

ARTICLE

Risk of Incident Psychiatric Disorders in Sexual Assault Victims: A Nationwide Population-Based Cohort Study

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Abstract

Sexual offenses cause harm to the victims' physical and psychological functions. This study was conducted to evaluate the risk of incident psychiatric disorders in sexual assault victims. Taiwan's National Health Insurance Research Database was used to conduct a nationwide population-based cohort study to assess the risk of incident psychiatric disorders in sexual assault victims and to further evaluate the respective risk estimates on the basis of diagnostic patterns. A total of 81 sexual assault victims and 324 controls matched by sex, age and residential area were included. The mean age of the sexual assault victims was 18.39 (SD 10.23) years, and 93.83% (76/81) of the sample were females. Sexual assault victims had a higher incidence density of psychiatric disorders than did the control group (9.2% per year, 95% confidence interval [CI] 1.1–33.2% per year *v.* 1.1% per year, 95% CI .4–15.7% per year; $p = .037$). Sexual assault was an independent risk factor for incident psychiatric disorders, with an incidence rate ratio of 3.40 (95% CI 1.04–26.41) after adjustment for potential confounding factors. Assessment of psychiatric disorders should be implemented in the integrative care of sexual assault victims. Physicians providing clinical care to the sexual assault victims should receive more all-round training to understand and manage this type of violence.

Keywords psychiatric disorders; sexual assault victims

INTRODUCTION

Sexual crimes are a major cause of public concern. When new offenses are committed by known offenders, such concerns are increased when it appears that the offense should have been predicted and prevented (Mann, Hanson, and Thornton 2010). Sexual assault is a unique type of contact violence with serious negative consequences for the victims. This type of violence is also considered a significant global issue and public health problem (Hwa et al. 2010). A previous study estimated that 13% of women and 3% of men are victims of sexual assault at some time in their lifetime

(Spitzberg 1999). However, assessing the risk of sexual offenders is an essential task that provides the basis for many decisions that have profound consequences for both offenders and the public. Thus, providing first-line specialists, such as practitioners, parole officers and probation officers, with highly effective methods that minimize the risk of misclassification is critical (Hempel et al. 2013).

Sexual assault not only damages or impairs a victim's body (through disfigurement, loss of the ability to bear children, loss of hearing or vision, paralysis, or human immunodeficiency virus [HIV] infection) but can also cause serious psychological trauma, including an increased fear of further assault, symptoms of posttraumatic stress disorder (PTSD) such as depression, anger, crying alone, substance abuse, nightmares, and feelings of depression, anxiety, fear and powerlessness (Yang et al. 2014). The Annual Report of the National Police Agency in Taiwan (<http://www.npa.gov.tw>) has estimated that 4,245 and 3,752 sexual assault cases were reported in Taiwan in 2012 and 2013, respectively, with high clearance rates in both years (96.06 and 96.06%, respectively). Nevertheless, many victims do not seek medical care or report the assault to the police. There is an increasing epidemic of sexual assault in Taiwan and in other Asian countries (Hwa et al. 2010).

To the best of our knowledge, however, few evidence-based studies have attempted to determine the risk of incident psychiatric disorders in sexual assault victims in Taiwan, who face the burden of this sexual crime. To identify the incidence of psychiatric disorders in sexual assault victims, the present study explored the potential for condition-related incident psychiatric disorders, because the incidence has been considered to underscore crucial implications for understanding of the overall pathogenesis of psychiatric disorders in this population. As mentioned, because sexual offenses cause harm to the victims' physical and psychological functions, the purpose of the present study was to explore the context of the incidence of psychiatric disorders among sexual assault victims in Taiwan by conducting a nationwide population-based cohort study.

METHODS

Data Sources

In Taiwan, the National Health Insurance (NHI) program has provided health care for the population since its inception in 1995. This single-payer health care program provides medical coverage for more than 99% of the population of Taiwan. The Bureau of NHI manages the claims and administrative data contained in the National Health Insurance Research Database (NHIRD) and releases it for research purposes. The bureau depersonalizes the data to ensure individual privacy by scrambling any personal information before releasing the data to researchers. In the NHIRD, diseases are defined using International Classification of Diseases 9th Revision Clinical Modification (ICD-9-CM) codes (Chi et al. 2015).

In this study, we retrieved the data from the Longitudinal Health Insurance Database 2005 (LHID2005), which contains the claims data of 1,000,000 beneficiaries enrolled in the year 2005, randomly sampled from the Registry for Beneficiaries of the NHIRD, which contains the registration data of all beneficiaries (approximately 25.68 million individuals) for the period from January 1, 2005 to December 31, 2005. The LHID2005 has been validated as a representative sample of the Taiwanese population in terms of age, sex and average payroll bracket (Cheng et al. 2011). The

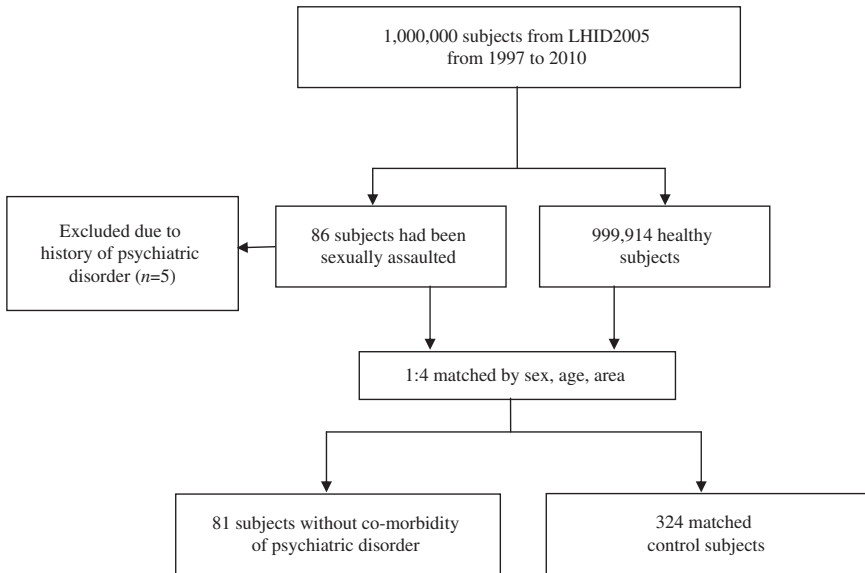


Figure 1. Flowchart of selection of the study population. LHD2005, Longitudinal Health Insurance Database 2005

LHD2005 has been extensively used in thousands of published epidemiological studies (Chen et al. 2013). Because the National Health Research Institute has addressed any confidentiality assurance problems, all procedures were performed in accordance with the guidelines of our institutional ethics committee and adhered to the tenets of the Declaration of Helsinki. All patient information was anonymous.

Study Subjects

We first recruited only those subjects who received a new diagnosis of sexual assault from 1997 to 2010. Subjects who received a psychiatric disorder diagnosis before the sexual assault were excluded to prevent overestimating the risk of incident psychiatric disorders between January 1997 and December 2004. Figure 1 illustrates the selection process. The final study cohort group comprised 81 sexual assault victims without any co-morbidity of psychiatric disorder and 324 control subjects who were matched at a ratio of 1:4.

Definition of Variables

ICD-9-CM codes 995.83 (adult victims) and 995.53 (child victims) were used to identify sexual assault victims. The outcomes of our interest were incident psychiatric disorders, namely suicide (E950–E959), schizophrenia (ICD-9-CM: 295.xx) and bipolar disorder (ICD-9-CM: 296.xx).

Statistical Analysis

All statistical analyses were performed by using SAS version 9.4 (SAS Institute, Cary, NC). The χ^2 test and two-sample independent *t* test were used to compare categorical and continuous variables, respectively. A Poisson regression model was also adopted

to estimate the incidence rate ratio (IRR) for incident psychiatric disorders between the sexual assault victims and controls after adjustment for related confounding factors. A two-sided p value of $<.05$ was considered statistically significant.

RESULTS

The demographics of the matched cohort are illustrated in Table 1. We identified 81 sexual assault victims and 324 matched controls. The mean age was 18.39 (SD 10.23) years for the sexual assault victims and 18.39 (SD 10.18) years for the controls (t test, $p = 1.00$). The table shows that there were no significant differences in sex or residential area between the two groups (χ^2 test, $p = 1.00$).

During the follow-up period, two sexual assault victims (2.47%) and one control (.31%) developed a psychiatric disorder. The incidence density (ID) per person-year of psychiatric disorders among the sexual assault victims was significantly higher than the controls (9.2 *v.* 1.1 per person-year, $p = .037$) (Table 2). In addition, the proportions of suicide among the sexual assault victims and controls were 1.23 and 0%, respectively. The ID of suicide was significantly higher among the sexual assault victims than the controls (ID 4.5 *v.* 0 per person-year, $p = .043$).

As shown in Table 3, the sexual assault victims exhibited an increased risk of incident psychiatric disorders (crude IRR 10.63, 95% confidence interval [CI] 2.06–54.81) with borderline significance compared with the controls. After adjustment for age, sex, income, residential area and co-morbidity, sexual assault victims remained at a significantly higher risk of incident psychiatric disorders (adjusted IRR 3.40, 95% CI 1.04–26.41).

DISCUSSION

Clinical-Epidemiological Aspects of Psychiatric Disorder and Sexual Assault

In 1997, Taiwan enacted the Sexual Assault Crime Prevention Act, amending it with numerous provisions in 2005. The Sexual Harassment Prevention Act was also enacted in 2005 and amended in January 2006. The passage of these two acts offered a comprehensive safeguard for protecting personal security, physical autonomy and privacy. Sexual assault includes rape, sexual coercion, being forced to penetrate someone else and unwanted sexual experiences without physical contact (McCauley and Casler 2015).

Table 1. Comparisons of Characteristics among the Matched Cohort

Variables	Sexual assault				p
	Yes ($n = 81$)		No ($n = 324$)		
	n	%	n	%	
Age (years)					1.0000
Mean	18.39		18.39		
SD	10.23		10.18		
Females	76	93.83	304	93.83	1.0000
Urban	45	55.56	180	55.56	1.0000

Table 2. Incidence Density of Psychiatric Disorder among the Matched Cohort

Variables	Sexual assault		<i>p</i>
	Yes (<i>n</i> = 81)	No (<i>n</i> = 324)	
All outcomes			
Number of new cases	2	1	
Person-years	217.7	915.7	
Incidence density	9.2	1.1	.037
95% Confidence interval	1.1–33.2	.4–15.7	
Suicide			
Number of new cases	1	0	
Person-years	223.1	915.8	
Incidence density	4.5	.0	.043
95% Confidence interval	.1–25.0	–	
Schizophrenia			
Number of new cases	0	0	
Person-years	228.9	915.8	
Incidence density	.0	.0	–
95% Confidence interval	–	–	
Bipolar disorder			
Number of new cases	2	1	
Person-years	217.7	915.7	
Incidence density	9.2	1.1	.037
95% Confidence interval	1.1–33.2	.4–15.7	

Experts have estimated that unreported incidents (the so-called “dark figure of crime”) outnumber reported cases by 7- to 10-fold. Therefore, it is reasonable to infer that statistics on forcible rape in Taiwan underestimate the overall rate of sexual assault cases. As of the beginning of the twenty-first century, two women on average are forcibly raped every hour in Taiwan. Perceptions of government officials, the academic community and the public are in consensus that sexual assault in Taiwan must be handled prudently (Wu 2008).

In this study, the mean age of the sexual assault victims was 18.39 (SD 10.23) years. A previous study indicated that 80% of sexual assault survivors experience their first assault before the age of 24 years and that college campuses are a particularly crucial venue for prevention (Sinozich and Langton 2014). For college campuses, efforts aimed at reducing risky alcohol use, whether in the form of campus policies and

Table 3. Incidence Rate Ratio (IRR) for Psychiatric Disorder among the Matched Cohort

Variables	Sexual assault (yes v. no)			
	Crude IRR ^a		Adjusted IRR ^b	
	IRR	95% confidence interval	IRR	95% confidence interval
All outcomes				
Non-sexual assault	1.00	–	1.00	–
Sexual assault	10.63	2.06–54.81	3.40	1.04–26.41
Suicide				
Non-sexual assault	1.00	–	1.00	–
Sexual assault	12.18	1.27–117.13	9.55	.77–120.98
Bipolar disorder				
Non-sexual assault	1.00	–	1.00	–
Sexual assault	10.63	2.06–54.81	3.40	1.04–26.41

^aIRR was calculated using Poisson regression.

^bAdjustment for age, sex, income, urbanization and co-morbidity.

programs or brief interventions in college health centers, would benefit victims by incorporating universal messages about healthy relationships and healthy sexuality; such efforts would reduce or prevent sexual violence (McCauley and Casler 2015).

Sexual assault differs from other crimes. It is highly private and commonly lacks third-party witnesses, requiring victims to describe the event themselves and to collect biological evidence from their bodies as soon as possible after the incident (Lou, Huang, and Lee 2009). In addition, while the physical injury typically includes relatively minor injuries such as bruises, scratches, bites and sprains, the psychological damage and fear resulting from an assault is deep (Crowley 1999). In this study, sexual assault was found to be an independent risk factor for incident psychiatric disorders after adjustment for potential confounding factors. People who have been sexually assaulted are more likely to report depressive symptoms compared with people who have not been sexually assaulted (Bailey et al. 2016). The prevalence rates of PTSD and depression in sexually assaulted women are both estimated to be more than 30% (Zinzow et al. 2012). Exposure to lifetime sexual violence often results in an elevated likelihood of PTSD and major depressive disorder (Bailey et al. 2016). Sexual assault victims most commonly report distress with the physical effects of the assault as well as heightened fear and anxiety when in public places (Fuller 2015).

Experiencing sexual violence is also related to heightened risks of suicide and suicide attempts (Sumner et al. 2015). Adult female sexual assault victims are more likely to consider and attempt suicide than their non-sexually abused counterparts (Behnken et al. 2010). However, the association does not appear to be direct, because some sexual assault victims do not exhibit suicidal tendencies (Cloitre, Scarvalone,

and Difede 1997). A possible reason is that some risk and protective factors affect the probability of a sexual assault victim becoming suicidal (Swahn and Bossarte 2007). In the present study, we did not achieve sufficient statistical power to effectively evaluate the presence of incident suicide between the sexual assault victims and controls and then to subsequently adjust for confounding factors given the relatively small sample. From a clinical perspective, many health care or clinical approaches to sexual violence prevention remain in early development and, in general, there is limited experimental evidence of the efficacy of such approaches (Sumner et al. 2015). Although the mechanism by which sexual violence and suicide are related still remains to be elucidated, these findings indicate that physicians should routinely enquire not only about physical domestic violence but also about emotional and sexual abuse – particularly given the increasing evidence that emotional abuse may have a higher health impact than physical violence (Jewkes 2010).

Perceived Limitations

One of the major limitations of this study is that the NHIRD does not contain detailed information regarding the socio-economic status and family history of systemic diseases, which may be risk factors for psychiatric disorders. Second, evidence derived from a retrospective cohort study design is generally lower in statistical quality because of potential biases related to adjustments for confounding variables. Third, a meticulous study design and control measures for confounding factors were used; however, bias resulting from unknown confounders may have influenced the results. Fourth, all data in the NHIRD are anonymous; consequently, relevant clinical variables, such as serum information, imaging and pathology findings, were unavailable. Fifth, although the codes for sexual assault and psychiatric disorder have been used in previous studies, none of the cited studies is a validation study that has determined the accuracy of the coding. Our estimation may have suffered from some level of misclassification bias. Finally, the study investigated a specific population (Han Chinese); therefore, as with other population-specific studies, the findings might not be generalizable.

Conclusion

In the present study, the incidence of psychiatric disorders was significantly higher in the sexual assault victims than in the controls. Assessment of psychiatric disorders should be implemented in the integrative care of this population. In addition, physicians providing clinical care to the sexual assault victims should receive more all-round training regarding the features and management of this type of violence.

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TRANSLATED ABSTRACTS

Résumé

Objectif. Les agressions sexuelles ont un impact négatif sur les fonctions physiques et psychologiques des victimes. Cette étude a été menée pour évaluer le risque de troubles psychiatriques chez les victimes d'agression sexuelle à la suite de l'agression subie.
Méthodes. La base de données nationale de la sécurité sociale de Taiwan a été utilisée pour

mener une étude nationale sur la population afin d'évaluer le risque de troubles psychiatriques chez les victimes d'agression sexuelle et d'évaluer les risques respectifs sur la base des diagnostics. *Résultats.* Un total de 81 victimes d'agression sexuelle et 324 personnes témoins triées selon le sexe, l'âge et la zone résidentielle ont été inclus. L'âge moyen des victimes d'agression sexuelle était de $18,39 \pm 10,23$ ans, et 93,83% (76/81) de l'échantillon étaient des femmes. Les victimes d'agression sexuelle présentaient une densité d'incidence de troubles psychiatriques plus élevée que le groupe témoin [9,2% par année, intervalle de confiance à 95%: 1,1% -33,2% par année contre 1,1% par année, IC à 95%: 0,4% -15,7% par an; $p = 0,037$]. L'agression sexuelle était un facteur de risque indépendant pour les troubles psychiatriques conséquents, avec un rapport de taux d'incidence de 3,40 (IC à 95%: 1,04-26,41) après un ajustement des facteurs potentiels de confusion. *Conclusion.* L'évaluation des troubles psychiatriques devrait être mise en œuvre dans les soins des victimes d'agression sexuelle. Les médecins fournissant des soins cliniques aux victimes d'agression sexuelle devraient recevoir une formation plus complète pour comprendre et gérer ce type de violence.

Mots-clés: trouble psychiatrique; victime d'agression sexuelle

Sinopsis

Objetivo. Las ofensas sexuales causan daño a las funciones físicas y psicológicas de las víctimas. Este estudio se realizó para evaluar el riesgo de trastornos psiquiátricos incidentes en víctimas de agresión sexual. *Metodos.* La base de datos de investigación del seguro nacional de salud de Taiwán se utilizó para realizar un estudio de cohortes basado en la población a nivel nacional para evaluar el riesgo de trastornos psiquiátricos incidentes en víctimas de agresión sexual y evaluar las respectivas estimaciones de riesgo sobre la base de patrones de diagnóstico. *Resultados.* Se incluyeron un total de 81 víctimas de agresión sexual y 324 controles emparejados por sexo, edad y área residencial. La edad media de las víctimas de agresión sexual fue de 18.39 ± 10.23 años, y el 93.83% (76/81) de la muestra fueron mujeres. Las víctimas de agresión sexual tenían una mayor densidad de incidencia de trastornos psiquiátricos que el grupo de control [9,2% por año, intervalo de confianza del 95% (IC): 1,1% -33,2% por año vs. 1,1% por año, IC 95%: 0,4% -15,7% por año; $p = 0.037$]. La agresión sexual fue un factor de riesgo independiente para los trastornos psiquiátricos incidentes, con una tasa de incidencia de 3.40 (IC 95%: 1.04-26.41) después del ajuste por posibles factores de confusión. *Conclusión.* La evaluación de los trastornos psiquiátricos debe implementarse en el cuidado integral de las víctimas de agresión sexual. Los médicos que brindan atención clínica a las víctimas de agresión sexual deberían recibir más capacitación integral para comprender y manejar este tipo de violencia.

Palabras clave: trastorno psiquiátrico; víctima de agresión sexual

摘要

性犯罪會導致受害者的生理與心理功能的傷害。本研究為評估性侵害受害者之精神疾病發生率。

方法:以台灣全民健康保險資料庫建立以全國人口為基礎的世代研究,除探討性侵害受害者其精神障礙的發生率外,並進行風險模式評估。

結果:利用性別、年齡和居住地區進行配對共81名的性侵害受害者及324名的對照

組。性侵害受害者的平均年齡為 18.39 ± 10.23 歲，其中有93.83% (76/81)為女性受害者。性侵害受害者精神障礙之年發生率高於對照組[9.2% (95%信賴區間 (confidence interval, CI):1.1%–33.2%) vs. 1.1% (95%信賴區間:0.4%–15.7%)], $p=0.037$]。此外，在控制其他干擾因子後，性侵害為被害人精神障礙發生之獨立危險因子，發生率相對風險(incidence rate ratio)為3.40 (95% CI: 1.04-26.41)。結論:精神障礙的評估應該在性侵害受害者的綜合治療中實施。為性侵害受害者提供臨床護理的醫師應該接受更全面的培訓，以了解和管理這種暴力類型。

關鍵字: 精神障礙; 性侵害受害者

ملخص

الغرض: تلحق الجرائم الجنسية ضرراً بالوظائف الجسدية والنفسية للضحايا. وقد أجريت هذه الدراسة لتقييم مخاطر الاضطرابات النفسية العرضية التي يواجهها ضحايا الاعتداء الجنسي.

الأساليب: استخدمت قاعدة البيانات الوطنية لبحوث التأمين الصحي في تايوان لإجراء دراسة جماعية سكانية على المستوى القومي، لتقييم مخاطر الاضطرابات النفسية العرضية التي يواجهها ضحايا الاعتداء الجنسي، ولمواصلة تقييم تقديرات المخاطر ذات الصلة على أساس أنماط التشخيص.

النتائج: تم إدراج إجمالي 81 ضحية من ضحايا الاعتداء الجنسي و 324 فرداً من المجموعات المرجعية المتطابقة وفقاً للجنس والعمر والمنطقة السكنية. وكان متوسط العمر لضحايا الاعتداء الجنسي 18.39 ± 10.23 سنة، وكانت 93.83% (81/76) من العينة من الإناث. كما تبين أن ضحايا الاعتداء الجنسي هم أكثر عرضة للاضطرابات النفسية من المجموعات المرجعية [9.2% سنوياً، 95% فترات ثقة (Confidence Intervals CI): 1.1% - 33.2% سنوياً مقابل 1.1% سنوياً، 95% حدود الثقة: 0.4% - 15.7% سنوياً، المجموع = 0.037]. كان الاعتداء الجنسي عاملاً خطراً مستقلاً للاضطرابات النفسية العرضية، بمعدل إصابة بنسبة 3.40 (95% حدود الثقة: 1.04-26.41) بعد التعديل بسبب عوامل الخلط المحتملة.

الاستنتاج: ينبغي تنفيذ تقييم الاضطرابات النفسية في الرعاية التكميلية لضحايا الاعتداء الجنسي. كما ينبغي أن يتلقى الأطباء الذين يقدمون الرعاية السريرية لضحايا الاعتداء الجنسي مزيداً من التدريب المتقن لفهم هذا النوع من العنف وتوجيهه.

الكلمات الرئيسية: اضطراب نفسي، ضحية الاعتداء الجنسي

Tao-Hsin Tung received the PhD degree in Public Health from National Yang-Ming University, Taipei, Taiwan in 1996 and 2005, and was a PhD candidate in the Department of Crime Prevention and Correction, Central Police University, Taoyuan, Taiwan. In 2004, he joined the Department of Medical Research and Education, Cheng-Hsin General Hospital, as an Associated Researcher, and in 2008 became a Researcher. His current research interests include clinical epidemiology, biostatistics, disease screening, medical law and criminology.

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