; 412 of them were firearm-suicides (30.1%). Statistics are not kept to specify how many of these were carried out with army weapons, but the police estimate these to be about 40% (Killias & Haas, 2001). Study and documentation of the relationship between the ready access to firearms and the high rate suicide with firearms in Switzerland is needed.

Aims

This study examined the use of firearms for suicides and domestic homicides, based on data for the region of Basel. It compared sociodemographic, clinical, and suicide-relat-

ed variables for people who committed suicide with army weapons, private firearms, and other means. It also compared firearm suicides and homicides in the region over the study period.

Material and Method

"Extraordinary deaths" in Switzerland are typically examined by medical doctors (Pattscheider & Hartmann, 1986). The region of Basel consists of two half-cantons, Basel-City and Basel-Country, constituting an urban-rural mix with a population of 460,000. Autopsies of bodies of suicide victims are performed either at the Institute of Forensic Medicine of the University of Basel (IRM) or at the Cantonal Institute of Pathology in Liestal, in Basel-Country. Records kept in these institutes of 460 suicides between 1992 and 1996 had been obtained for a previous study of assisted suicide (Frei et al., 2001) and were analyzed for this study. After reviewing the records, 13 cases were excluded because these suicides in Basel had not resided in Basel; 447 cases remained in the study.

Between 1992 and 1996, 25 homicides occurred in the region. As required, these and other perpetrators of dangerous and violent crimes in this region were assessed by the forensic psychiatric services of the Psychiatric University Clinic of Basel (Frei, Graf, & Dittmann, 2003).

With permission from the Federal Commission for the Protection of Medical Confidentiality in Medical Research, all four Cantonal psychiatric institutions in the region were asked whether any of these persons who died by suicide had ever been a patient there.

Sociodemographic study variables included age, sex, profession, origin, and place of residence. Clinical data included a positive history for former psychiatric treatment, other evidence of a psychiatric and/or pathological-anatomic diagnosis, and other data related to the means of suicide, prior attempts, suicide notes, or suicidal statements before the suicide. Because toxic screens and alcohol levels at the time of death had only been obtained according to the requirements of the law enforcement agencies, we could not analyse such data systematically. Former patients were classified as "acute" if their suicide occurred as an inpatient, within 7 days of discharge, or within 30 days after the last outpatient session with a psychiatrist. Psychiatric diagnoses in patients' files were classified according to WHO's ICD-10. In addition to the psychiatric diagnosis in clinical case files, we analyzed notes of investigating police officers that referred to a putative psychiatric illness, designating this as a police diagnosis in our analysis. Suicides with a pathological-anatomical and a psychiatric diagnosis were classified as having a combined diagnosis.

Categories of suicide methods were considered for analysis if they were used in more than five cases. Means of suicide used less often were aggregated and classified as "rare" (namely self-immolation, strangulation, suffocation,

and electrocution). Firearms were subclassified as army weapon or private firearms. Army weapons were subclassified further as a carbine, semiautomatic assault rifle, or pistol. Classification of suicide methods for cases of combined murder and suicide and for double suicides were analyzed separately (Fishbain, d'Achille, Barsky, & Aldrich, 1984; Marzuk, Tardiff, & Hirsch, 1992).

Finally, the means (weapons) and the types of all homicides in the same region during the study-period were based on files of forensic-psychiatric experts on the perpetrators who had been assessed at the Psychiatric University Clinic of Basel. Spousal femicide and infanticide were aggregated as domestic homicide and compared with other types of homicide.

Analysis

Variables describing suicides with army weapons and private firearms were each compared with suicides by means other than firearms. With the exception of mean age, for which the *t*-test was used, all variables were categorical and evaluated as simple two-by-two contingency tables assessed with the χ^2 statistic. Types of homicide were compared with the means of homicide (weapons) in the same way. All calculations were made using SPSS Version 12.

Results

Suicide Methods

Table 1 presents the frequencies of different suicide methods for men, women, and the total. Among those using private firearms, 4 used rifles, 68 military handguns, and 10 were unclassified. Among army weapons, 6 used rifles, 23 semiautomatic assault rifles, 21 pistols, and 1 case was unclassified. In one case the pistol of a customs officer was used. The most frequent method for men was firearms, and the subclassification of army weapons was second to private firearms and at the same rate as hanging. Women preferred so-called nonviolent methods (Lester, 2002), such as drowning or intoxication. Assisted suicide was the second most frequent suicide method of women. Both women who died with an army weapon were killed by their husbands in the context of a suicide pact.

Sample Characteristics

More than a third of male suicides with army weapons were within the 20–34 year-old age group, the age of most military conscripts (Table 2). Foreigners generally comprised a small percentage of suicides in all three groups. Most men, more than one in four, who used weapons, were clas-

Table 1. Suicide methods for men and women

	Male (n = 285)	%	Female (n = 162)	%	Total (n = 447)	%
Firearm ¹	120**	42.1	14	8.6	134	30.0
– Private firearm	70**	24.6	11	6.8	81	18.1
– Army weapon	50**	17.5	3	5.7	53	11.9
Hanging	50	17.5	23	14.2	73	16.3
Legal Drugs	22	7.7	39**	24.1	61	13.6
Fall	27	9.5	23	14.2	50	11.2
Assisted	17	6.3	25**	14.8	42	9.4
Railway	15	4.9	8	5.3	23	5.1
Drowning	8	2.8	14*	8.6	22	4.9
Plastic bag	5	1.8	8	4.9	13	2.9
CO	7	2.5	1	0.6	8	1.8
Cutting/Stabbing	7	2.5	1	0.6	8	1.8
Rare	4	1.9	3	1.4	7	1.6
Illegal	2	0.7	4	2.5	6	1.3

* $p < .05$, ** $p < .01$ Pearson χ^2 . ¹Private firearms as subclassification remains the most frequent suicide method. Army weapon ranks fourth.

Table 2. Sample characteristics for suicides with firearms and other means

Variables	Army weap- on (n = 53)	%	Private fire- arm (n = 81)	%	No firearm (n = 313)	%	Total (n = 447)	%
Mean age	46**	–	54.5	–	55.4	–	54.1	–
Range	19–94		17–86		15–95		15–95	
SD	20.26		18.09		20.08		19.94	
Age groups								
– <19	1	1.9	1	1.2	5	1.6	7	1.6
– 20–34	20**	37.7	12	14.8	53	16.9	85	19.0
– 35–49	12	22.4	20	24.7	70	22.4	102	22.8
– 50–64	10	18.9	23	28.4	74	23.6	107	23.9
– 65–79	6	11.3	16	19.8	68	21.7	90	20.1
– 80 <	4	7.5	9	11.1	43	13.7	56	12.5
Origin								
– Swiss	50	94.3	75	92.6	281	89.8	406	90.8
– Foreigner (European)	2	3.8	6	7.4	28	8.9	36	8.1
– Foreigner (Non-European)	1	1.9	0	0	4	1.3	5	1.1
Profession								
– Academic/Manager	14**	26.4	6	7.4	21	6.7	41	9.2
– Blue-collar	10	18.9	15	18.5	44	14.1	69	15.2
– Disabled	3	5.7	4	4.9	21	6.7	28	6.3
– Housewife	0**	0	3	3.7	30	9.6	33	7.4
– Retired	9**	18.9	27	32.1	116	37.1	152	34.0
– Student	5	9.4	2	2.5	11	3.5	19	4.0
– Unemployed	1	1.9	2	2.5	8	2.6	11	2.5
– Unknown	3	5.7	7	8.6	14	4.5	24	5.4
– White collar	7	13.2	16	19.8	48	15.7	71	15.9
Marital state								
– Divorced	2	3.8	19*	23.5	39	12.5	60	13.4
– Married	23	43.4	36	44.4	117	37.4	176	39.4
– Single	26**	49.1	16*	19.8	100	31.9	142	31.8
– Unknown	1	1.9	2	2.5	9	2.9	12	2.7
– Widowed	1**	1.9	8	9.9	48	15.3	57	12.8

* $p < .05$, ** $p < .01$ Pearson χ^2 or t -test. Comparison of suicides with army weapons and suicides with a private firearm with suicide methods without firearms.

Table 3. Medical and psychiatric history, and suicidological data for suicides with firearms and other means

Variables	Army weap- on (n = 53)	%	Private fire- arm (n = 81)	%	No firearm (n = 313)	%	Total (n = 447)	%
Available clinical history								
- Former psychiatric treatment	16	30.2	21**	25.9	135	43.1	172	38.5
- Acute outpatient	1	1.9	4	4.9	30	9.6	35	7.8
- Acute inpatient	2	3.8	1	1.2	24	7.7	27	6.0
- Police diagnosis	8	15.1	19	24	40	12.1	67	15.0
- Combined diagnosis	8**	15.1	28*	34.6	102	36.6	138	30.9
- No diagnosis	17**	32.1	17	21.0	46	14.7	80	17.9
Suicidological data								
- Suicide at home	35	66.0	62	76.5	218	69.6	315	70.5
- Suicide note	16	30.2	26	32.1	104	33.2	146	32.7
- Suicide statement	18	34	31	38.3	121	38.7	170	38
- Prior suicide attempt	3*	5.7	8	9.9	57	18.2	68	15.2

* $p < .05$, ** $p < .01$ Pearson χ^2 . Comparison of suicides with army weapons and suicides with a private firearm with suicide methods without firearms.

sified as academics and managers, a heterogeneous group that included teachers, pilots, managers, self-employed businessmen and entrepreneurs, etc.

Medical and Psychiatric History, and Other Features of Suicide

A suicide with firearms was less likely to occur in the context of a psychiatric history or diagnosis, although rates for police diagnosis were comparable (Table 3). Those who used an army weapon were most likely to have no diagnosis from clinical or police data. The three persons using army weapons who were in treatment were suffering from schizophrenic psychosis (ICD-10 F2), three of the five persons in psychiatric treatment who used private firearms had affective disorders (ICD-10 F3), another was diagnosed with a personality disorder (ICD-10 F6), and the fifth with multiple drug abuse (ICD-10 F19). The 54 suicides without firearms and psychiatric treatment had a broad range of psychiatric disorders. Among the 17 with no diagnosis at all who died with army weapons, 7 were in the relatively higher functioning level of academics/managers, compared with 3 among those who used private firearms. The army weapons group was also least likely to have a history of a prior suicide attempt.

Double Suicides

Seven cases of extended suicide (corresponding to a rate of 0.3 per 100,000) were all in the context of suicide pacts, documented with suicide notes. Six of these were spousal suicides, comprising couples over 70 years of age, and one was a lovers' suicide. Three of the spousal suicides were

completed with the assistance of a right-to-die society, as previously reported (Frei, Schenker et al., 2003). The lovers' suicide involved a 24 year-old man with a history of illicit drug dependence who shot his 19-year-old lover before killing himself with an assault rifle. Illegal drugs in a nonlethal concentration were identified from blood studies at autopsy. No drugs were identified in autopsies of other suicides with firearms.

Homicides

Private firearms, all handguns, were the most frequent weapons for the 25 homicides that were identified during the study period (12, 48.0%). Army weapons were used in three cases (12.0%); in one of these it was an assault rifle used in a robbery; in the second a 19-year-old used his father's pistol to take revenge for a minor insult; and in the third, a 47-year old husband killed his estranged wife with an army pistol left to him by a friend. Five of the 12 handguns had been acquired illegally, and 10 (40.0%) of the homicides occurred in the context of domestic conflicts. Blunt force was the cause of death in three of the domestic homicides and was together with private handguns the most frequent means reported for domestic violence.

Discussion

Firearms are by far the most frequent means for suicide, followed by hanging. Distinguishing private firearms and army weapons is justified in the Swiss context and private firearms remain the most frequently used method; and army weapons rank fourth.

Psychiatric Morbidity

Our findings of 38.5% cases with prior psychiatric treatment and 13.8% in psychiatric treatment at the time of suicide are consistent with other studies based on psychological autopsies, which were also better able to identify treatment by private doctors (Appleby et al., 1999; Owens, Booth, Briscoe, Lawrence, & Lloyd, 2003). Even before the national firearms law of 1999, legal purchase of firearms required legal documentation of fitness, and conscripts must be adjudged physically and mentally fit. Consequently, one should expect lower rates of documented psychopathology among suicides using firearms, especially army weapons, compared with use of other means. Use of firearms was mainly associated with male suicides. This was most notable for army weapons, and expected because at the time of the study women were only serving as voluntary, unarmed auxiliary forces in the Swiss army. Suicide with army weapons was associated with younger age, less psychopathology, and higher-level occupations.

Use of firearms for suicide may also be distinguished from suicide by other violent methods with reference to identifiable mental illness. For example, de Moore and Robertson (1999) found that firearm suicides were less likely to be associated with a psychiatric history than jumping from a height, a means of suicide associated with high rates of severe psychopathology in Western cultures (Cantor et al., 1989). Survivors of deliberate self-harm using a firearm were significantly more often male and less likely to have a history of psychiatric treatment than survivors of deliberate self-harm who had jumped from a great height (de Moore & Robertson, 1999). This again fits well with our findings that less acute or former psychiatric patients were among the users of private firearms and army weapons rather users of other means.

Although rates of a documented psychiatric history may be similar, psychiatric autopsies typically assert much higher rates of psychopathology, about 90% (Arsenault-Lapierre, Kim, & Turecki, 2004). Our finding of additional police diagnoses (15.0%) is consistent with expectations of psychiatric problems beyond documented psychiatric history in the records available for our study. It is likely that case studies and family interviews would identify additional psychiatric problems since psychiatric autopsies routinely include findings from more in-depth case studies, as relevant research suggests. For example, psychological autopsies of 43 Israeli men who died by suicide in military service identified a psychiatric disorder for 81% (Apter et al., 1993). Inasmuch as psychiatric disorders are also often presumed to be a feature of suicide, especially in studies by clinical psychiatric investigators, psychological autopsies may overestimate the role of psychopathology. Further research is required to clarify this point.

Extended Suicide and Cultural Values

Although extended suicides were identified at rates comparable with the international literature (Fishbain & Aldrich, 1985; Marzuk et al., 1992), the substantial role of right-to-die societies reflected the Swiss cultural context. Frei, Schenker, and colleagues (2003) have discussed this phenomenon with reference to an emerging "Zeitgeist." Other forms of suicide more inimical to Swiss culture, such as murder-suicide (homicide followed closely in time by the suicide of the perpetrator), and family-annihilator suicides were not identified in this study (Marzuk et al., 1992).

Limitations

Our study is retrospective and based on data that are relatively old. Since then, federal legislation has introduced regulations to better control access to personal firearms and permission to carry them in public. Further study of more recent data will be useful to determine the impact of this legislation. In any event, the regulations controlling personal firearms do not affect the requirement of military conscripts to keep weapons and ammunition in their homes.

Our data sets lacked potentially valuable information about the reasons for suicide and social setting. For example, "single" as a marital status does not necessarily mean this person lived alone, and provides no information about the stress of common-law marriages. Developing a profile of characteristics of suicides, including means, triggers, and contexts, is likely to contribute to developing more specific and targeted strategies for preventing suicide (Pirkola, Isometsä, & Lönnqvist, 2003).

Implications

Although our findings suggest serious hazards of firearms used for suicide, the question of whether limiting access to firearms would lead to a shift in methods, rather than fewer suicides, remains debatable (Stack, 2000). Shooting, however, is the most lethal suicide-method (Shenassa et al., 2000). Consequently, even if restricted access to firearms led to a shift to other, less lethal methods, that development would bring some advantage (Cantor & Baume, 1998).

Access to army weapons is also a relevant consideration for homicide. The army weapon of deceased conscripts should not remain in their homes and people suffering from substance use disorders should not have easy access to army weapons. Although our study shows that firearms were the most frequent method for both homicide and suicide, they were less often used in domestic conflicts and spousal homicides. Restricting access to firearms may, therefore, have greater benefits in preventing suicides than homi-

cides, because firearms used for criminal activities are more likely to be obtained illegally.

The burden of suicide mortality resulting from army weapons is greater than mortality rates suggest because of the young age of those who use them. Such deaths contribute relatively more to disability-adjusted life-years lost (DALY), and policy should acknowledge this (Gunell & Middleton, 2003). With regard to questions of indicated prevention, it is notable that all three inpatients who used army weapons for suicide were diagnosed with schizophrenia. Clinicians should be attentive to this risk factor and inform authorities to limit access of such patients to army weapons. Even in the absence of indicated risk based on identified psychopathology, however, the presence of army weapons is likely to contribute a definite component of attributable risk, since choice of methods depends on availability of means and capacity to use them (Cantor & Baume, 1998). Even if these additional suicides are acceptable in the context of competing interests of public policy, that risk should be acknowledged and efforts should conscientiously be made to minimize that risk.

The fact that Swiss conscripts must keep a personal firearm and ammunition at home is a political issue. Discussion and debate about access to firearms and their associated problems focus mainly on their use for crime, but not suicide (Häfliger, 2003). Our study shows, however, that questions about the misuse of firearms for suicide pose a greater, more preventable personal and social burden than their use for crime. We hope that these findings may inform public debate and contribute to policy for preventing suicide in Switzerland.

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