

## SHORT REPORT

## Suicide mortality among electricians in the Swedish construction industry

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**Objectives:** To investigate the risk of suicide in Swedish electricians employed in the construction industry. A few studies have indicated an increased risk of suicide for electricians in the construction industry and electricians exposed to electromagnetic fields.

**Methods:** This is a cohort study. Electricians were identified through a computerised register of construction workers who had participated in health examinations in 1971–92. In this register, 33 719 male electricians were identified together with a reference group consisting of 72 653 male glass or woodworkers. Through a linkage with the Swedish Death Register, the cause of death was identified to the end of 1997. Mortality as a result of suicide was also compared with the general population with adjustments for sex, age, and period.

**Results:** The risk of mortality from suicide was decreased for electricians (standardised mortality ratio (SMR) 0.58, 95% confidence interval (95% CI) 0.47 to 0.71) and for the reference group of construction workers (SMR 0.81, 95% CI 0.72 to 0.91) compared with the general population.

**Conclusion:** Contrary to some other studies, risk of suicide was not increased among electricians in the construction industry.

A recent study indicated an increased risk of suicide among electric utility workers.<sup>1</sup> Men employed as electricians and linemen were at an increased risk whereas the risk in power plant operators was decreased. According to the authors, these results indicated that occupational exposure to low frequency electromagnetic fields (EMFs) is associated with an increased risk of suicide. Other studies from the United States and Canada have also indicated an association between EMFs and suicide, but there are studies reporting no association between the two.<sup>1</sup> Furthermore, some United States studies have indicated an increased risk of suicide in construction workers—for example, electricians.<sup>2–4</sup> A recent United States study indicating an increased risk<sup>1</sup> was cited in the Swedish press, causing some concern that Swedish electricians also were at increased risk.

The objective of this study was to investigate the risk of suicide in Swedish electricians employed in the construction industry. The study base comprised a cohort of electricians employed in the building industry.

## METHOD

This is a cohort study where the incidence of suicide was compared among electricians, a control group of other construction workers, and the general population. The electricians were identified through a computer file of people who had participated in health examinations in the construction industry between 1971 and 1992. In total, the file contained

information on more than 389 000 people. Through an agreement between unions and employers, Swedish construction workers all over the country were offered regular health examinations by foundation owned (Bygghälsan) occupational health centres between the late 1960s and 1992. The participation rate has been estimated at 80% or more (Englund, personal communication). Between 1971 and 1992, some information from those examinations was included in a computerised file. A total of 33 719 men were registered as electricians at the time of their health examinations. There were too few women to make an analysis of women feasible (n=110).

Glass and wood workers constituted the control group of 72 653 people identified in the same file of construction workers who had undergone a health check. Through a linkage with the Swedish Death Register, the mortality and cause of death among electricians and the control group were found between 1971 and 31 December 1997. In the analysis, we have only considered deaths between the ages of 20 and 74 years. We have abstracted all diagnosis from the death certificates that were classified as suicides by the register—that is, the eighth or ninth revision of the international classification of diseases (ICD-8 or 9) codes E950-E959 and ICD-10: X60-X84. The person-year method was used to calculate the expected mortality stratifying for sex, age group, and calendar year in the calculation.<sup>5</sup> For electricians and the control group, the first follow up was performed the calendar year after the health examination. The follow ups were performed to 31 December 1997, year of death, or year of emigration, whichever came first. People lost in follow up (in total 0.16% of the cohort) were excluded from the analysis. Ninety five per cent confidence intervals (95% CIs) were calculated according to a Poisson distribution. The study was approved by Umeå University Committee of Ethics (00–130).

## RESULTS

The electricians, glass, and wood workers all were at a decreased risk of suicide compared with the general population (table 1). The electricians were also at a decreased risk compared with glass and wood workers (standardised mortality ratio (SMR) 0.72, 95% CI 0.58 to 0.87).

## DISCUSSION

United States construction workers seem to be at an increased risk of suicide. A study from Alabama compared 11 different industries and found construction workers to be at the highest risk of suicide.<sup>3</sup> A study based on census samples in the United States also found an increased risk of suicide in the construction industry.<sup>3</sup> Furthermore, another United States study found that electricians in the construction industry were at an increased risk of suicide (proportionate mortality

**Abbreviations:** SMR, standardised mortality ratio

**Table 1** Observed and expected number of suicides between 1971 and 1997 in male electricians and glass and wood workers, 20–74 years of age, compared with the general population

Group	Observed	Expected	SMR (95% CI)	Person-years
Electricians	95	164.2	0.58 (0.47 to 0.71)	544547.0
Glass and wood workers	296	364.9	0.81 (0.72 to 0.91)	1156298.0

ratio 113).<sup>4</sup> However, the risk was much lower than in the study by Liu and Waterbor.<sup>2</sup> By contrast, our data indicate that electricians, glass, and wood workers employed in the Swedish construction industry are at a lower risk of suicide than the general population. The difference may depend on socioeconomic factors, differences in job recruiting, and cultural factors. Furthermore, other studies have used proportionate mortality ratio analysis or ecological analysis with inherent weaknesses rather than a prospective cohort analysis, as in this study. A lower risk than the general population can be explained by selection bias because the general population contains a higher proportion of people with disabilities and long term illness than workers in the construction industry. Furthermore, because this cohort was based on willing participants in the health examinations, people with drinking problems or other psychosocial disorders may not have participated, making the comparison with the general population more biased. However, for a comparison between groups within the construction industry—for example, among electricians, glass, and wood workers—the selection bias should be absent or very weak. Within the construction industry there are both skilled and unskilled workers. Glass and wood workers were selected as the control group because they were of similar socioeconomic status to electricians and were supposed to have low to moderate exposure to EMFs.

It has been hypothesised that exposure to EMFs causes depression, which leads to an increased risk of suicide.<sup>1</sup> In another study, exposure to very low frequency magnetic fields (40–800 Hz) has been measured by personal sampling on a single day for 11 Swedish electricians working in the construction industry.<sup>6</sup> The exposure during the work shift was on average 0.31  $\mu\text{T}$  (SD 0.23  $\mu\text{T}$ ). Wood workers ( $n=10$ ) had a mean (SD) exposure to 0.27  $\mu\text{T}$  (0.26  $\mu\text{T}$ ) and the corresponding value for glass workers ( $n=10$ ) was 0.29  $\mu\text{T}$  (0.21  $\mu\text{T}$ ). The use of electrical tools did not influence the averages over the shift for any of the occupational groups. However, there was some correlation with the distance from transformers and power lines. The construction workers in our study were probably a representative sample of all electricians working in the construction industry during the period of 1971–92. However, it is unclear if the few workers measured in the other study represented a representative sample or a convenience sample.<sup>6</sup> In the study by Wijngaarden *et al*,<sup>1</sup> power plant operators had lower exposure to EMFs than electricians

### Main messages

- Electricians in the construction industry seem to have no increased risk of suicide; the conclusions cannot be extended to all electricians as their exposures—for example, to electromagnetic fields—may vary.

### Policy implications

- This study does not indicate that there is a need for special measures to prevent suicide as a result of occupational exposures for electricians working in the construction industry.

(0.79 v 1.11  $\mu\text{T}$ ) and were at a decreased risk of suicide. Our study does not contradict the hypothesis that high exposure to EMFs may cause depression and increase the risk of suicide.

In conclusion, our study indicates that electricians in the construction industry are not at an increased risk of suicide.

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