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Factors Related to Physical Violence Experienced by Parents of Persons with Schizophrenia
in Japan

Running head: FACTORS RELATED TO FAMILY VIOLENCE IN SCHIZOPHRENIA

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Abstract

Most violence by patients with mental illness is perpetuated against family members rather than the general public. However, there is insufficient research to reach a consensus on factors related to family violence for this population. Thus, the current study aimed to clarify factors related to physical violence by patients with schizophrenia towards their parents in Japan. A self-administrated survey was distributed through family groups to families with a relative with a psychiatric disorder. Questionnaires completed by 400 parents of patients with schizophrenia were analyzed. Of the 400 parents, almost two-thirds experienced “no physical violence” and close to one-third experienced “physical violence” during the past year. Results of a mixed-effects logistic regression revealed that physical violence was significantly related to the patients’ gender (female rather than male), multiple patient hospitalizations (3 or more times as compared to never hospitalized), low annual household income (less than US\$20K as compared to over US\$40K), and higher hostility and criticism of family interactions. Family violence maybe reduced through education on communication strategies for both parents and patients.

Keywords: violence; schizophrenia; mental disorders; caregivers; expressed emotion;

Japan

1. Introduction

In 2002, the World Health Organization (WHO) issued a report declaring the need for a global effort to address violence as a serious public health concern (Krug et al., 2002).

Research on the rate of violence among persons with mental illness, particularly those with schizophrenia, has indicated that there is a higher risk of violence for those with mental illness than for the general population. But this risk is only moderately elevated, especially when substance use or abuse is involved (Walsh et al., 2002; Corrigan and Watson, 2005; Fazel et al., 2009; Fleischman et al., 2014). Furthermore, persons with mental illness are more likely to be victims of violence than to victimize others (Desmarais et al., 2014; Tsigebrhan et al., 2014). In addition, the proportion of violent crimes committed by persons with mental illness is very low, and of those who engage in violence, more than half direct violence toward family members, not strangers (Arboleda-Florez et al., 1998; Steadman et al., 1998; Angermeyer, 2000; Desmarais et al., 2014; Imai et al., 2014). The authors of a recent review on the topic concluded that at least 40% of caregivers have experienced violence by a relative with a severe mental illness (SMI) since the onset of the illness (Labrum and Solomon, 2015). Although the WHO report recommended that public health research on violence become a priority (Krug et al., 2002), research regarding family violence by persons with SMI is limited, due primarily to fears of further stigmatization of those with mental illness (Solomon et al., 2005). It would be useful to examine the factors that are potentially

related to family violence by individuals with SMI in order to prevent this type of violence.

This study employed the conceptual framework of risk of violence against family caregivers by relatives with SMI developed by Solomon and colleagues (2005), which was specifically designed to compensate for the sole reliance in prior research on confining predictors to clinical and sociodemographic characteristics. The risk factors were conceptualized into three categories: characteristics of relatives with psychiatric illness, characteristics of family caregivers, and family caregiver and ill relative relationship factors, as family violence is a complex phenomenon embedded within the family context of the relationship between victim and perpetrator and each person's life history (Solomon et al., 2005). The category characteristics of relatives with psychiatric illness consisted of socio-demographics, clinical characteristics, and psychosocial factors (e.g., living arrangements and medication adherence, history of violence and crime, including victimization). The category of family caregiver characteristics was comprised of socio-demographics, health and mental health status, social support/social network, and history of violence and crime. The category of family caregiver and ill relative relationship factors was comprised of expressed emotion (EE) or psychological aggression, attitudes toward each other, dependency of the ill relative, limit setting by the family caregiver, and contributions by the ill relative or gratification from the ill relative. The variables selected for the present study were based on this framework, while taking into account the culture and

circumstances in Japan regarding this population, as well as on input from representatives of the sample population. The input came from preliminary interviews that were conducted with 14 family members regarding their experiences with violence from their ill relatives with schizophrenia and their assessment of the mental health status of their ill relative. For example, substance abuse was not included due to the fact that only 2% of those with schizophrenia in Japan have a co-morbid substance abuse disorder (Umeno et al., 2008). Similarly, since the rate of physical violent crime in Japan is extremely low (1.1% for 5 years), history of violence and crime was not included either (Research and Training Institute of the Ministry of Justice, 2008). In the case of caregiver characteristics, employment status was not included as the study sample consisted of almost 60% retirees (Zenkaren, 2006). The present study employed a multivariate analysis to compensate for the weaknesses of most prior studies, which primarily used descriptive statistics, with the exception of an older study by Swan and Lavitt (1988) and the research by Chan (2008) and Elbogen et al. (2005).

In Japan, the government has rapidly implemented deinstitutionalization policies despite insufficient community support services (e.g., residential services) (Oshima et al., 2007). Many inpatients return to their parents' home following release. Therefore, family violence has become a more serious issue. To find solutions to family violence, it would be useful to clarify family violence-related factors. The present study focused on patients with schizophrenia, as the majority of patients in inpatient settings in Japan are diagnosed with

schizophrenia (almost 60%) (Ministry of Health Labour and Welfare, 2014). Thus, this population is most impacted by the recent deinstitutionalization policy. Parents are frequently the primary caregivers of these patients, and patients and parents usually cohabitate (Chiba Prefecture Family Association of Persons with Mental Disorders, 2009). Specifically, this study aimed to identify the factors related to parental physical violence committed by patients with schizophrenia.

2. Method

2.1. Participants

The present analysis is part of a larger study entitled, “Japanese Family Violence and Mental Illness” (Kageyama et al., 2015). The objective of the larger study was to assess factors related to family violence among caregivers and siblings of individuals with mental illness. Eligible participants were family members from households belonging to a prefecture-level association (Japan is divided into 47 prefectural administrative entities) of a national family group association “Minna-Net” (formerly “Zenkaren”) for relatives with a psychiatric illness in Japan, similar to the U.S. National Alliance for Mental Illness (NAMI) state organizations. In Japan, Minna-Net is the only national organization of family groups for caregivers of patients with mental illness. Approximately 15,000 households are fee-paying members of the organization. The majority of members are parents (85.1%, mostly mothers) in their 60s

or 70s. Most of them (79.5%) are living with their ill adult child (average age 42, 64.5% male and 35.5% female) with schizophrenia (82.7%) (Minna-Net, 2010). The rate of cohabitation (79.5%) is similar to 80.3% that national survey of persons with mental disorders (Ministry of Health Labour and Welfare, 2013) . Of patients whose family members belong to the national organization, 87.6% have severe grade certificates that signifies severely limited ability for typical activities of daily living, including maintaining a balanced diet, maintaining sanitary conditions, managing finances, and communicating with others without difficulty (Ibaragi family groups association on mental illness, 2007). This rate (87.6%) is somewhat higher than 73.5% found in the national survey (Ministry of Health Labour and Welfare, 2013). The prefecture-level association samples included 866 households (5.8% of all 15,000 households in the national organization) from 27 affiliate family groups.

Based on the judgment of group leaders, leaders distributed questionnaires to 768 households. Each group leader distributed the surveys in person or sent them via mail to each household. Questionnaires were not provided to 118 households due to potential respondents' current health condition or family issues. The reasons for not recruiting certain households were as follows: frail elderly (42), heavy care burden (22), an unknown household issue (15), having mental disorders themselves (10), deceased patient (5), and other (24). A total of 463 parent questionnaires (346 households) of 482 (350 households) returned were sufficiently completed to be considered valid. Mothers comprised 63% of the 463 respondents and fathers

31.8%. The average age was 68.8 years (SD 8.0). The socio-demographic characteristics of this sample did not differ from members of family groups in other prefectures in Japan (Zenkaren, 1997, 2006). Given that the present analysis focused on parents of patients with schizophrenia, we excluded questionnaires returned by parents of patients who had other diagnoses ($n = 39$), respondents other than parents ($n = 21$), and those missing information about patient diagnosis ($n = 4$), relationship to the patient ($n = 1$), and incomplete violence items ($n = 3$). Thus, the final sample size consisted of 400 parents from 295 households (given overlap, $n = 63$ excluded).

2.2. Instruments

All study data were collected from respondents who were parents of patients with schizophrenia. No information was directly obtained from the patients themselves.

2.2.1. Physical violence

Physical violence experienced by parents was the dependent variable. The frequency of the nine acts of physical violence was determined by respondents selecting from *never*, *1–4 times*, and *5 times or more* within the past year. These violent acts were divided into two categories “acts of violence” and “other aggressive acts,” based on the categorization used in the MacArthur Violence Risk Assessment Study (MVRAS) (Monahan et al., 2001). Although the original measure was developed to be employed as an interview, we used it as part of a

self-administered survey for caregivers, similar to other studies (e.g., Labrum and Solomon, 2015). We did not include the sexual assault item from the original measure. The “acts of violence” were operationally defined if violent acts resulted in physical injury or were likely to result in severe injury and were committed by using a weapon or choking. This category included five items: visit to a physician resulting from injury, knife injury, threatening with a knife, beating with a physical object, and choking. The term “other aggressive acts” was operationally defined as violent acts that did not result in injury or were not likely to result in severe injury and were committed without using a weapon or choking; these included four items: destroyed property, pushing, punching and kicking, and throwing an object. Responses were divided into “other aggressive acts only” and “acts of violence.” “Other aggressive acts only” included parents who experienced only “other aggressive acts.” Parents who experienced “other aggressive acts” as well as “acts of violence” were included in “acts of violence.” Finally, all responses were categorized into either “physical violence” (“other aggressive acts only” or “acts of violence”) or “no physical violence” (no experiences in either category).

2.2.2. Variables related to family violence.

The patients’ socio-demographic characteristics included age, gender, and employment status. Clinical characteristics consisted of history of hospitalization (i.e., number since onset of illness). Psychosocial characteristics included living arrangement

(co-habitation with parents or not), medication and treatment adherence (taking medication as prescribed, visiting psychiatrist regularly), mental health service use (rehabilitation service use), and social support/social network (average days a month when talking with others).

The parents' socio-demographic factors included age, gender (i.e., father or mother), and household income. Psychosocial parent factors included health/mental health status, and social support/social network. Mental health status was measured as to whether they visited a psychiatrist for treatment. Physical health was measured as to whether they visited a physician for treatment. Social support/social network was measured as to whether they participated in activities sponsored by family groups.

Parent and patient relationship factors included two aspects of EE, criticism and hostility; attitudes toward each other, and dependence of patient on family caregivers. EE refers to the nature of family interactions, explicitly the existence of hostility, criticism, and emotional over-involvement (Amaresha and Venkatasubramanian, 2012). We measured only criticism and hostility of EE using the Family Attitude Scale (FAS), which is a self-report measure translated into Japanese. The FAS is a 30-item scale with scores ranging from 0 to 120, with higher scores indicating a greater degree of criticism and hostility (Amaresha and Venkatasubramanian, 2012). In Japanese samples, the best cut-off with the highest sensitivity and specificity on the FAS was 59/60, and the reliability and validity of the Japanese version has been established (Fujita et al., 2002). The Cronbach's alpha in this study was 0.95.

Attitude of parent toward the patient was measured as perceived attitude of the parent with the following two items: “The patient is important to me,” and “I think I am respected by the patient.” Item scores ranged from 0 (*strongly disagree*) to 4 (*strongly agree*). Dependence of the patient on the family caregiver was measured by whether the parent informally/formally managed the patient’s money or did not. Most arrangements were informal, as only 2.4% use the official representative payee system in Japan (Chiba Prefecture Family Association of Persons with Mental Disorders, 2009).

2.3. Statistical Analysis

Initially, we calculated the frequency of the nine items regarding physical violence and subsequently calculated the number of parents who experienced “acts of violence” and “other aggressive acts” within the past year. Next, if parents experienced only “other aggressive acts” and never experienced “acts of violence,” they were categorized into “other aggressive acts only.” Independent variables were examined between parents who experienced “no physical violence” and those who experienced “physical violence,” and between parents who experienced “other aggressive acts only” and those who experienced “acts of violence” within the past year. We used *t*-tests for continuous variables, chi-square tests for categorical variables in which each cell had an expected frequency of five or more, or Fisher’s exact test for categorical variables in which one or more cells had an expected

frequency of less than five. The rates of parents who experienced violence were compared to rates when one parent from each household was selected randomly in order to determine whether the rates were different from those when two parents responded from the same household. Finally, to identify factors related to parents' experience of physical violence, we performed mixed-effects logistic regression with household as random effect. Most parents from the same household lived with the same patient and tended to experience violence similarly. As some data were nested within a household, we selected the analysis accordingly. We selected independent variables for inclusion in the model that were related to the dependent variable at the $p < 0.2$ level of significance. We tested for multicollinearity by the variance inflation factor (VIF) and confirmed $VIF < 2$ among selected variables. All analyses were conducted using SAS version 9.4 (SAS, North Carolina, United States).

2.4. Ethical Considerations

The Research Ethics Committee, the Faculty of Medicine, the University of Tokyo approved the study (February 24, 2014; No. 10,415). All participants were informed of the study's aim and that their participation was voluntary. Informed consent was implied through questionnaire completion and return. Although we used identification numbers of the particular family group to which we distributed the questionnaire, we ensured that confidentiality of the collected data and anonymity of respondents were maintained as we did

not use identification numbers or any code that could be linked to a specific household or individual respondent's name. Contact information for agencies that could assist participants who required help pertaining to the experience of violence was provided.

3. Results

Two thirds of the respondents were mothers (66.8%), primary caregivers (67.7%), and most lived with the patient (83.8%). The average age of these respondents was 69.2 years.

Two thirds of the patients were male (63.6%) and their average age was 39 years. Of patients who have disability certificate, 89.6% had severe grades that signifies severely limited ability for typical activities of daily living. The sample characteristics were similar to average family caregivers and their ill relatives of households belonging to the national organization of family groups.

3.1. Physical Violence Experiences

The frequencies of “acts of violence” and “other aggressive acts” are shown in Table 1. Parent respondents who had experienced “acts of violence” and “other aggressive acts” within the past year were 35 (8.8%) and 136 (34.0%), respectively. Of the 136 parents who were categorized into the group “other aggressive acts,” 34 had experienced “acts of violence” as well. Therefore, respondents who experienced “other aggressive acts only” consisted of 102 parents. Of 400 parents, 263 (65.8%) were categorized into “no physical violence” and

137 (34.3%) into “physical violence.” Selection of a parent from each household produced 295 parents, from which 24 parents (8.1%) had experienced “acts of violence” and 105 parents (35.6%) “other aggressive acts.” The categorization of the 295 parents into “no physical violence” and “physical violence” resulted in 190 (64.4%) and 105 (35.6 %) parents, respectively. These rates were similar to rates calculated from the 400 parents. We were concerned that there may be a difference in rates between selecting just one respondent and using both respondents from the same household, as there was a lack of independence between these two respondents, since both were responding with regard to the same patient.

[Insert Table 1 about here]

3.2. Comparisons of Parents With and Without Physical Violence Experience

As shown in Table 2, independent variables were examined between parents who experienced “no physical violence” and “physical violence,” and between parents who experienced “other aggressive acts only” and “acts of violence” within the past year using *t*-tests, chi-square tests, or Fisher’s exact test.

We compared parents who experienced “no physical violence” and “physical violence” on the independent variables, of which 8 variables were significant ($p < 0.05$). Compared to parents who did not experience violence in the past year, parents who did experience violence were more likely to care for patients who were female, were not

competitively employed, were hospitalized three or more times since the onset of the illness, did not use rehabilitation services, and had fewer days of talking to others per month. Parents who experienced violence were also more likely to have a lower household income. In terms of relationships with patients, parents who experienced violence were more likely to have higher hostility and criticism scores on the EE measure and to manage the patient's money. Two other independent variables regarding medication and treatment showed significant differences ($p < 0.2$). When comparing parents who experienced “other aggressive acts only” and “acts of violence” on the same independent variables, there were no significant differences at the significance level of $p < 0.05$.

[Insert Table 2 about here]

3.3. Odds Ratio for Experience of Physical Violence

Of the 10 independent variables that showed significant differences ($p < 0.2$), employment was not entered into the analysis because only a few patients were employed. After confirming that VIFs were below 2.0, we used mixed-effects logistic regression with 9 independent variables (Table 3). Experience of physical violence was significantly related to the patients' gender (female) (odds ratio [OR] = 2.05; 95% confidence interval [CI] [1.08, 3.89]; $p = 0.028$), multiple hospitalizations (3 or more times) (OR = 2.44; 95% CI [1.02, 5.87]; $p = 0.046$), low annual household income (less than US\$20K) (OR = 2.45; 95% CI

[1.02, 5.89]; $p = 0.046$), and high FAS (OR = 2.60; 95% CI [1.30, 5.17]; $p = 0.007$).

[Insert Table 3 about here]

4. Discussion

4.1. Factors Related to the Experience of Parental Physical Violence

Of the 400 parents, almost two-thirds experienced “no physical violence” and close to one-third experienced “physical violence” during the past year. Our study’s rate of violence is consistent with a recent 20-35% estimation of family violence by patients with SMI within a 6 to 12 month time frame (Labrum and Solomon, 2015).

We aimed to clarify factors related to the experience of parental physical violence perpetrated by their relative with schizophrenia. The results determined that female patients, multiple hospitalizations, low household income, and higher hostility and criticism of family interactions were significantly associated with parents’ experience of physical violence.

In the current study, female patients were more likely to commit physical violence in the past year. In the general population, females commit far fewer violent crimes than males. However, among patients with SMI, the findings from general population studies may not apply. Although the study by Corrigan and Watson (2005) revealed that male patients committed serious violent acts more often than females, other studies found no significant difference with regard to gender (Robbins et al., 2003), and still others showed higher rates of

minor violent acts committed by female patients (Monahan et al., 2001; Desmarais et al., 2014). Patients with schizophrenia, particularly females, were at increased risk for violent crimes compared with the general female population (Schanda et al., 2004; Fleischman et al., 2014). Regarding violence towards family members, Swan and Lavitt (1988) found no significant gender differences among patients with SMI. According to the study by Robbins and colleagues (2003), female patients with SMI were more likely to target family members and be violent at home, while males were more likely to commit serious violent acts outside of the home environment. Over 60% of patients whose parents experienced physical violence did not use rehabilitation services; consequently, most of them may well have stayed at home for most of the day. Such circumstances may have contributed to the increased risk of violence among female patients at home, as opposed to male patients. Another possible reason for the increased risk of violence by females is that parents may be less likely to prevent violence committed by daughters, as they consider female violence to be less injurious or life threatening. Therefore, parents may be more likely to experience violence by female patients than by male patients.

Multiple hospitalizations have been used as an indicator of illness severity and as a risk factor for physical violence by patients with SMI toward the general population (Arboleda-Florez et al., 1998; Fleischman et al., 2014) and family members (Swan and Lavitt, 1988). When interpreting the relationship between number of hospitalizations and violence,

Fleischman et al. (2014) indicated that the association could be interpreted in several ways, including as an indicator of severity of illness or non-adherence to medication. However, in the current study, adherence to medication was unrelated to physical violence toward parents. Specifically, the majority of our sample was severely ill and the average length of illness was 18–19 years since onset, but the patients maintained good medication adherence. Most patients were limited in their ability to live independently. Additionally, patients with schizophrenia are likely to have cognitive impairments such as deficits in attention and psychomotor performance and especially in verbal working memory and cognitive flexibility (Green, 1996; Green et al., 2000; Wobrock et al., 2009). These cognitive impairments represent a risk for developing aggression in patients with schizophrenia (Reinhardt et al., 2014). Thus, in this severely ill patient sample, the relationship between number of hospitalizations and family violence may be due to cognitive impairments rather than psychiatric symptoms. Although we cannot draw concrete conclusions about the significance of the number of hospitalizations, patients who are hospitalized multiple times may benefit from cognitive assessment. Furthermore, escalation of violence by the patient may be a precipitant of hospital admission, as parents may feel safer if the patient is hospitalized. Consequently, multiple hospitalizations may be an indicator of frequency of violent acts toward family members.

Parents who had lower annual household incomes (less than US\$20K) were more

likely to experience physical violence in the past year than parents who had higher income (over US\$40K). A large national survey conducted on family groups of U.S. NAMI members almost 30 years ago revealed that higher family income were significantly related to fewer experiences of violence perpetrated by their patient relative. Respondents who had higher incomes rated themselves as being more effectively able to cope with their relative when they lived with the patient (Swan and Lavitt, 1988). In Japan, there is limited public space for parents to escape from their home environment for a short period of time. Therefore, family caregivers' potential for respite from their relative with SMI who may be potentially violent is contingent on their finances. Many low-income parents may also suffer from financial distress so that a stay in a hotel to extract themselves from a potentially volatile situation is not possible. In addition, violent patients may require greater attention from family members to avoid further violence; consequently, these parents may lose their jobs due to the care they must provide, which further reduces their financial resources.

Greater hostility and criticism of family interactions with the patient were related to parental experience of physical violence. In a previous study, family violence was associated with higher levels of caregivers' expressed hostility toward their patient relative (a component of high EE) (Onwumere et al., 2014). Negative attitudes may produce hostile and aggressive feelings that may provoke violence (Solomon et al., 2005). In a qualitative study of both parents and patients with schizophrenia, poor communication including arguing,

conflict, and rejection exacerbated patients' violence towards parents (Hsu and Tu, 2014). On the other hand, caregivers who experience violence may feel a sense of anger that may result in expressed hostility and criticism toward the patient. Thus, the temporal sequence of violence and expressed emotions is unclear in the present study.

4.2. Practice Implications

Psychiatrists and other mental health providers need to have an increased awareness of family violence committed by patients with schizophrenia. A family violence assessment conducted on all patients with schizophrenia, regardless of gender, upon discharge from the hospital as well as on an ongoing basis in community practice, particularly when patients live with their parents, may well be beneficial. Given that parents with low household income are likely to be in a difficult situation, such that they have no means to escape the home environment, the government should provide publicly funded respite programs for families in these circumstances (Jeon et al., 2005). To avoid violence, both parents and patients need to acquire strategies for more effective communication, as risk of harm is likely related to household communication style of both the parent and the patient (Katz et al, 2015). Intervention programs including anger management and communication skills training for patients may be effective strategies to alleviate potentially violent situations. Additionally, patients with schizophrenia are likely to have cognitive impairments, which may put them at

risk for aggression (Reinhardt et al., 2014). Education and training in communication skills for patients with cognitive impairments may be an effective strategy to reducing violence as well. Family education and family support groups may provide parents with the skills for de-escalating violence and for understanding potential triggers for violence. Family psychoeducational interventions have been found to reduce high levels of EE (Pharoah et al., 2010), and also help to improve family relationships, which lead to better outcomes for their relatives with mental illness (Dixon et al., 2009). Dixon and colleagues (2009) noted that high EE was an indicator of family relationship problems. Masland and Hooley (2015) recently suggested using a quick perceived criticism assessment in clinical practice to improve patient outcomes.

4.3. Research Limitations and Further Research

The current study has several limitations. First, the study findings were based on a self-report questionnaire completed by family caregivers; consequently, the information about patients may not be completely accurate. Since most caregivers live with the patient, as the cohabitation rate is over 80% in Japan, it is presumed that the provided information had a high degree of validity. However, further research with more precise assessment of patient factors is needed. In addition, the current study was cross-sectional, which limits the ability to make causal statements regarding these relationships. Future longitudinal study designs are

necessary for increasing confidence in the causality of relationships. Finally, this sample was not representative of all parents of patients with schizophrenia. Specifically, the survey was conducted through a family group association. Thus, the majority of parents lived with patients, participated in family education programs, and provided daily care for patients with severe grade disabilities. Consequently, their communication patterns may differ from parents who are infrequently involved with patients or patients with schizophrenia with less severe functional disability. Due to sample limitations, generalizing with regard to what needs to happen for all patients is beyond the scope of this paper. However, the current study is valuable in that it provides additional findings to supplement the limited research about family violence committed by patients with schizophrenia.

Conflict of interest

The authors declare that they have no conflicts of interest.

Contributors

MK, PS, SK, SN, KY, and YN designed the research project. PS, SK, and CF advised on the interpretations of results. All authors approved the final draft.

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Table 1. Violence experienced by parents of patients with schizophrenia in the past year ($N = 400$)

No. item or category	Never	1–4 times	≥ 5 times
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Acts of physical violence			
1 Visited physician for injury	392 (98.0)	8 (2.0)	0 (0.0)
2 Injured with knife	397 (99.3)	1 (0.3)	2 (0.5)
3 Threatening with knife	384 (96.0)	13 (3.3)	3 (0.8)
4 Beating with a physical object	379 (94.8)	14 (3.5)	7 (1.8)
5 Choking	397 (98.5)	3 (0.8)	3 (0.8)
Acts of violence (1–5)	35 (8.8) (≥ 1 time)		
6 Destroyed property	284 (71.0)	90 (22.5)	26 (6.5)
7 Pushing	340 (85.0)	43 (10.8)	17 (4.3)
8 Punching and kicking	325 (81.3)	57 (14.3)	18 (4.5)
9 Throwing an object	348 (87.0)	43 (10.8)	9 (2.3)
Other aggressive acts (6–9)	136 (34.0) (≥ 1 time)		

Table 2. Comparisons between parents who have and have not experienced physical violence

		No physical violence (#1)	Physical violence			Comparison #1 vs. #2	Comparison #3 vs. #4
			Total (#2)	Other aggressive acts only (#3)	Acts of violence (#4)		
		<i>n</i> = 263	<i>n</i> = 137	<i>n</i> = 102	<i>n</i> = 35		
			<i>n</i> (%) or Mean ± SD			<i>p</i>	<i>p</i>
Patient factors							
Socio-demographics							
Age	Average	39.2±7.5	38.7±8.5	38.8±8.0	38.2±10.1	0.537	0.714
Gender	Female	85 (32.8)	58 (43.3)	43 (43.0)	15 (44.1)	0.041*	0.910
	Male	174 (67.2)	75 (56.7)	57 (57.0)	19 (55.9)		
Employment	Yes	22 (8.5)	3 (2.2)	2 (2.0)	1 (2.9)	0.016*	<u>1.000</u>
	No	238 (91.5)	132 (97.8)	98 (98.0)	34 (97.1)		
Clinical characteristics							
Number of hospitalizations (times)	0	58 (22.1)	18 (13.2)	15 (14.7)	3 (8.8)	0.011*	0.586
	1–2	131 (50.0)	62 (45.6)	47 (46.1)	15 (44.1)		
	3 or more	73 (27.9)	56 (41.2)	40 (39.2)	16 (47.1)		
Psychosocial factors							
Cohabitation with the parent	Yes	221 (84.7)	111 (82.2)	83 (82.2)	28 (82.4)	0.529	0.982
	No	40 (15.3)	24 (17.8)	18 (17.8)	6 (17.7)		
Medication as instructed	Yes	249 (95.4)	124 (91.2)	93 (92.1)	31 (88.6)	0.094†	<u>0.505</u>
	No	12 (4.6)	12 (8.8)	8 (7.9)	4 (11.4)		
Visit psychiatrist	Regularly	235 (89.7)	112 (82.4)	84 (83.2)	28 (80.0)	0.076†	<u>0.610</u>
	Hospitalized	16 (6.1)	17 (12.5)	11 (10.9)	6 (17.1)		

	Not regularly	11 (4.2)	7 (5.2)	6 (5.9)	1 (2.9)		
Rehabilitation Service	Used	133 (51.2)	50 (37.0)	40 (40.0)	10 (28.6)	0.008*	0.228
	Not used	127 (48.9)	85 (63.0)	60 (60.0)	25 (71.4)		
Days of talking to others per month	3 days or less	60 (24.3)	44 (35.2)	31 (33.0)	13 (41.9)	0.027*	0.365
	Over 3 days	187 (75.7)	81 (64.8)	63 (67.0)	18 (58.1)		
<hr/>							
Parent's factors							
Socio-demographics							
Age	Average	69.4±7.2	69.0±7.8	68.9±7.5	69.2±8.5	0.618	0.858
Gender	Father	93 (35.4)	40 (29.2)	29 (28.4)	11 (31.4)	0.214	0.737
	Mother	170 (64.6)	97 (70.8)	73 (71.6)	24 (68.6)		
Household income ^{a)}	Less \$20K US	42 (16.4)	47 (34.6)	35 (34.7)	12 (34.3)	<0.001*	0.667
	\$20 to 40K US	152 (59.4)	59 (43.4)	42 (41.6)	17 (48.6)		
	Over \$40K US	62 (24.2)	30 (22.1)	24 (23.8)	6 (17.1)		
Health/mental health status							
Visit psychiatrists	Yes	28 (11.0)	17 (12.6)	11 (11.0)	6 (17.1)	0.645	<u>0.379</u>
	No	226 (89.0)	118 (87.4)	89 (89.0)	29 (82.9)		
Visit physicians	Yes	135 (53.2)	74 (54.8)	59 (59.0)	15 (42.9)	0.754	0.099
	No	119 (46.9)	61 (45.2)	41 (41.0)	20 (57.1)		
Social support/social network							
Family groups	Participated	211 (81.2)	117 (85.4)	87 (85.3)	30 (85.7)	0.288	0.952
	Not participated	49 (18.9)	20 (14.6)	15 (14.7)	5 (14.3)		
Parent and patient relationship factors							
FAS	Low (< 60)	207 (83.5)	85 (62.0)	68 (66.7)	17 (48.6)	<0.001*	0.057
	High (≥ 60)	41 (16.5)	52 (38.0)	34 (33.3)	18 (51.4)		
Attitude toward each other (0-4)							

The patient is important to me		3.1±0.9	3.0±0.9	3.1±1.0	3.1±0.9	0.589	0.766
I am respected by the patient		1.9±1.0	1.8±0.9	1.9±1.0	1.7±0.9	0.427	0.368
Money management	Respondent	51 (19.5)	42 (31.3)	33 (33.3)	9 (25.7)	0.008*	0.404
	Other	211 (80.5)	92 (68.7)	66 (66.7)	26 (74.3)		

Note: a): Conversion 100 Yen to \$1 US

Significance levels: *t*-test, chi-square test, or Fisher's exact test (underlined numerals), * $p < 0.05$, † $p < 0.2$

Table 3. Odds ratios for experienced physical violence ($n = 334$)

		OR (95% CI)	<i>p</i>
Patients' factors			
Gender	Male	Reference	
	Female	2.05 [1.08, 3.89]	0.028*
Number of hospitalizations (times)	0	Reference	
	1–2	1.63 [0.72, 3.67]	0.235
	3 or more	2.44 [1.02, 5.87]	0.046*
Medication as instructed	Yes	Reference	
	No	0.54 [0.14, 2.09]	0.367
Visit psychiatrist	Regularly	Reference	
	Hospitalized	0.37 [0.08, 1.65]	0.189
	Not regularly	1.06 [0.18, 6.17]	0.948
Rehabilitation service	Yes	Reference	
	No	0.98 [0.46, 2.05]	0.946
Days of talking to others per month	3 days or less	Reference	
	Over 3 days	0.49 [0.22, 1.10]	0.082
Parents' factors			
Household income ^{a)}	Less \$20K US	2.45 [1.02, 5.89]	0.046*
	\$20 to 40K US	0.80 [0.38, 1.66]	0.538
	Over \$40K US	Reference	
Parent and patient relationship factors			
FAS	Low (<60)	Reference	
	High (≥ 60)	2.60 [1.30, 5.17]	0.007*
Money management	Respondent	1.52 [0.78, 2.98]	0.219
	Other	Reference	

Note: FAS: Family Attitude Scale

Mixed-effects logistic regression with household as random effect, * $p < 0.05$