



Firesetting and general criminal recidivism among a consecutive sample of Finnish pretrial male firesetters: A register-based follow-up study

Annika Thomson^{a,*}, Jari Tiihonen^{b,c,d}, Jouko Miettunen^{e,f}, Matti Virkkunen^g, Nina Lindberg^g

^a Psychiatry, Kellokoski Hospital, University of Helsinki and Helsinki University Hospital, Finland

^b Niuvanniemi Hospital, Kuopio, Finland

^c University of Eastern Finland, Department of Psychiatry, Kuopio, Finland

^d Karolinska Institutet, Department of Clinical Neuroscience, Stockholm, Sweden

^e Medical Research Center Oulu, Oulu University Hospital and University of Oulu, Oulu, Finland

^f Center for Life Course Health Research, University of Oulu, Finland

^g Forensic Psychiatry, University of Helsinki and Helsinki University Hospital, Helsinki, Finland

A B S T R A C T

The rate of criminal reoffending among firesetters varies greatly. Our aim was to investigate firesetting and general criminal recidivism in a consecutive sample of Finnish males who were sent for a forensic psychiatric examination (FPE)¹ after committing firesetting offenses. We also wanted to evaluate the relationships between psychopathy and criminal recidivism, and between schizophrenia-spectrum disorders and criminal recidivism. The sample comprised 113 firesetters with a mean age of 32.8 years, and the average follow-up time was 16.9 years. The FPE statements of the firesetters were reviewed and psychiatric diagnoses were collected. The psychopathy assessments were based on the 20-item Hare Psychopathy Checklist-Revised (PCL-R). Information on reoffending was gathered from the Finnish National Police Register. During the follow-up 20 (18%) persons were registered for a new firesetting and 84 (74%) for any new offense. Firesetters with high traits (PCL-R \geq 25) of psychopathy were more likely than those with low traits (PCL-R < 25) to reoffend with any crime during the follow-up. The risk of general criminal recidivism was lower among firesetters with a schizophrenia-spectrum disorder than among those with non-psychotic disorders. Conclusively, both firesetting and general criminal-recidivism rates were high in this sample of offenders.

1. Introduction²

Arson, the intentional destruction of property by fire for unlawful purposes, and other deliberate firesetting acts are easily performed crimes, but they are hard to investigate because much of the evidence is destroyed in the fire. These fires may result in devastating personal and economic damage. In the US, there were 1.2–1.4 million fires reported each year in 2010–2014 (Brushlinsky et al., 2016), and more than 280,000 intentional fires were reported yearly to the US Fire Department in 2007–2011 (Campbell, 2014). The proportion of deliberate fires of all fires in England in the last decade was around 25% (Home office, 2017), a figure somewhat lower than that observed in Finland as an average over the last five years (31.4%) (Pelastustoimi, 2016). These numbers do not include cases in which the reason for ignition is undetermined, so the true figures for deliberate firesetting are probably

higher.

Earlier research depicts arsonists as dangerous criminals who are likely to reoffend (Repo and Virkkunen, 1997a). However, later studies do not support this view (Brett, 2004). According to studies with follow-up periods of between six and 20 years, between four and 10% (Ducat et al., 2015; Edwards and Grace, 2014; Soothill and Pope, 1973; Soothill et al., 2004), or up to 39% (Repo et al., 1997) of firesetters reoffended with further deliberate firesetting, and from four (Barnett et al., 1997) to more than 60% (Edwards and Grace, 2014; Repo and Virkkunen, 1997a, b; Rice and Harris, 1991) reoffended with any crime. The wide range of criminal recidivism rates among the studies is related to the different samples and settings (Brett, 2004).

Stoat et al. (2005) found in their study of 184 Finnish arsonists that 11% of them reoffended with further deliberate fires, and 76% with any crime during a 6.5-year follow-up period after serving a prison

* Correspondence to: Kellokoski Hospital, Vanha Valtatie 198, 04500 Kellokoski, Finland.

E-mail address: annika.thomson@hus.fi (A. Thomson).

¹ FPE = Forensic psychiatric examination.

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sentence. Of those who committed any crime, 49% perpetrated at least one violent crime, and 58% at least one property crime during the follow-up after a deliberate firesetting. Other common crimes included traffic offenses (43%), drug-related offenses (23%), and sexual offenses (1%). The average delay between the index arson and any reoffending was 428 days (standard deviation (SD) 623, range 0–3073) after release from prison. It was reported in an Irish study among 54 firesetters, that seven of the 19 recidivists renewed their crime within six months, and the delay reported for the rest varied between six months and ten years (O'Sullivan and Kelleher, 1987). Soothill and Pope (1973) observed a delay of as long as 15 years for recidivist firesetting in their 20-year cohort study.

According to Edwards and Grace's (2014) actuarial model for predicting arson recidivism, arsonists who were younger at the time of the index offence had faced more than one concurrent arson charge, had previously committed more vandalism offenses, and were significantly more likely to commit an arson offence in the future. Risk factors that have been reported among mentally disturbed arsonists include childhood firesetting, a young age at the time of the first firesetting, a high number of firesettings, arson as the only concurrent charge, a low intelligence quotient (IQ) (Rice and Harris, 1996), diminished responsibility (Barnett et al., 1999), poor social and relational skills, hostility (Hagenauw et al., 2015), and an expressed interest in fire/explosives (Tyler et al., 2015). Identified risk factors for general criminal recidivism include a high number of previous convictions, a less serious index offence, a versatile offending history, substance abuse (Pflueger et al., 2015), and a young age at examination (Pflueger et al., 2015; Stoat et al., 2005). Edwards and Grace (2014) also reported the following significant predictors of violent recidivism in their above-mentioned actuarial model: first arson < 18 years of age, age at the first offence, and several prior violent and other offenses. In the case of non-violent criminal recidivism, the significant predictors turned out to be age at the first arson attempt, the number of prior thefts, as well as the number of prior drug offenses.

Psychopathy is defined as a constellation of affective, interpersonal, and behavioral characteristics (Cleckley, 1976; Hare, 1991). On the interpersonal level, psychopathic individuals have been described as grandiose, arrogant, callous, dominant, superficial, and manipulative, whereas on the affective level they tend to be short-tempered, unable to form strong emotional bonds with others, and to lack guilt or anxiety. These interpersonal and affective features are associated with a socially deviant lifestyle that includes irresponsible behavior and a tendency to ignore or violate social conventions and norms (Hare, 1991). It is thus not unexpected that there is a strong correlation between psychopathy and crime (DeLisi, 2009), and particularly because psychopathy is known to predict both general and violent criminal recidivism (Firestone et al., 1998; Grann et al., 1999; Hart et al., 1988; Hawes et al., 2013; Mokros et al., 2014; Olver et al., 2013; Rice and Harris, 1992; Tengström et al., 2000). According to a recent study conducted by Thomson et al. (2015), there is a subgroup of arsonists with significant psychopathic traits. However, as far as the authors know, until now, psychopathy has not been studied from the perspective of arson recidivism.

Arson has been associated with schizophrenia and other psychotic disorders (Anwar et al., 2011; Ducat et al., 2013; Geller, 1987; Lindberg et al., 2005; O'Sullivan and Kelleher, 1987), and diminished responsibility has been reported as a risk factor for arson recidivism (Barnett et al., 1999). In a sample of 90 Finnish recidivist arsonists sent for a forensic psychiatric examination (FPE), for example, 20% were diagnosed with a psychotic disorder (Lindberg et al., 2005). The number is high, given that the lifetime prevalence of all psychotic disorders is estimated to be 3.1%, and that of schizophrenia to be 0.9% in the Finnish general population (Perälä et al., 2007). A diagnosis of schizophrenia has been reported to decrease the risk of subsequent violence, and hence to serve as a protective factor inhibiting further violence (Harris and Lurigio, 2007; Monahan et al., 2001).

Arson is a legal rather than a medical term. Research findings are therefore more or less country-specific, and their generalizability remains uncertain. We use the term firesetter in the present study to describe persons intentionally setting objects on fire, regardless of their motives or intentions. Our primary aim was to investigate firesetting and general criminal recidivism in a consecutive sample of Finnish males who were sent for an FPE after committing firesetting offenses. We hypothesized that firesetters would show a high rate of firesetting and general criminal recidivism. Second, knowing that the firesetters had been thoroughly psychiatrically examined we wanted to shed more light on the relationship between recidivism and psychopathy, as well as on the relationship between recidivism and a schizophrenia-spectrum disorder. We hypothesized that firesetting and general criminal recidivism would be related to both psychopathy and a disorder on the schizophrenia spectrum.

2. Methods

2.1. Procedure and sample

The minimum age of criminal liability in Finland is 15 years. According to Finnish law, when a person is charged with a crime the court decides whether an FPE is needed or not. Having decided on an examination it then requests the National Institute for Health and Welfare to make the necessary arrangements. FPEs, which are conducted either in a state or municipal psychiatric hospital or in a psychiatric hospital for prisoners, are inpatient evaluations lasting approximately two months. They include data gathering from various sources, psychiatric evaluation, standardized psychological tests, interviews conducted by a multi-professional team, evaluation of the offender's physical condition, and continuous observation of the offender by hospital staff. The final FPE statement includes an opinion on the level of criminal responsibility, possible psychiatric diagnoses, and an assessment as to whether or not the offender fulfils the criteria for involuntary psychiatric care. The overall quality and reliability of Finnish FPEs are considered high among both courts and scientists (Eronen et al., 2000).

The study population comprised a consecutive sample of 114 male firesetters who were subjected to a pretrial FPE in 1990–1998 at Helsinki University Hospital because of firesetting offenses, mainly arson. One subject had a security prohibition denying access to his charts and was thus excluded from the analyses. The final number of subjects included in the study was 113.

We collected the following data from the FPE: name, personal identification number, index day, possible earlier convictions according to official criminal records, and all diagnoses.

2.2. Psychopathy

We used the 20-item Hare Psychopathy Checklist-Revised (PCL-R) to assess the level of psychopathy among the subjects (Hare, 1991). It has become the standard for assessing psychopathy in forensic settings because of its reliability and validity (Gacono and Hutton, 1994; Grann et al., 1998; Hare et al., 2000). Every item is individually rated on a three-point scale (0 = absent, 1 = present to some degree or contradictory data, 2 = definitely present). Scores are summed resulting in a total maximum score of 40, scores ≥ 30 points being considered diagnostic of psychopathy (Hare, 2003). In line with recommendations to apply a lower cut-off score for European populations (Cooke and Michie, 1999; Hare et al., 2000; Sullivan et al., 2006), a cut-off of 25 has been used in studies in Scandinavian countries (Putkonen et al., 2010; Rasmussen et al., 1999; Thomson et al., 2015), and a score of 20 is sometimes considered to be a cut-off for "medium psychopathy" (Woodworth and Porter, 2002). PCL-R assessments can be made upon file information alone in research settings (Alterman et al., 1993; Grann et al., 1998; Mossman, 1994; Wong, 1988), although it is generally

recommended that they be based on a file review and an interview with the subject. In this study, one forensic psychiatrist (NL) scored the PCL-R based on FPE reports. Four (3.5%) of the subjects had an IQ < 70 and were omitted from the analyses given that it is questionable whether PCL-R is suitable for persons with a low IQ. Consequently, 109 subjects were included in the analyses concerning psychopathy.

2.3. Psychiatric diagnoses and schizophrenia-spectrum disorder

The psychiatric disorders were gathered from the FPE statements. The Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, 9th Revision (ICD-9) (World Health Organization, 1977) was used in Finland between 1987 and 1995, after which it was replaced with ICD-10 (World Health Organization, 1992). ICD-9 diagnoses were translated into ICD-10 diagnoses for this study. Diagnoses F20–29 were combined under the term schizophrenia-spectrum disorders.

2.4. Follow-up

The follow-up began when the FPE was finished and the examination report was signed (index day), and ended if the person died ($n = 41$), moved abroad ($n = 2$) or at the latest on 31 January 2014 ($n = 70$). The oldest examination report was signed 26 January 1990. Data on mortality were obtained from the Causes of Death statistics (Statistics Finland), and information on the persons' place of residence from the Population Information System (Population Register Centre). The follow-up lasted on average 16.9 years (SD 5.91, range 1.53–24.1, median (md) 18.4).

2.5. Criminal activity during the follow-up

Criminal data were obtained from the Finnish National Police Register. It holds information on all contact with the police after the person reached 15 years of age, and has been used in Finnish crime studies (see e.g. Elonheimo et al., 2015). All recorded criminal activities were collected and sorted into groups (see 3.2).

2.6. Statistical analyses

We calculated the statistics using IBM SPSS version 22. We compared the groups in accordance with the independent samples t -test, the Mann-Whitney U -test, and the exact chi square (χ^2) test, and we used Cox regression analysis and reported hazard ratio (HR) with its 95-percent confidence interval (CI). The findings were considered significant when the two-tailed $p < 0.05$. We reported the phi (ϕ) coefficient as an effect-size measure for the χ^2 -test, Cohen's d for the independent-samples t -test, and theta (θ) for the Mann-Whitney U -test. The ϕ coefficient's magnitude was interpreted thus: 0.1 a small, 0.3 a moderate and 0.5 a large effect, and Cohen's d thus: 0.2 small, 0.5 moderate and 0.8 large, respectively (Cohen, 1992, 1998; Rea and Parker, 2014). θ was interpreted as follows: 0.56 small, 0.64 moderate and 0.70 large (Acion et al., 2006).

2.7. Ethical considerations

The study plan was evaluated by the Ethics Committee of the Helsinki and Uusimaa Hospital District, Finland. Permission to conduct the study was granted by the administration of the Helsinki and Uusimaa Hospital District, Finland, and the National Institute of Health and Welfare, Finland. The study was performed in accordance with the Declaration of Helsinki.

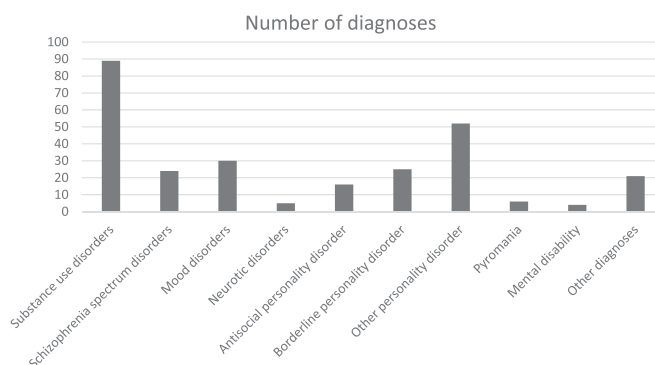


Fig. 1. The distribution of all diagnoses transformed into ICD-10 diagnoses in the FPEs. There were, on average, 2.5 diagnoses per firesetter (range 0–6, one person received no diagnosis at all), meaning that the total number of diagnoses exceeded the number of firesetters ($n = 113$). Substance-use disorders include ICD-10 diagnoses beginning with F1; schizophrenia-spectrum disorders F2; mood disorders F3; neurotic disorders F4; other personality disorders F60.0–1 and F60.4–9; pyromania F63.1; mental disability F7; other diagnoses include somatic disorders such as epilepsy, asthma, diabetes and heart conditions, and psychiatric disorders such as conduct disorders or enuresis.

3. Results

3.1. Sample characteristics

The mean age of the 113 firesetters was 32.8 years (SD 11.82, range 15.5–64.9), and 40 (35.4%) of them were aged 15–25 years. Fig. 1 presents the distribution of the FPE diagnoses. Twenty-four (21.2%) firesetters were diagnosed with a schizophrenia-spectrum disorder at index.

3.2. Criminal activity during the follow-up

A total of 2547 crimes were registered during the follow-up. We excluded from the analyses 311 minor offenses such as violations of traffic rules and driving a vehicle with minor defects. Hence, the number of crimes included was 2236. We categorized the crimes as firesetting, violent, sexual, property, traffic, drunk-driving, and miscellaneous offenses. Firesetting accounted for 2.6% ($n = 59$) of all the crimes (see Fig. 2). Almost half ($n = 1067$, 47.7%) were property offenses, and violent offenses comprised 15.3% ($n = 343$). Reoffending subjects committed 26.6 crimes each, on average (SD 44.6, range 1–274, md 9.0).

According to the Police register, 20 (17.7%) of the firesetters set new fires during the follow-up. The number of firesetting offenses varied between one and 13 (mean 2.95, SD 3.22, md 1). One person set a fire 13 times, or in 22.0% of the cases (Table 1). Eighty-four (74.3%) of the firesetters committed new offence of some kind. Property offenses were recorded for 63 (55.8%) and violent offenses for 55 (48.7%) of the subjects. On average, the delay to the first offence after the index day was 3.8 years (SD 3.47, range 0.03–15.15). The criminal-reoffending curves are presented in Fig. 3.

3.3. Exclusive firesetting behavior and pyromania

Seven (6.2%) of the subjects only had firesetting in their official criminal histories before committing the crime that led to the FPE, and 50 (44.2%) of them had no official criminal history at all. Of the exclusive firesetters at index day, only two (3.5%) reoffenders remained exclusive throughout the follow-up. Six (5.3%) subjects were diagnosed with pyromania in the FPE. None of these were caught for later firesetting crimes during the follow-up, but two of them committed other crimes (violent and drug-related).

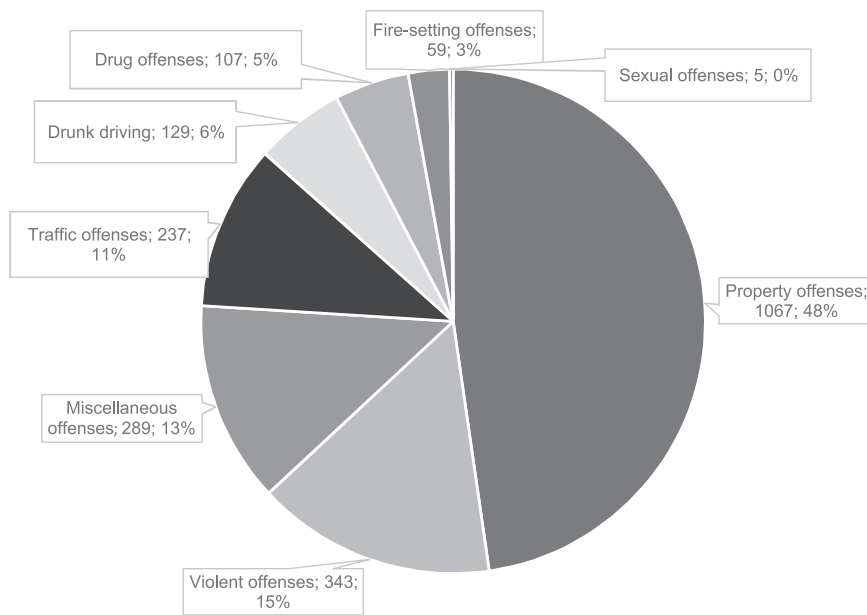


Fig. 2. The distribution of crimes committed by firesetters during the follow-up. Class of crime; Number of crime; Corresponding percentage.

3.4. Firesetters with high and low traits of psychopathy

Eighteen (16.5%) of the firesetters showed high traits of psychopathy (PCL-R ≥ 25), and 91 (83.5%) showed low traits (PCL-R < 25). Three (16.7%) of those with high traits and 16 (17.6%) with low traits were recorded for new firesettings during the follow-up (HR 1.78, 95% CI 0.51–6.19, $p = 0.367$) (Fig. 3C). The mean time to a new firesetting crime was 5.6 years (SD 3.7) for firesetters with high traits of psychopathy and 7.9 years (SD 5.4) for those with low traits ($t = 0.705$, $p = 0.490$). In the case of general criminal recidivism, 16 (88.9%) persons with high and 65 (71.4%) with low psychopathy traits reoffended (HR 2.20, 95% CI 1.26–3.84, $p = 0.005$) (Fig. 3D). The mean time to any reoffending was 2.3 years (SD 2.16) and 4.2 years (SD 3.65), respectively, for firesetters with high and low psychopathy traits ($t = 1.96$, $p = 0.054$).

Sixteen (88.9%) firesetters with high traits of psychopathy reoffended 65 times on average (SD 75.6, range 1–274, md 29), which was significantly more than the firesetters showing low psychopathy traits (mean 18, SD 28.1, range 1–175, md 8) ($Z = -2.51$, $p = 0.012$, $\theta = 0.30$).

3.5. Firesetters and schizophrenia-spectrum disorders

Two persons (8.3%) diagnosed with a schizophrenia-spectrum

disorder and 18 (20.2%) firesetters without such a disorder at index reoffended by committing a firesetting crime during the follow-up (HR 0.27, 95% CI 0.06–1.15, $p = 0.077$) (Fig. 3E). The mean time to a new firesetting was 7.6 years (SD 3.6) and 7.4 years (SD 5.3), respectively, for firesetters with and without a schizophrenia-spectrum disorder ($t = 0.057$, $p = 0.955$). In terms of general criminal recidivism, thirteen (52.0%) of the firesetters with a schizophrenia-spectrum disorder and 71 (80.7%) of those without one at index reoffended with any crime (HR 0.44, 95% CI 0.24–0.80, $p = 0.007$) (Fig. 3F). The mean time to any reoffending was 5.2 years (SD 4.4) and 3.5 years (SD 3.2), respectively, for firesetters with and without a schizophrenia-spectrum disorder ($t = 1.584$, $p = 0.117$).

4. Discussion

The aim of the present prospective follow-up study was to characterize both firesetting and general criminal recidivism among a consecutive sample of pretrial male firesetters. Our hypothesis that firesetters would show a high rate of firesetting recidivism was confirmed in that 18% of our sample reoffended in that way. This rate is substantially higher than those reported by *Stoat et al. (2005)* (11%), *Edwards and Grace (2014)* (6.2%), and *Ducat et al. (2015)* (5.3%). Criminal reoffending of any kind was observed in 75% of our firesetters during the follow-up. This finding is in line with the results of *Stoat*

Table 1

A comparison between criminally reoffending and non-reoffending firesetters.

	Re-offender (n (%)) 84 (74.3)	Non-reoffender (n (%)) 29 (25.7)	Statistics ¹	p	Effect size
Mean age on index day (SD [*])	31.1 (10.6)	38.0 (13.7)	$t = 2.474$	0.018	$d = -0.563$
Aged 15–25 years on index day (n (%))	34 (40.4)	6 (20.7)	$\chi^2 = 3.691$	0.072	$\phi = 0.181$ (max = 0.794)
Conviction/s for arson before index day (n (%))	6 (7.14)	1 (3.44)	$\chi^2 = 0.506$	0.477	$\phi = 0.067$ (max = 0.151)
Conviction/s for any crime before index day (n (%))	39 (46.4)	17 (58.6)	$\chi^2 = 1.282$	0.288	$\phi = 0.107$ (max = 0.582)
Schizophrenia spectrum disorder in FPE ^{**} (n (%))	13 (15.5)	11 (37.9)	$\chi^2 = 5.225$	0.022	$\phi = 0.215$ (max = 0.305)
APD ^{***} in FPE (n (%))	15 (17.9)	0	$\chi^2 = 5.971$	0.022	$\phi = 0.229$ (max = 0.230)
BPD ^{****} in FPE (n (%))	19 (22.6)	6 (20.7)	$\chi^2 = 0.047$	0.829	$\phi = 0.020$ (max = 0.313)
Alcohol use disorder in FPE (n (%))	55 (65.5)	20 (69.0)	$\chi^2 = 0.118$	0.822	$\phi = 0.032$ (max = 0.825)
Pyromania in FPE (n (%))	2 (2.4)	4 (13.8)	$\chi^2 = 5.584$	0.037	$\phi = 0.222$ (max = 0.139)

* SD = Standard deviation.

** Forensic psychiatric examination.

*** Antisocial personality disorder.

**** Borderline personality disorder.

¹ The independent sample t-test (t) and exact chi square test (χ^2) were used to compare groups. Effect sizes are reported $d =$ Cohen's d , $\phi =$ phi and its maximum value.

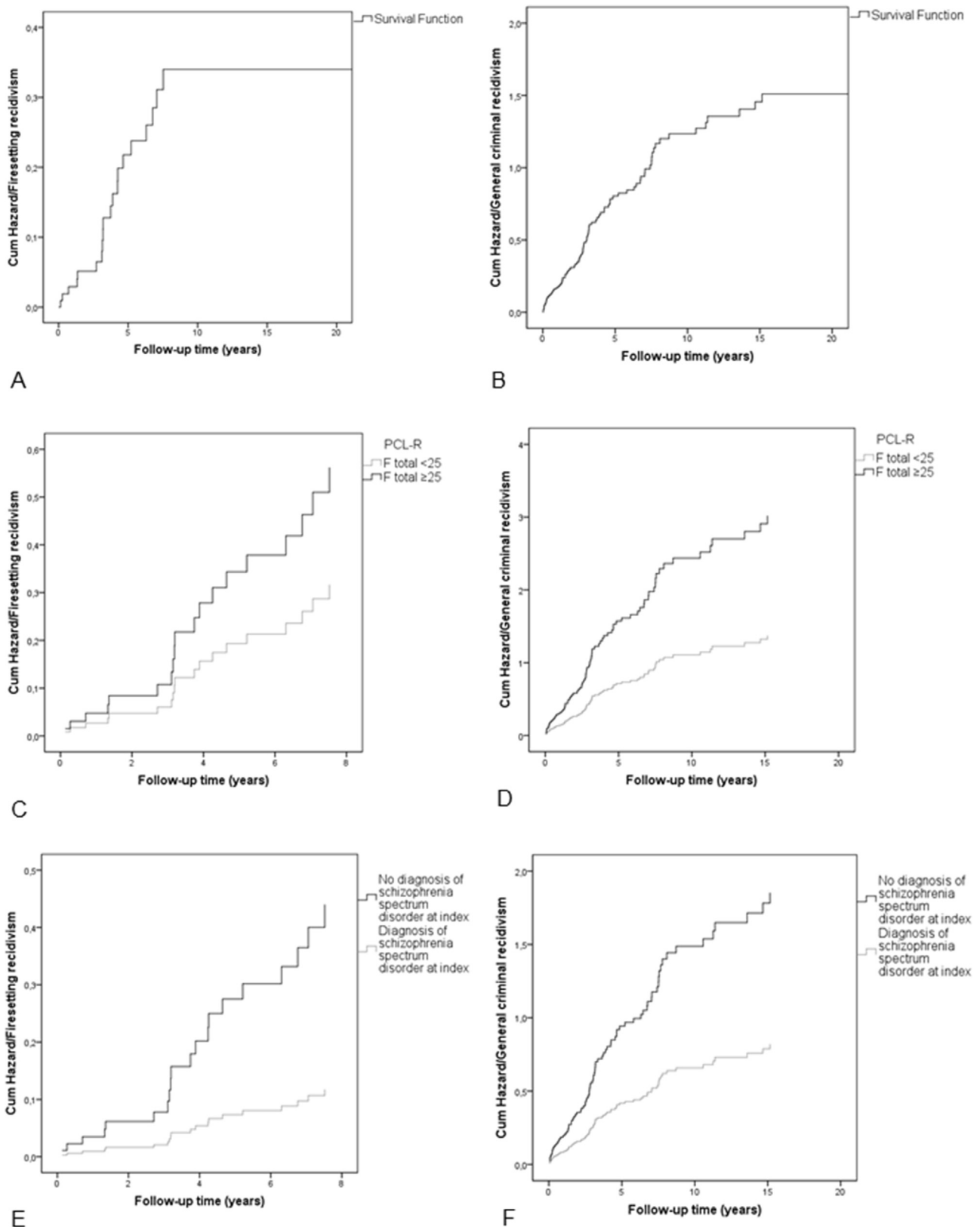


Fig. 3. ($n = 113$). (A) Survival curve for firesetting recidivism among firesetters. (B) Survival curve for all criminal recidivism among firesetters. (C) Cox regression analyses of firesetters with high (PCL-R ≥ 25) or low (PCL-R < 25) traits of psychopathy committing new firesetting crimes during the follow-up. The curves do not differ significantly ($-2 \log$ likelihood 154.93, $\chi^2 = 0.84$, degrees of freedom (df) 1, $p = 0.360$). (D) Cox regression analysis depicting firesetters with high or low traits of psychopathy committing any new crimes during the follow-up. The curves differ significantly ($-2 \log$ likelihood 659.57, $\chi^2 = 8.14$, $df = 1$, $p = 0.004$). (E) Cox regression analyses of firesetters with or without an FPE diagnosis of a schizophrenia-spectrum disorder committing new firesetting crimes during the follow-up. The curves do not differ significantly ($-2 \log$ likelihood 160.97, $\chi^2 = 3.60$, $df = 1$, $p = 0.058$). (F) Cox regression analysis of firesetters with or without an FPE diagnosis of a schizophrenia-spectrum disorder, depicting the cumulative hazard of committing any crime during the follow-up. The curves differ significantly ($-2 \log$ likelihood ratio 688.35, $\chi^2 = 7.57$, $df = 1$, $p = 0.006$).

et al. (2005) and Edwards and Grace (2014), reporting that 76% and 79.3%, respectively, of arsonists reoffended with any crime during follow-up. The subjects of Stoa et al. (2005), Ducat et al. (2015), and Edwards and Grace (2014) were persons who had been convicted, whereas our subjects had undergone an FPE to determine their psychopathology and criminal responsibility. The majority of our subjects were diagnosed with one or more psychiatric condition, and only one person (0.9%) was not given a psychiatric diagnosis. Hence, our subjects resembled those of Rice and Harris (1996), who found a recidivism rate involving new firesettings of 16% among mentally disordered firesetters. Alcohol-use disorders were highly prevalent in our sample, too. Substance use and personality disorders also turned out to be significant risk factors for reoffending behavior in an Australian study among 1264 released prisoners (O’driscoll et al., 2012). Thus, the high rate of reoffending by deliberately causing fires could be attributable to the more serious psychopathology in our sample.

Property offenses made up 48% of all crimes in our study, and violent crimes comprised the second largest offence group with 15% of all crimes. It was reported in a Finnish study on arsonists conducted by Stoa et al. (2005) that 58% of arsonists committed property offenses and 49% committed violent crimes during follow-up. Our numbers were almost identical: as many as 56% of the firesetters committed property offenses and 49% committed violent crimes. Furthermore, of the 57 exclusive firesetters at index day, only two reoffenders remained exclusive throughout the follow-up. Pyromania, an impulse-control disorder affecting individuals who repeatedly fail to resist impulses to deliberately start fires, turned out to be a rare diagnosis (5.3%), as previously reported by Lindberg et al. (2005). We were not able to show that an interest in fire in itself led to a shorter delay or a higher frequency of further firesetting. However, given the low number of pyromaniacs, further studies with larger samples are obviously needed.

There is a subgroup of firesetters with accentuated psychopathic traits (Thomson et al., 2015). Our hypothesis that firesetters with elevated traits of psychopathy would reoffend more often than those with fewer psychopathic traits was only partly supported. We were not able to find a significant difference in firesetting-recidivism rates, but the risk for any crime was significantly higher in those with elevated levels of psychopathy. Psychopathic criminals are typically versatile (Thomson et al., 2015; Campbell et al., 2004), they begin their criminal activities at a relatively young age, and they continue to engage in these activities throughout their lives (Forth and Burke, 1998). They are also reported to reoffend more quickly and more often following release from custody than other offenders (Salekin et al., 1996). A psychopathic character is related to poor treatment compliance and a high dropout rate (O’Neill et al., 2003; Spain et al., 2004), which most probably explains the high reoffending rates.

Barnett et al. (1999) reported an arson-relapse rate among mentally disordered arsonists of 9–10% for those with diminished or no responsibility compared with four percent for those with full responsibility. Contrary to this and to our hypothesis, we were not able to find a significant difference in firesetting recidivism between firesetters with and without a schizophrenia-spectrum disorder. With respect to general criminal recidivism, firesetters with such a disorder turned out to be, less likely to reoffend than those with non-psychotic disorders, mostly personality disorders. This finding could be attributable to the fact that all the individuals with a schizophrenia-spectrum disorder were pronounced criminally irresponsible and sent for involuntary psychiatric treatment, which in Finland typically lasts several years. Hence, their reoffending possibilities were limited. Most non-psychotic persons were sent to prison: in Finland, prison sentences for firesetting crimes are typically shorter than involuntary hospital treatment periods for forensic patients. It is also possible that adequate psychosis treatment diminished reoffending. Igoumenou et al. (2015) found in their recent study that prisoners with current symptoms of schizophrenia reoffended more quickly following release than those without these symptoms. However, treatment with antipsychotic medication

significantly delayed time to violence, by 18%.

4.1. Strengths and limitations

Our data consisted of a consecutive sample of firesetters from a single Finnish forensic psychiatric ward specialized in FPEs. The Finnish tradition of a thorough FPE as well as reliable diagnoses of psychotic disorders (Isohanni et al., 1997; Pihlajamaa et al., 2008) and statistics constitute a solid basis on which to conduct register-based studies such as this one. All residents of Finland are identified by a social security code, for example, which enables reliable identification across different registers. Moreover, the median follow-up period was substantial, almost 17 years. However, the sample consisted of pretrial offenders, and was not representative of firesetters in general: it has been estimated that around 10% of suspected firesetters in Finland are evaluated in an FPE (Rasanen et al., 1995). Unfortunately, no females were included in this study, which was conducted in an all-male ward. It is known that firesettings are more common among males (Gannon and Pina, 2010; Hoertel et al., 2011), although females engage in the activity almost as frequently in psychiatric settings (Hollin et al., 2013). There are some indications that females may even be more prone to repeat firesetting than males (Tyler et al., 2015). We did not have access to data about the length of firesetters’ convictions (non-psychotic offenders) or involuntary psychiatric hospital treatments (offenders with schizophrenia-spectrum disorders) related to a firesetting crime. Thus, we were not able to subtract the time spent in prison/hospital from the total follow-up time. Staying in prison or a psychiatric hospital protects those involved from criminality, thus our results related to recidivism might rather be considered underestimates.

Firesetters with an IQ < 70 were omitted from the PCL-R analyses given the questionability of its use among individuals with cognitive disability. Although four of the subjects were only 15–17 years old, they were still evaluated on the PCL-R, instead of the Psychopathy Checklist – Youth Version (PCL-YV) (Forth et al., 2003). Moreover, only one experienced forensic psychiatrist evaluated the PCL-R, so no inter-rater reliability was calculated.

4.2. Implications

Firesetters seem to renew their crimes mostly in a versatile way, and the general reoffending rate is high. A high PCL-R score was found to relate to general criminal recidivism. Although various risk factors for criminal recidivism among firesetters are known, using PCL-R ratings might help to identify persons at the highest risk of reoffending. Adequate treatment of psychotic disorders seems to diminish general criminal recidivism. In the future, a prospective follow-up study in which known risk factors are analyzed thoroughly among firesetters with full, diminished and no legal responsibility for their actions, could help to shed more light on the important question of which risk factors are the strongest in terms of firesetting and general criminal recidivism, and how they could be addressed in correctional and mental-health services. Neurobiological and molecular genetic research is also needed to enhance understanding of risk and of protective factors for recidivism.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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