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Family Violence and Mental Health among Finnish Health Care Professionals:  
The Mediating Role of Perceived Sleep Quality

## **Abstract**

### **Objective**

The aim of the study was to investigate the prevalence and effects of family violence (FV) among Finnish health care professionals. In addition to analyzing direct connections between different types of FV and mental health, the mediating effect of sleep quality was also taken into account.

### **Methods**

The study followed a cross-sectional design. The sample comprised 1 952 health care professionals from Central Finland, who participated in a survey measuring their health and well-being. The dependent variables were perceived sleep quality and mental health as measured by depressive symptoms and the MHC-SF questionnaire. Data were analyzed using cross-tabulations, ANOVA and structural equation modelling.

### **Results**

41% of the participants reported experiencing FV. The most common forms of abuse were “psychological FV only” and “psychological & physical abuse”. Participants with FV experiences scored significantly worse on depressive symptoms ( $p < 0.001$ ), MHC-SF classification ( $p = 0.008$ ), sleep quality ( $p = 0.001$ ) and emotional ( $p < 0.001$ ), social ( $p < 0.001$ ), and psychological ( $p = 0.008$ ) well-being. The mediation analyses indicated that the harmfulness of FV was at least partially explained by impaired sleep quality.

### **Conclusions**

The results demonstrate that FV experiences are common among Finnish health care professionals and that they significantly affect their mental health. FV should thus be taken into account in seeking to promote the occupational well-being of health care professionals.

The results also suggest that the harmfulness of FV might be mediated by sleep quality. This finding prompts the need for further investigation and FV-related interventions.

*Keywords:* family violence, mental health, sleep, health care professionals, care  
givers

Family Violence and Mental Health in a Sample of Finnish Health Care Professionals:

The Mediating Role of Perceived Sleep Quality

### **Introduction**

In this paper, family violence (FV) is defined as close-relationship violence. FV includes intimate partner violence but can also refer to abuse between parents and children, between siblings and between former partners. Although there is much variation in the terms and definitions used in the scientific literature, FV is clearly a major public health issue that affects the well-being of numerous people around the world. According to the World Health Organization, FV can be physical, sexual or psychological (1). The prevalence of adulthood FV seems to be somewhat higher in Finland than elsewhere in Europe (2, 3) with as many as 17% of Finnish women and 16 % of men reporting physical or sexual abuse in their current relationship and 42% of women and 22% of men reporting abuse in a previous relationship (4). Additionally, 53% of Finnish women have reported experiencing psychological FV during their lives (3). No corresponding data currently exist on men. Recent years have witnessed a significant decrease in FV experienced by Finnish children (5) whereas in earlier decades the prevalence of childhood psychological or physical FV was as high as 70% (6). Thus, experiences of childhood FV are common among Finnish adults.

The effects of life-time exposure to family violence include injuries and various physical symptoms, depression, posttraumatic stress disorder (PTSD), anxiety, suicidal tendencies, impaired sleep quality, substance abuse and social dysfunction (7, 8, 9, 10, 11). It is also noteworthy that mental health symptoms resulting from FV can be harmful even at the sub-diagnostic level (12). All these related physical and psychological health issues mean that people with FV experiences are more likely than non-victims to use health care services (1). It should also be noted that many patient groups, such as pregnant women and psychiatric patients, are especially vulnerable to FV victimization (2). Health care

professionals could thus potentially play a major role in both recognizing and treating the consequences of FV.

However, studies have also indicated that health care professionals' personal FV experiences may affect their recognition of FV and level of care in FV cases, as well as their general work performance and well-being (13, 14, 15). Despite these connections, only a few studies have investigated FV experiences among health care professionals themselves. In these studies, the overall life-time prevalence of FV has been found to be over 20% in Finland and Sweden (15, 16) and 38-39% in other countries (17, 18). Studies distinguishing between different forms of FV among health care professionals have reported prevalence rates of 13-25% for physical or sexual abuse, 7% for specific sexual abuse and 14-42% for emotional abuse (16, 19, 20). To our knowledge, no studies have reported on the prevalence of different types of FV among Finnish health care professionals.

The health effects of FV are long-term and may persist for years or even decades after the abuse has ended (7, 9). This seems to be especially true in the case of mental health symptoms (7), although the reason for this remains unclear. A growing body of studies has also highlighted the adverse effects of psychological abuse in comparison to physical or sexual abuse (10), whereas others have emphasized abuse severity and the co-occurrence of different types of FV (7). But since most of the research on the subject has focused on finding direct correlations between FV and different well-being variables, the mechanisms underlying these discrepancies in research findings remain unknown. More complex analytical models could potentially yield valuable new insights on the subject as well as new interventional methods. For example, there has been a call for more research on the link between FV and sleep quality (21, 22).

### **Theoretical framework**

Three possible pathways between FV, sleep quality and mental health have been identified. First, both psychological and physical FV have been shown to be strongly associated with decreased sleep quality. FV experiences have been linked with greater frequency of nightmares, difficulty in falling asleep, reduced sleep length, higher usage of sleep medication, more sleep disturbances, lower sleep efficiency and lower perceived quality of sleep (7, 11, 23, 24). A recent study by Miller-Graff and Cheng (25) suggests that sleep disturbances are a regulatory stress response that is most strongly associated with recent FV. However, abusive experiences in childhood have also been found to affect sleep quality either directly or indirectly (11, 25). Severity of abuse has also been associated with poorer sleep quality (26). These findings are in line with existing psychobiological theories that attribute sleep problems to disturbed neurobiological activity resulting from an acute threat (27, 28).

The second pathway connecting FV, sleep and mental health derives from the general importance of sleep for well-being. Sleep problems are associated with various health issues, such as cardiovascular and metabolic disorders, depression, anxiety, substance abuse and decrease in perceived quality of life (29, 30, 31, 32). Dolsen et al. (29) argue in their review that sleep problems are not only a comorbid symptom of various mental health disorders, such as depression, but also a separate transdiagnostic process that is related to mental health problems either causally or bidirectionally. This conclusion is supported by longitudinal studies showing that sleep problems both precede mental health disorders and expose people to them. Additionally, Dolsen et al. (29) state that while sleep-specific treatments have successfully alleviated comorbid mental health symptoms, disorder-specific treatments appear not to have had a similar effect on sleep problems.

The third potential pathway is the possible mediating effect of sleep quality on FV and mental health. Abused women have reported that FV has severely affected their sleep quality and that loss of sleep in turn has caused them various health problems and also

affected their ability to cope with FV (33). Some statistical evidence has been adduced for this mediation effect, although research on the phenomenon is scarce. For example, impaired sleep quality has been reported to influence the effects of generally violent or stressful experiences on mental health outcomes, such as depression and PTSD (22, 34). In one of the few studies focusing solely on FV, Pigeon et al. (35), in a sample of women exposed to FV, found that when adjusted for socio-demographic factors, abuse severity and PTSD symptoms, poor sleep quality significantly increased the risk for depressive symptoms. A large population-based study by Lalley-Chareczko et al. (36), in turn, concluded that the adverse mental health effects of exposure to physical or sexual violence or threats by an intimate partner were mediated by sleep quality, regardless of whether the violence was measured as life-time or past-year prevalence. In contrast, a study by Hernandez-Ruiz (37) provided somewhat mixed results, concluding that while music therapy effectively reduced anxiety levels and improved the sleep quality of sheltered FV survivors, the changes in these two outcome variables were not correlated.

Studies linking FV and sleep could help explain the mechanisms through which FV affects mental health and well-being. This knowledge could also facilitate the identification of violent experiences that might be causing sleep problems and lead to new possibilities for FV-related interventions. The preliminary and partially contradictory findings of the existing studies call for more research on the topic.

### **The current study**

This study aimed to contribute to the literature on two different fronts. The first was to investigate the prevalence of FV and its effects on well-being among Finnish health-care professionals. The second was to add to the existing research-based knowledge on the connections between FV, sleep quality and mental health by exploring the possible mediation effect of sleep quality between FV and mental health. The specific research questions were:



- 1) How common are experiences of physical, sexual and psychological FV in the present sample of Finnish health care professionals?
- 2) Are FV experiences significantly associated with mental health outcomes?
- 3) Are the possible associations between FV and mental health mediated by sleep quality?

## **Method**

### **Procedure**

The data used in this study were originally collected in May 2010 as a part of a project promoting health and occupational well-being among employees of the Central Finland Health Care District (38). The data collection originated from the health care district's 2009-2013 action plan for health promotion. Although FV was not a special interest in this action plan, a few items addressing the issue were included in the study. A link to an anonymous web-based questionnaire with an accompanying cover letter was sent to all employees who at the time of the study had an official e-mail address provided by the health care district. In addition, printed questionnaires were delivered to some workplaces. The 52-item questionnaire measured the health, well-being and lifestyle of the participants, mainly with multiple-choice items with yes/no or Likert-scale response options. The items of interest for the present study were those measuring FV experiences, depressive symptoms, general mental health and sleep quality. The study was approved by the ethical committee of the Central Finland Health Care District.

### **Participants**

A total of 1 952 persons, accounting for 54% of all the employees of the health care district, participated in the study. The sample demographics are displayed in Table 1. The approximate response rates for the different occupational groups were 45% for

physicians, 69% for nurses, 77% for the occupational group other 1 and 59% for the group other 2.

[Table 1]

## Measures

**Family violence.** Participants were asked if they had ever experienced a) psychological, b) physical, or c) sexual FV. Three response options were given for each item: “yes”, “don’t know” and “no”. Only the “yes” and “no” answers to each of the three items were included in the statistical analyses.

**Depressive symptoms.** Depressed mood was measured by three items: 1) “During the past two weeks, have you often been bothered by feeling down, depressed, or hopeless?” 2) “During the past two weeks, have you often been bothered by feeling little interest or pleasure in doing things?” and 3) “Do you need help regarding these issues?” All questions were dichotomous, with yes/no answer options. The first two questions follow the preliminary screening criteria for depression recommended by the Finnish Medical Society Duodecim and the Finnish Psychiatric Association (39). In this study, a participant was labeled as experiencing depressive symptoms if he/she had answered “yes” to either of these two questions and in addition felt a need for help. This definition was used to identify sub-clinical symptoms of depression in a sample that was known to have a relatively high level of well-being (38). A Cronbach’s alpha resulted in a value of 0.70, indicating reasonable internal reliability for these three items. Additionally, deletion of any of the items would have resulted in a lower alpha value.

**Mental health continuum short form (MHC-SF).** The MHC-SF scale developed by Keyes (40) was used as a measure of general mental health. The internal reliability of the MHC-SF scale has been found to be high (>0.80) and it has been validated in several countries (40). The MHC-SF comprises 14 items distributed in three clusters of *emotional*,

*social and psychological well-being*. The response options for all items were “never”, “once or twice”, “about once a week”, “about 2 or 3 times a week”, “almost every day” and “every day”. The responses were coded from 0 to 5, respectively. According to the criteria provided by Keyes (40), participants were first coded into three categories of mental health:

*flourishing, moderate and languishing*. To be labeled as flourishing, a person must have answered “every day” or “almost every day” to at least one item in the first cluster and to a total of at least six items in the other two clusters. Accordingly, if a person answered “never” or “once or twice” to at least one item in the first cluster and to at least six items in the other two clusters, he/she was labeled as languishing. If the criteria for either of these two categories were not met, the person was labeled as having moderate mental health. Mean scores were also calculated for emotional, social and psychological well-being by dividing each total cluster score with the number of items on that cluster, resulting in a range of 0.00-5.00. The mean scores and their standard deviations were as follows: emotional well-being ( $M = 4.00, SD = 0.90$ ), social well-being ( $M = 3.09, SD = 1.06$ ) and psychological well-being ( $M = 3.91, SD = 0.86$ ). The mean scores were z-standardized and used as separate outcome variables in further analyses.

***Sleep quality.*** In the original questionnaire, perceived sleep quality was measured by seven items, which had five Likert-scale response options ranging from “Completely disagree (1)” to “Completely agree (5)”. The seven items, Q1-Q7, are displayed in Table 2.

Confirmatory factor analysis (CFA) was performed using Mplus 8 (41) to find out whether the seven sleep-related items could be compressed into one variable for further analyses. The number of missing data patterns for the CFA was 6, resulting in a sample size of 1 946. The initial model, in which only factor loadings, factor variance and residual variances were included, did not show sufficient goodness-of-fit (RMSEA=0.14, CFI=0.88, TLI=0.82 and SRMR=0.06). According to the modification indices, covariances between the items were

included in the model until a satisfactory model fit was reached. The six residual covariances included were: Q1 with Q2 & Q3; Q7 with Q5, Q6 & Q3; and Q4 with Q6. The final model showed good fit (RMSEA=0.59, CFI=0.99, TLI=0.97 and SRMR=0.02). The factor loadings for each item are presented in Table 2. The factor scores were saved and z-standardized for further analyses.

### **Statistical Analysis**

Statistical analyses were conducted using Mplus 8 and SPSS 24. In SPSS, missing data were excluded listwise. In Mplus, full-information maximum likelihood estimation (FIML) was used to capitalize on all available data. In FIML, missing values are assumed to be missing at random (MAR). The possibility for participants to skip questions in the questionnaire resulted in a listwise missing rate of 0.9% across all participants and all variables of interest.

The variables used in this study were not normally distributed, and thus the initial correlations between them were calculated using Kendall's Tau correlation coefficient. Due to some small cell counts, the cross tabulations used to analyze the connections between FV and the categorical dependent variables were performed using Monte Carlo simulation. Connections between FV and the continuous dependent variables were studied by one-way ANOVAs. The assumption of homogeneity of variances was not met for the variables measuring sleep quality, emotional well-being and psychological well-being. Thus, the ANOVAs were performed using bias-corrected bootstrapping (1000 iterations with 95% confidence intervals (CI)).

After establishing the direct effects between FV, sleep and mental health outcomes through ANOVAs and crosstabs, the possible mediation effects between these variables were analyzed by constructing mediator models with Mplus, using structural equation modeling (SEM). Different FV groups were recorded as dummy variables with the

“no violence” group as the reference group in the SEM analyses. For the continuous mental health variables (MHC-SF cluster scores), the significance of mediation paths was tested by generating bias-corrected bootstrap confidence intervals (1000 iterations, 95% CI) for indirect effects, as suggested by Preacher & Hayes (42). For the categorical mental health variables (depressive symptoms and MHC-SF classification), bootstrapping was not possible, and thus the corresponding mediator models were constructed using a Bayesian estimator (4000 iterations with 95% credibility interval (CR)). The Bayesian estimator uses the probit link function to explain the dependent variable and handles the missing data in the same way as FIML.

Initial correlations between all the study variables are presented in Table 3. In the first step of specifying the mediator model, all covariates that correlated significantly with the respective dependent variable and/or sleep quality were included in the model. Next, non-significant covariate paths were removed from the model one by one starting from the variable with the highest *p*-value until the model included only significant covariate paths. For models including continuous dependent variables, the goodness-of-fit of the final model was evaluated using the RMSEA, CFI, TLI and SRMR measures. For the categorical mediator models, goodness-of-fit was evaluated using Bayesian posterior predictive checks (43).  $R^2$  values were reported as a measure of effect size. In the categorical mediator models, the  $R^2$  values were calculated for the latent continuous dependent variable  $y^*$ , which has a linear relationship with the independent variable  $x$  (44).

[Table 3]

## Results

A total of eight different combinations of FV were identified in the data and are presented in Table 4. The two smallest groups, “physical & sexual FV” and “sexual FV only”, contained so few cases that they were omitted from all further statistical analyses.

Cross tabulation showed a significant gender difference within the FV groups ( $\chi^2(7) = 40.31$ ,  $p < 0.001$ ). As can be seen from the adjusted residuals displayed in Table 4, the number of women was significantly lower in the “no violence” group and significantly higher in the groups “psychological FV only”, “psychological & physical FV” and “psychological, physical & sexual FV”. However, in the further statistical analyses, specific gender comparisons were not made as the sample contained only two men who had reported sexual FV.

[Table 4]

### **Family Violence and Well-Being**

The associations between FV and the categorical mental health variables are presented in Table 5. Cross tabulations revealed significant differences between the analyzed FV groups in both depressive symptoms ( $\chi^2(5) = 22.24$ ,  $p < 0.001$ ) and MHC-SF classification ( $\chi^2(10) = 23.73$ ,  $p = 0.008$ ). As can be seen from the adjusted residuals, the participants with no experiences of FV scored better on both measures, reporting significantly less depressive symptoms and a higher MHC-SF classification. “Psychological FV only” was the only group associated with more depressive symptoms as well as a lower MHC-SF classification, whereas “physical FV only” showed no statistically significant connections with these measures. For the other FV groups, the results were more inconsistent, with “psychological & physical FV” and “psychological & sexual FV” showing a significant link with depressive symptoms but not with the MHC-SF classification. All three FV types combined were, in turn, significantly associated with a lower MHC-SF classification but not with depressive symptoms.

[Table 5]

One-way ANOVAs were conducted to investigate the effect of FV on sleep quality and the MHC-SF cluster scores. The results and post-hoc group comparisons are presented in Table 6. The ANOVAs showed a statistically significant difference between the six FV

groups for both sleep quality ( $p = 0.001$ ), emotional well-being ( $p < 0.001$ ), social well-being ( $p < 0.001$ ) and psychological well-being ( $p = 0.008$ ). The effect sizes for these models were small ( $\eta^2 = 0.008-0.015$ ). Tukey post-hoc tests with Bonferroni correction revealed a significant difference between the “no violence” and “psychological FV only” groups in sleep quality ( $p = 0.001$ ), emotional well-being ( $p = 0.001$ ), social well-being ( $p < 0.001$ ) and psychological well-being ( $p = 0.031$ ). In addition, the “psychological, physical & sexual abuse” group differed significantly from the “no violence” group in emotional well-being ( $p = 0.041$ ). Other differences between the FV groups were not statistically significant.

[Table 6]

### **Sleep as a Mediator**

The mediator models used for testing the relationships between FV, sleep and mental health variables are outlined in Figure 1. *Path a* represents the direct effect of independent variables X on sleep quality and *path b* the direct effect of sleep quality on dependent mental health variables Y. The indirect *path a\*b* represents the effect of X on Y through the mediating variable M. The total causal effect of X on Y is composed of the indirect effect and the direct effect of X on Y (*path c'*).

The hypothesized mediation effects were tested separately for each dependent variable. The categorical covariates included in the initial mediator models were age and form of employment for depressive symptoms; gender, age, form of employment and occupation for MHC-SF classification; age, form of employment and occupation for emotional and psychological well-being and age, form of employment, nature of work, working hours and occupation for social well-being. Of the 25 possible indirect paths (*path a\*b*), only those including the groups “psychological FV only” and “psychological & physical FV” yielded significant results. Additionally, the group “psychological, physical & sexual FV” had a significant direct effect on MHC-SF classification and emotional well-

being, but these effects were not mediated by sleep quality. These final mediator models with their path coefficients, significant covariates and goodness-of-fit indices are presented in Figures 2-6. The indirect effects are displayed in Table 7. The mediation models explained 12-21% of the variance in dependent variables. For depressive symptoms, both mediation effects were partial since the direct paths  $c'$  remained significant after controlling for the indirect effect. For MHC-SF classification, both mediation effects were complete since the direct paths  $c'$  became insignificant. For emotional, social and psychological well-being, the mediation effects were partial for the group “psychological FV only” and complete for “psychological & physical FV”.

[Figure 1]

[Figure 2]

[Figure 3]

[Figure 4]

[Figure 5]

[Figure 6]

[Table 7]

## Discussion

### Principal Findings

The first aim of this study was to investigate the prevalence and effects of FV in a sample of health care professionals. The total prevalence rate of FV in this sample was 38%, which is somewhat higher than previously found among Scandinavian health care professionals (15,16) but not as high as the total prevalence of FV in Finnish population-based samples (3, 4, 6). The present findings thus indicate that FV is a common issue among Finnish health care professionals. However, since the present data were collected in only one hospital



district, further studies are needed to ascertain whether FV experiences are equally as common among health care professionals elsewhere in Finland. The present participants with a history of FV reported more depressive symptoms, scored worse on the MHC-SF scale and rated their sleep quality lower than those who reported never experiencing FV. The most significant contributor to these negative effects was psychological abuse, which alone was significantly associated with all outcome variables used in the study. For other forms of FV the results were more inconsistent. These findings are compatible with previous studies emphasizing the adverse effects of FV and especially psychological abuse (10).

The second aim of the study was to investigate whether the harmful effects of FV could be mediated by sleep quality. Previous studies have established that FV has a negative effect on sleep and that sleep quality is in turn associated with physical and mental health (23, 24, 26, 32). In the present study, sleep quality was found to be a significant mediator between FV and depressive symptoms, MHC-SF classification and MHC-SF cluster scores, thus supporting the previous findings by Pigeon et al. (35) and Lalley-Chareczko et al. (36). However, significant mediation effects were found for only two abuse groups, namely “psychological FV only” and “psychological & physical FV”. These differences are interesting and prompt speculation on the possible reasons.

First, it is possible that the proposed mediation model between FV, sleep and mental health is unique to psychological abuse even when it is combined with other forms of FV. This could help to explain the harmfulness of psychological abuse. Previously it has been argued that psychological FV, which includes elements of domination and belittling, could have a more significant impact on the personality of victims than physical or sexual abuse (9). Psychological abuse might also lead to prolonged and cumulative exposure to FV because people experiencing psychological FV might be less likely to seek help – either because they do not see psychological abuse as serious enough or because controlling abuse

limits their access to support (10). Some or all of these mechanisms could be manifested in proposed mediation model. The previous studies conducted on the subject by Pigeon et al. (35) and Lalley-Chareczko et al. (36) did not distinguish between different forms of FV, and hence it is possible that the mediation effects found in these two studies were also mainly related to psychological abuse.

However, the differences found in the present study could also be influenced by additional factors, such as the duration, timing or severity of FV. For example, less recent occurrence of abuse could explain why the mental health effects of all three FV types combined were not mediated by sleep quality, despite the co-existence of psychological abuse in this group. The present findings might also be affected by statistical factors, since “psychological FV only” and “psychological & physical FV” were the most common abuse groups in the sample. This may have caused their effects to be overestimated (type I error) and/or the effects of the other FV groups to be underestimated (type II error). Additionally, while the investigated mediator models were controlled for gender, age, form of employment, occupation, nature of work and working hours, the possibility remains that other variables not included in the present models could have influenced the observed direct or indirect effects. Such potentially mediating or moderating variables identified in previous research include PTSD symptoms, anxiety and physical health (11, 24, 26). Thus, more research is needed to support the present findings as well as explain them.

### **Strengths and Limitations**

The present study is one of the first to investigate FV experiences among Finnish health care professionals, although it should be noted that the topic has thus far received little research attention elsewhere. Gaining more accurate and up-to-date information on health care professionals’ personal experiences of FV is important since such experiences can affect not only their personal health and well-being but also their

performance at work. The present study was also one of the first to analyze the possible mediating effect of sleep on the mental health effects of FV. This is a new and promising direction in FV research. The study design included several measures of mental health and comparisons were made between psychological, physical and sexual FV. SEM provided a powerful tool for estimating the associations and possible mediation effects between the variables of interest. The sample used in the study was large and it provided new insights into how FV affects professionals with a relatively high level of health and well-being. However, the study also has several limitations that need to be addressed.

First, the effect sizes for the direct and indirect effects found were relatively small, which means that the findings on the proposed mediation model should be considered preliminary only. Secondly, the sample used in this study did not enable identification of precisely when the FV had occurred or who the perpetrator was. As a result, participants reporting FV experiences may have had very different abuse backgrounds, rendering the comparability of these experiences debatable. However, as the literature demonstrates, the effects of FV on adult health and well-being are very similar regardless of whether the abuse has been experienced in childhood or adulthood (see e.g. Dillon et al. (7) and Hillis et al. (9)). On the reliability of using a lifetime definition of FV, it can be argued that possible recall bias may lead to under- rather than overestimation (8). Thus, it is likely that a sample comprising only more recent experiences of FV would have produced even more significant effects with larger effect sizes. The same applies to the lack of more specific definitions of FV in the data collection questionnaire, since people do not necessarily recognize all their abusive experiences as FV. This might be especially true for psychological abuse. Another limitation is that owing to the relatively small number of persons reporting physical or sexual abuse in the sample, the comparisons between the different FV groups were not as comprehensive as

they could be. The same is true for the small number of men reporting FV, which made it impossible to perform more detailed gender comparisons within the sample.

### **Policy and Research Implications**

The findings of this study demonstrate that FV can significantly affect the well-being of health care professionals. However, screening and intervention procedures for FV are practically non-existent both among people employed in health care services and in occupational health care settings in general. To more effectively reduce the personal and societal costs of FV, it should be addressed more actively in the context of various low-threshold services, including occupational health care. This is especially important in the case of health care professionals, since processing their own FV experiences could have cumulative positive effects on the extent and modes of treatment provided to patients (13, 14, 15). Health care professionals should thus be made more aware of the adverse effects of FV, educated in the recognition and treatment of FV and supported in dealing with their own experiences of FV.

The present study also provides interesting implications for FV-related interventions. The mediation effects found suggest that the mental health of FV survivors could be improved by focusing on their sleep quality. This could be a new and relatively straightforward and practical way of helping people who suffer from the adverse consequences of FV, although other supportive and preventive measures remain greatly needed to reduce the prevalence and harmful effects of FV. Sleep-related interventions have been shown to be successful among other populations with mental health issues (29), while few treatment trials targeted specifically to FV survivors have also been conducted or are in process (37, 45). However, further studies on the subject are needed before more precise suggestions and recommendations for FV-related interventions can be made. Future studies on the subject should include a population-based sample, more precise definitions regarding

the severity, perpetrators and timing of FV, and additional measures of mental health and well-being.

### **Conclusions**

The purpose of this study was to contribute to the literature on FV and to examine its consequences for mental health among health care professionals. The findings demonstrate that FV experiences have a significant effect on the well-being of health care professionals. To reduce both the personal and financial costs resulting from impaired mental health and well-being, FV should be regarded as one health risk among others and addressed more effectively in occupational health care settings and other low-threshold services. The present study also provided a possible explanatory mechanism for the adverse effects of FV, namely the mediating effect of sleep quality. These findings point to interesting possibilities for services aimed at helping FV survivors; for example, interventions focusing on sleep quality could help to attenuate the adverse consequences of FV. However, more research is needed to fully establish the connections between FV, mental health and sleep quality found in this study.

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### **Author contribution**

All authors contributed to the study design. MH contributed to data collection. HS contributed to the statistical analyses and drafting of the manuscript. JH supervised and reviewed the drafting of the manuscript.

### **Ethical approval**

The study was approved by the Ethical Committee of the University of Jyväskylä (20.06.2011) and a research permit for the study was received from the Central Finland Health Care District (10.11.2011).

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Table 1

*Sample demographics (N=1 952)*

	f	%
<b>Gender</b>		
Women	1 684	86.3
Men	268	13.7
<b>Age</b>		
≤ 30	316	16.2
31-40	373	19.1
41-50	623	31.9
51-60	556	28.5
≥ 61	84	4.3
<b>Form of employment</b>		
Permanent	1 463	74.9
Fixed-term	489	25.1
<b>Nature of work</b>		
Full-time	1 778	91.1
Part-time	174	8.9
<b>Working hours</b>		
One-shift	944	48.4
Two-shift	277	14.2
Three-shift or night work	642	32.9
Other	89	4.6
<b>Occupation</b>		

Table 1

*Continued*

	f	%
Doctor	131	6.7
Nurse	1 102	56.5
Other 1	440	22.5
Other 2	279	14.3

*Note.* Other1 = Research and therapy staff, research and therapy assistants, office staff, IT staff. Other2 = Cleaning, cooking, laundry, technical, storage and logistic staff.

Table 2

*Standardized and unstandardized coefficients for CFA*

Item	$\beta$	B	SE
Q1: I get enough sleep	0.65	1.00	-
Q2: I sleep well	0.91	1.38	0.04
Q3: I feel alert when I wake up	0.63	0.96	0.04
Q4: I fall asleep easily	0.62	0.93	0.04
Q5: I sleep without waking up during the night	0.72	1.28	0.06
Q6: I easily fall asleep again if I wake up during the night	0.70	1.08	0.05
Q7: I don't normally wake up earlier than usual (before my alarm clock goes off)	0.48	0.87	0.05

*Note.* CFA = Confirmatory factory analysis. SE = Standard error.

Table 3

*Correlations between study variables (N = 1 942)*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender	-												
2. Age	-0.038	-											
3. Form of employment	-0.032	0.378***	-										
4. Nature of work	0.062**	-0.012	0.097***	-									
5. Working hours	-0.009	-0.190***	-0.119***	-0.002	-								
6. Occupation	0.000	0.186***	0.096***	0.020	-0.368***	-							
7. Family violence	-0.137***	0.006	-0.044*	-0.025	0.051*	-0.002	-						
8. Depressive symptoms	0.011	0.001	0.030	-0.036	-0.028	-0.007	0.088***	-					
9. MHC-SF classification	-0.059**	-0.045*	-0.041	-0.006	-0.007	-0.078***	-0.048*	-0.252***	-				
10. Sleep quality	-0.002	-0.084***	-0.077***	0.021	0.002	0.010	-0.066***	-0.197***	0.237***	-			
11. Emotional well-being	-0.031	-0.074***	-0.074***	-0.034	-0.007	-0.052**	-0.055**	-0.225***	0.545***	0.273**	-		
12. Social well-being	-0.033	-0.051**	-0.043*	0.006	-0.036*	-0.065***	-0.067***	-0.163***	0.548***	0.217**	0.422***	-	



Table 3

*Continued*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
13. Psychological well-being	-0.034	-0.062**	-0.082***	-0.018	-0.006	-0.074***	-0.049**	-0.204***	0.622***	0.249**	0.514***	0.493***	-

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 4

*Frequency of FV*

FV type	All ( <i>N</i> = 1 951)	Women ( <i>N</i> = 1 683)	Men ( <i>N</i> = 268)
No violence	62.2 %	59.5% <sup>†</sup>	78.7 % <sup>††</sup>
Psychological only	18.5 %	19.4 % <sup>††</sup>	12.7 % <sup>†</sup>
Psychological & physical	12.3. %	13.1. % <sup>††</sup>	7.1 % <sup>†</sup>
Psychological, physical & sexual	3.6 %	4.2 % <sup>††</sup>	0.4 % <sup>†</sup>
Physical only	1.8 %	2.0 %	0.7 %
Psychological & sexual	1.2 %	1.3 %	0.4 %
Physical & sexual <sup>a</sup>	0.1 %	0.1 %	-
Sexual only <sup>a</sup>	0.4 %	0.4 %	-

<sup>a</sup>Excluded from further analyses

<sup>†</sup>Adjusted residual  $\leq -2.0$ . <sup>††</sup>Adjusted residual  $\geq 2.0$

Table 5

*FV, depressive symptoms and MHC-SF classification*

FV type	Depressive symptoms	MHC-SF classification		
	(N = 1 940)	(N = 1 934)		
		<i>Flourishing</i>	<i>Moderate</i>	<i>Languishing</i>
No violence	5.0 % <sup>†</sup>	68.8 % <sup>††</sup>	30.3 %	0.9 % <sup>†</sup>
Psychological only	9.4 % <sup>††</sup>	63.3 %	32.8 %	3.9 % <sup>††</sup>
Psychological & physical	11.3 % <sup>††</sup>	67.1 %	30.0 %	2.9 %
Psychological, physical & sexual	8.5 %	54.9 % <sup>†</sup>	42.3 % <sup>††</sup>	2.8 %
Physical only	5.7 %	71.4 %	25.7 %	2.9 %
Psychological & sexual	17.4 % <sup>††</sup>	62.5 %	34.8 %	0.0 %

<sup>†</sup>Adjusted residual  $\leq -2.0$ . <sup>††</sup>Adjusted residual  $\geq 2.0$

Table 6

*ANOVA analyses for sleep quality and MHC-SF cluster scores*

Variable	FV 1		FV 2		FV 3		FV 4		FV 5		FV 6		<i>F</i>	(df1, df2)	<i>p</i>	$\eta^2$	<i>N</i>
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)					
Sleep quality	-0.17	(1.07)	-0.08	(1.01)	-0.13	(1.01)	-0.24	(1.18)	0.23	(.93)	0.07	(0.97)	4.44	(1936, 1941)	.001	.011	1 942
Emotional well-being	-0.18	(1.09)	-0.22	(1.06)	-0.29	(1.16)	-0.14	(1.19)	0.20	(.80)	0.07	(0.94)	5.09	(1928, 1933)	.000	.013	1 934
Social well-being	-0.18	(0.99)	-0.09	(1.01)	-0.26	(1.10)	-0.03	(1.00)	0.26	(1.01)	0.08	(0.98)	5.77	(1928, 1933)	.000	.015	1 934
Psychological well-being	-0.12	(1.07)	-0.07	(1.05)	-0.25	(1.28)	0.04	(0.85)	0.02	(.94)	0.06	(0.95)	3.15	(1928, 1933)	.008	.008	1 934
<i>Continued</i>																	
	Sleep quality				Emotional well-being				Social well-being				Psychological well-being				
Pairwise comparisons	FV 6 > FV 1				FV6 > FV 1, FV 3				FV 6 > FV 1				FV 6 > FV 1				

*Note.* Pairwise comparisons column shows which group differences are statistically significant at  $p < .05$  (with Bonferroni correction).

FV 1 = Psychological only. FV 2 = Psychological & physical. FV 3 = Psychological, physical & sexual. FV 4 = Psychological & sexual.

Table 6

*Continued*

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*Note.* FV 5 = Physical only. FV 6 = No violence.

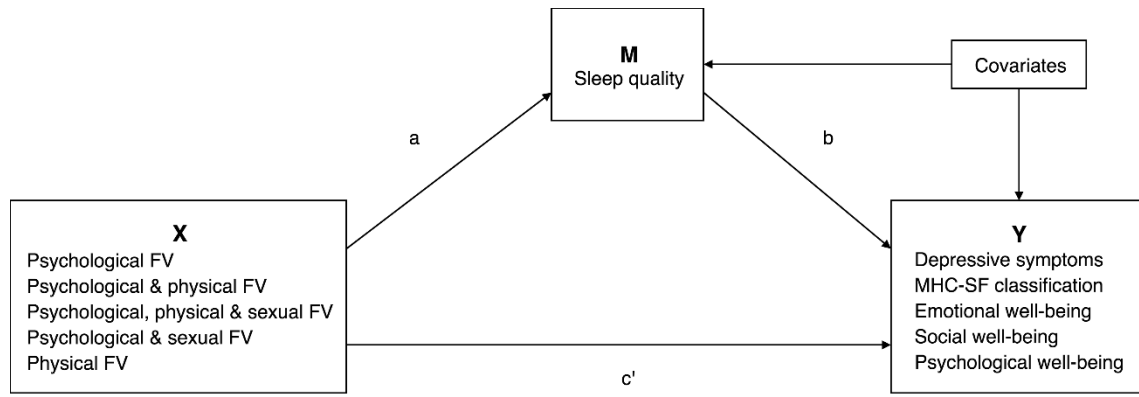
Table 7

*Standardized indirect effects within the final mediation models*

	Depression <sup>a</sup>		MHC-SF classification <sup>a</sup>		Emotional well-being		Social well-being		Psychological well-being	
	Estimate	[95% CR]	Estimate	[95% CR]	Estimate	[95% CI]	Estimate	[95% CI]	Estimate	[95% CI]
Psychological FV	0.11	<b>[0.06, 0.17]</b>	-0.09	<b>[-0.14, -0.05]</b>	-0.03	<b>[-0.05, -0.02]</b>	-0.03	<b>[-0.04, -0.01]</b>	-0.03	<b>[-0.05, -0.01]</b>
Psychological & physical FV	0.07	<b>[0.01, 0.13]</b>	-0.06	<b>[-0.12, -0.01]</b>	-0.02	<b>[-0.04, -0.00]</b>	-0.02	<b>[-0.03, -0.00]</b>	-0.02	<b>[-0.03, -0.00]</b>
Psychological, physical & sexual FV	-	-	-0.08	[-0.16, 0.01]	-0.01	[-0.03, 0.00]	-	-	-	-

*Note.* CR (credibility interval) and CI (confidence interval) ranges in bold are statistically significant.

<sup>a</sup>Non-standardized values



Note: Total effect  $c = c' + a * b$

Figure 1: The proposed mediation models between family violence, sleep quality and mental health.

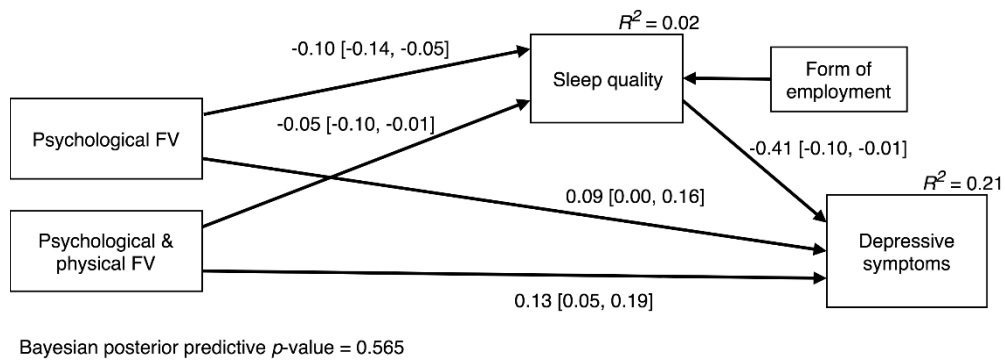


Figure 2: Final mediation model for depressive symptoms with standardized Bayesian estimates and 95% credibility intervals of the estimates.

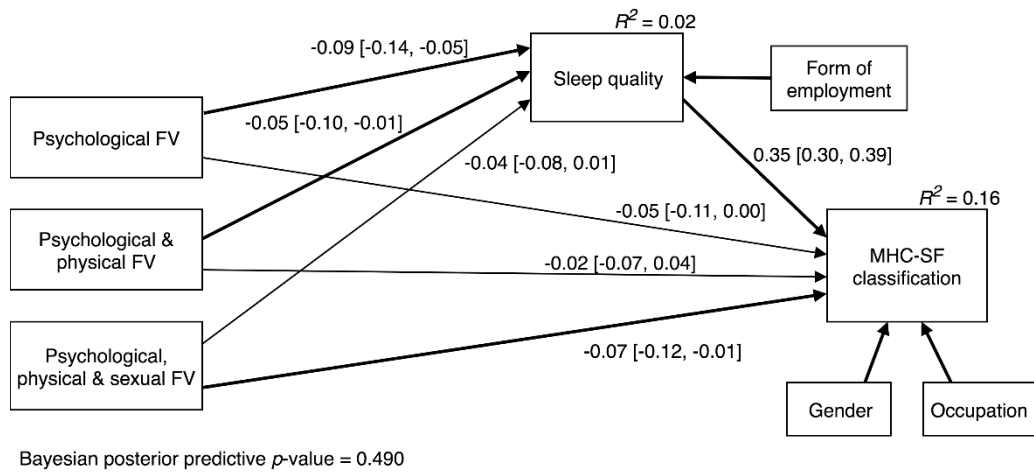


Figure 3: Final mediation model for MHC-SF classification with standardized Bayesian estimates and 95% credibility intervals of the estimates.

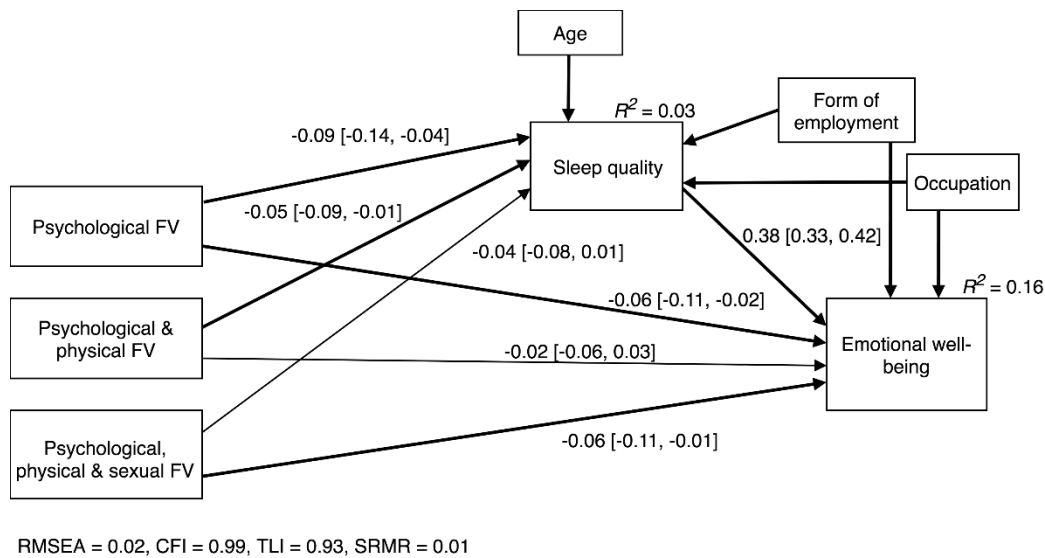


Figure 4: Final mediation model for emotional well-being with standardized bias-corrected bootstrap estimates and 95% confidence intervals of the estimates.



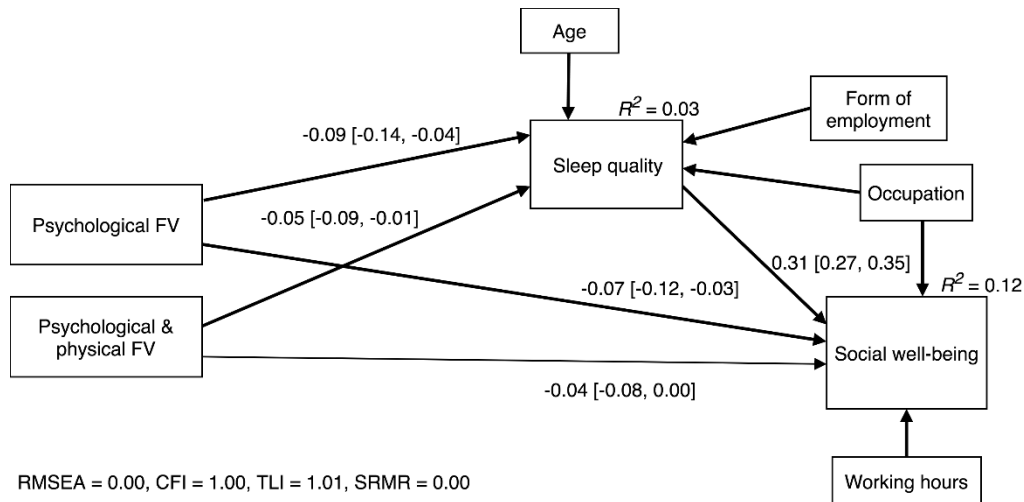


Figure 5: Final mediation model for social well-being with standardized bias-corrected bootstrap estimates and 95% confidence intervals of the estimates.

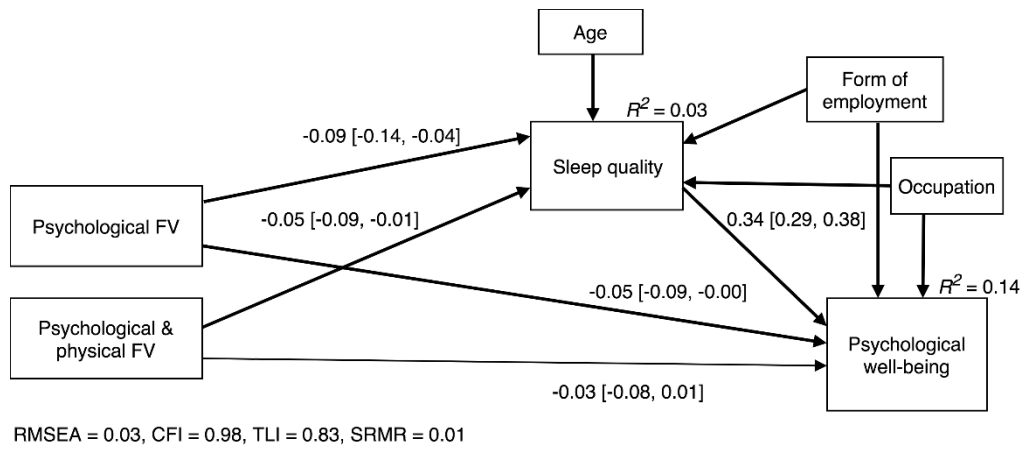


Figure 6: Final mediation model for psychological well-being with standardized bias-corrected bootstrap estimates and 95% confidence intervals of the estimates.

Appendix

Table A1

*MHC-SF questionnaire*

Cluster	Items
	“During the past month, how often did you feel...”
Emotional well-being	1. happy? 2. interested in life? 3. satisfied with life?
Social well-being	4. that you had something important to contribute to society? 5. that you belonged to a community (for example at your workplace or a social group)? 6. that our society is becoming a better place? 7. that people are basically good? 8. that the way our society works makes sense to me?
Psychological well-being	9. that you liked most parts of your personality? 10. good at managing the responsibilities of your daily life? 11. that you had a warm and trusting relationships with others? 12. that you had experiences that challenged you to grow and to become a better person? 13. confident to think or express your own ideas and opinions? 14. that your life has a sense of direction or meaning to it?

