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Gender differences in the association of living and working conditions and the mental health of trafficking survivors

Lisbeth Iglesias-Rios[1] · Siobán D. Harlow[1] · Sarah. A. Burgard[2] · Ligia Kiss[3] · Cathy Zimmerman[3]

Abstract

Objectives To assess the association of living and working conditions experienced during trafficking with mental health of female and male survivors.

Methods We analyzed a cross-sectional study of 1015 survivors who received post-trafficking services in Cambodia, Thailand, and Vietnam. Modified Poisson regression models were conducted by gender to estimate prevalence ratios.

Results For females, the elevated prevalence of anxiety, depression, and post-traumatic stress disorder (PTSD) symptoms was associated with adverse living conditions, while for males the prevalence of anxiety (PR = 2.21; 95% CI 1.24–3.96) and depression (PR = 2.63; 95% CI 1.62–4.26) more than doubled and almost tripled for PTSD (PR = 2.93; 95% CI 1.65–5.19) after adjustment. For males in particular, excessive and extreme working hours per day were associated with more than a four- and threefold greater prevalence of PTSD. Being in a detention center or jail was associated with all three mental health outcomes in males.

Conclusions Providers and stakeholders need to consider the complex mental health trauma of the differential effects of living and working conditions for female and male survivors during trafficking to support treatment and recovery.

Keywords Human trafficking · Forced labor · Gender · Working and living conditions · Mental health

Introduction

Human trafficking, forced labor, and modern slavery are terms often used interchangeably to denote conditions of extreme exploitation. These severe forms of exploitation involve fundamental human rights violations and have serious public health implications (United Nations General

✉ Lisbeth Iglesias-Rios
  lisgle@umich.edu

[1] Department of Epidemiology, Center for Midlife Science, School of Public Health, University of Michigan, 1415 Washington Heights, Ann Arbor, MI 48109-2029, USA

[2] Department of Sociology, College of Literature Science, and the Arts, University of Michigan, 500 S State St, Ann Arbor, MI 48109, USA

[3] Department of Global Health and Development, Gender Violence and Health Centre, London School of Hygiene and Tropical Medicine, 15-17 Tavistock Place, WC1H 9SH London, UK

Assembly 2004). Globally, approximately 40.3 million people (including children) are exploited in various labor sectors (International Labour Office 2017). The Asia–Pacific region, which includes the greater Mekong Subregion (GMS), accounts for the largest number of forced laborers (62% of the global total), where four out of every 1000 people suffer from forced labor and two out of every 1000 people are in a forced marriage situation (International Labour Office 2017).
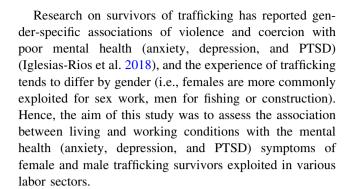
The global and complex dimensions of human trafficking first require the recognition that unfair and extreme exploitative labor practices are intrinsically linked to the demands of the global economy that impact health equity. Second, human trafficking is rooted in systematic social and economic inequities that sustain unfair and unlawful labor practices. Therefore, a better understanding of the working and living conditions during trafficking and their effects on the mental health of survivors is critical to further our knowledge of the health impact of these extreme forms of labor exploitation.

Previous research among trafficking survivors indicates a wide range of harmful and inhumane living and working

conditions that occur during trafficking (Kiss et al. 2015a; Zimmerman and Schenker 2014). However, research on the mental health consequences of these extreme exploitative working and living conditions during trafficking is limited even though they are embedded in the trafficking experience and could impact survivors' mental health. Poor living conditions include lack of provision for basic needs such as a lack of drinking water and food, limited access to toileting and poor hygiene conditions, dangerous living conditions, lack of personal freedom, and confinement, among others (Kiss et al. 2015a; Pearson et al. 2006; Zimmerman et al. 2014). Unsafe and dangerous working conditions may include lack of protection (e.g., condoms or helmets), extremely long work hours or indefinite work hours, exposure to hazardous substances and chemicals, being forced to work under adverse weather conditions, and lack of breaks. Legal and economic insecurity faced by trafficked persons can include lack of remuneration of any kind, confiscation of identity or travel documents, incarceration or detention (Kiss et al. 2015a; Pearson et al. 2006; Zimmerman et al. 2014).

Occupational and environmental stressors are known risk factors for adverse mental health outcomes (Evans and Cohen 1987; Commission on the Social Determinants of Health 2008). Studies in the general population show that poor living conditions (e.g., poor housing, crowding, noise, and poor indoor air quality) are associated with psychological distress, sleep deprivation, violence, anxiety, and depression (Commission on the Social Determinants of Health 2008; Evans and Cohen 1987; Evans et al. 2000; World Health Organization 2014). While similar conditions are endured by trafficking survivors (Kiss et al. 2015a), their impact on survivors' mental health is unknown. Similarly, research on non-trafficked workers indicates that the psychosocial and the physical work environment can have an impact on the mental health of workers (World Health Organization 2000; Stansfeld and Candy 2006). Poor working conditions, such as physical and chemical hazards, shift work, long working hours, and job strain and inadequate training, are associated with an increased risk of anxiety and depression (World Health Organization 2000). Employment in occupations involving exposure to work-related threats and severe work stress is a strong risk factor for anxiety, depression, and other stress-related disorders, including suicide (Wieclaw et al. 2006; Woo and Postolache 2008). For example, symptoms of post-traumatic stress disorder (PTSD), anxiety, and depression have been reported among non-trafficked workers in meat processing plants, domestic work, factory and construction work, and sex work (Boschman et al. 2013; Lipscomb et al. 2007; Malhotra et al. 2013; Wong and Chang 2010), all common occupational sectors for trafficked individuals (Kiss et al. 2015a).

Research on survivors of trafficking has reported gender-specific associations of violence and coercion with poor mental health (anxiety, depression, and PTSD) (Iglesias-Rios et al. 2018), and the experience of trafficking tends to differ by gender (i.e., females are more commonly exploited for sex work, men for fishing or construction). Hence, the aim of this study was to assess the association between living and working conditions with the mental health (anxiety, depression, and PTSD) symptoms of female and male trafficking survivors exploited in various labor sectors.

Methods

The data from this cross-sectional study were from the Study on Trafficking, Exploitation and Abuse in the Mekong Subregion (STEAM) (Kiss et al. 2015a). The study included 1015 female and male trafficking survivors, including youth, and children (aged 10–17 years) who attended post-trafficking assistance services in Cambodia, Thailand, and Vietnam. Details of the study design had been published elsewhere (Kiss et al. 2015a).

A two-stage sampling strategy was employed to identify 15 post-trafficking service providers in Cambodia, Thailand, and Vietnam. These service providers were selected based on sociodemographically diverse profiles of the population they served (e.g., age, sex, and sector of exploitation), relationship with International Office of Migration (IOM) country teams, and agreements with government agencies. Then, a consecutive sample of individuals voluntarily agreed to participate in a structured interview within two weeks of admission to the post-trafficking services. Individuals were invited to participate in the study after a locally trained caseworker or social worker determined that their participation would not cause harm to their well-being. Recruitment took place between October 2011 and May 2013. The response rate for the survey was 98%. The survey questionnaire was adapted from a prior instrument used in a European study on health and sex trafficking (Zimmerman et al. 2006). The instrument was translated into Khmer, Thai, Vietnamese, Burmese, and Lao from English, with iterative group translation discussions with IOM counter-trafficking teams, pilot-testing, and review after back translation into English.

Anxiety and depression symptoms experienced within the past week were measured by the Hopkins Symptom Checklist-25 (HSCL-25), a symptom inventory which measures symptoms of anxiety and depression (Mollica et al. 1987). It consists of 25 items: ten items for anxiety symptoms and 15 items for depression symptoms. The scale for each question includes four categories of response ("Not at all," "A little," "Quite a bit," and "Extremely,"

rated 1–4, respectively). Two scores are calculated: The anxiety score is the average of all ten items, while the depression score is the average of the 15 depression items. The depression score is correlated with major depression as defined by the *Diagnostic and Statistical Manual of the American Psychiatric Association*, 4th edition (*DSM-IV*) in several populations (American Psychiatric Association 1994). A cutoff of 1.625 instead of the established value of 1.75 was used to identify symptoms of depression, because the item "loss of sexual interest or pleasure" was excluded, given the experiences of the study population. For anxiety, a cutoff of 1.75 determined symptoms of anxiety, based on the previous research on individuals using post-trafficking services and studies of Cambodian, Laotian, and Vietnamese refugees in which this instrument has been validated (Mollica et al. 1987, 1993; Ottisova et al. 2016).

PTSD symptoms in the past week were measured using the 27 trauma symptoms from the Harvard Trauma Questionnaire part IV (Mollica et al. 1996). The first 16 items were derived from the *DSM-IV* criteria for PTSD symptoms (American Psychiatric Association 1994). The rest of the items focus on the impact that the traumatic experience may exert on an individual's life. Each question has four response categories: "Not at all," "A little," "Quite a bit," and "Extremely," rated 1–4, respectively. A total score was calculated by averaging the 27 items. A cutoff of 2.0 was used to assess symptoms of PTSD based on the previous research on trafficked individuals accessing post-trafficking services (Hossain et al. 2010; Kiss et al. 2015a; Zimmerman et al. 2008). Questions to assess living conditions included ten items related to adverse living conditions, such as living and sleeping in overcrowded rooms or sleeping in dangerous conditions (e.g., close to a generator or engine), sleeping on the floor or having nowhere to sleep, poor basic hygiene, insufficient food and water, no clean clothing, no or very few rest breaks, overexposure to adverse weather conditions (sunlight or rain), being locked in a room, and restricted freedom (never being free to do what they wanted or go where they wanted). Based on the distribution of the variable, we categorized these ten questions into a single categorical variable: 0 (0 or 1 adverse living condition), 1 (2 or 3 adverse living conditions), or 2 (4 or more adverse living conditions).

Working conditions included working hours, legal, and economic insecurity. Excessive work hours in the forced labor sector were determined based on the International Labour Organization's International Standards on Working Time and combined two variables: hours worked per day and hours worked per week (International Labour Office 2005). We defined non-abusive working time as less than 8 h of work per day or 40 h per week. Working time of 8–10 h per day or 40–48 h per week was defined as excessive. Extremely excessive working time included more than 10 h per day or more than 48 h per week, or no fixed time (> 24 h) (International Labour Office 2005). Legal and economic insecurity (yes or no) during trafficking was assessed with items related to confiscation of documents (personal identification or travel documents), economic exploitation (lack of remuneration), and being in detention in the destination country of exploitation (Pearson et al. 2006).

Covariates included in this analyses were based on prior trafficking research (Iglesias-Rios et al. 2018; Kiss et al. 2015a; Ottisova et al. 2016) and included: age (10–17, 18–25, and 26 or above), country of exploitation [Thailand, China, or others (Cambodia, Malaysia, Vietnam, Indonesia, Mauritius, South Africa, and Russia)], and sector of exploitation. Participants were asked about the type of exploitative sector they were in most recently. Sectors of exploitation in females were defined by four sectors as: (a) sex work, forced marriage, entertainment, or dancing; (b) domestic work, cleaning, restaurant work, or begging; (c) construction and factory work; (d) livestock, meat packing and preparation, agriculture, and fishing. For males, we assessed the same sectors as above but collapsed sectors a and b into one category due to small sample size and based on the previous literature suggesting that some of these sectors of exploitation share similar levels of violence (see Table 1) (Kiss et al. 2015a; Kristen et al. 2015; Zimmerman et al. 2008). For coercion, two questions (yes or no) evaluated threats experienced while being trafficked: (a) "While you were in this situation, did anyone threaten to hurt you?" and (b) "During this time did anyone threaten to hurt your family or someone you care about?" These questions are considered hallmarks of the trafficking experience (Kiss et al. 2015a; Zimmerman et al. 2006; Zimmerman and Schenker 2014).

A strict ethical and safety protocol was implemented based on the *World Health Organization (WHO) Ethical and Safety Recommendations for Interviewing Trafficked Women* (Zimmerman and Watts 2003). Ethical approval for the study was granted by the LSHTM and by the National Ethics Committee for Health Research in Cambodia, the Hanoi School of Public Health in Vietnam, and the Ministry of Social Development and Human Security in Thailand. This present study has been approved by the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board, eResearch ID: HUM00097096.

Statistical analyses

We analyzed the data as a complex sample with location of post-trafficking services as the clustering unit. Bivariate analyses using Rao–Scott Chi-square tests were conducted to assess associations of living, working, and legal and

Table 1 Living and working conditions of trafficked survivor females and males (n = 1015): The study on trafficking, exploitation and abuse in the Mekong Subregion (Cambodia, Vietnam, Thailand 2011–2013)

	Total n (%)	Females n (%)	Males n (%)
Total	1015	569 (56.1)	446 (43.9)
Living and working conditions			
Number of adverse living conditions during trafficking			
0–1	294 (29.0)	264 (46.4)	30 (6.7)
2–3	258 (25.4)	167 (29.4)	91 (20.4)
4 or more	463 (45.6)	138 (24.3)	325 (72.9)
Length of usual work day (hours)[a]			
< 8	146 (15.0)	113 (21.0)	33 (7.5)
8–10	145 (15.0)	94 (17.2)	51 (11.5)
> 10	296 (30.0)	99 (18.1)	197 (44.6)
No fixed time (> 24)	402 (41.0)	241 (44.1)	161 (36.4)
Was in detention or in prison in the destination country[b]			
Yes	245 (24.2)	118 (21.0)	127 (28.5)
No	767 (76.0)	448 (79.2)	319 (71.5)
Had identity or travel documents[c]			
Yes	314 (31.0)	217 (38.1)	97 (21.8)
No	700 (69.0)	352 (61.9)	348 (78.2)
Received monetary compensation[d]			
Yes	380 (37.7)	249 (44.2)	131 (29.4)
No	629 (62.3)	315 (55.9)	314 (70.6)

[a]Four males and 22 females missing

[b]Three females missing

[c]One missing male

[d]Five females and one male missing

economic insecurity conditions with each of the mental health outcomes (anxiety, depression, and PTSD symptoms). Unadjusted and adjusted modified Poisson regression models were used to estimate prevalence ratios (PRs) and their 95% confidence intervals (CI) for the association between living, working, and legal and economic insecurity conditions, and mental health symptoms (anxiety, depression, and PTSD) (Yelland et al. 2011; Zou 2004). Because of important gender differences in the distribution of sectors of exploitation and other sociodemographic factors (Iglesias-Rios et al. 2018), analyses were stratified by gender. The fit of the model was assessed by the independence model criterion (QIC) statistic, and an exchangeable correlation structure was used to account for cluster sampling. Generalized estimation equations (GEEs) with an extension of the sandwich variance estimator were used to calculate a robust variance estimation that considers the level of correlation of observations within a cluster and produces standard errors of the estimates accordingly. All analyses were performed using SAS version 9.4 (SAS Institute, Inc., Cary, NC).

Results

Descriptive characteristics of the living and working conditions of the study population stratified by gender are presented in Table 1. Sociodemographic characteristics of the study population by gender and prevalence of mental health symptoms had been published elsewhere (Iglesias-Rios et al. 2018).

A total of 569 (56.1%) females and 446 (43.9%) males participated in the survey. Males were more likely to report four or more adverse living conditions during trafficking than females (72.9% versus 24.3%). Work hours of forced labor for both males and females were excessive. Indefinite work hours (> 24 h) were reported by almost a half of the sample of females (44.1%) and more than a third of males (36.4%). More males than females (28.5% vs. 21.0%) were detained in an immigration detention center or a jail after being trafficked. Females were more likely to have identifying or travel documents (38.1%) and to have received some monetary compensation (44.2%) during trafficking than males. Tables 2, 3, and 4 present the results of the crude and adjusted modified Poisson regression models for

Table 2 Association of living and working conditions with anxiety for trafficked females ($n = 569$) and males ($n = 446$): crude and adjusted prevalence ratios: The study on trafficking, exploitation and abuse in the Mekong Subregion (Cambodia, Vietnam, Thailand 2011–2013)

	Females anxiety				Males anxiety			
	Unadjusted model		Adjusted[a] model		Unadjusted model		Adjusted[b] model	
	PR[c]	95% CI[d]	PR	95% CI	PR	95% CI	PR	95% CI
Living and working conditions								
Number of adverse living conditions during trafficking								
0–1 (referent)	1.0		1.0		1.0		1.0	
2–3	1.95	1.58–2.42***	1.59	1.24–2.04***	2.58	1.08–6.15*	2.05	1.00–4.22*
4 or more	2.38	2.04–2.77***	1.72	1.33–2.24***	3.09	1.54–6.23***	2.21	1.24–3.96**
Length of usual work day (hours)								
< 8 h (referent)	1.0		1.0		1.0		1.0	
8–10 h	1.81	1.41–2.32***	1.58	1.27–1.97***	1.76	1.13–2.76**	1.65	1.01–2.70*
> 10 h	2.23	1.90–2.62***	1.55	1.19–2.02***	1.59	0.97–2.60	1.32	0.77–2.28
No fixed time (> 24 h)	1.47	1.24–1.74***	1.27	0.98–1.64	1.80	1.34–2.40***	1.53	1.02–2.27*
Legal and economic conditions								
Had identity or travel documents								
Yes (referent)	1.0		1.0		1.0		1.0	
No	1.13	0.81–1.58	1.04	0.76–1.42	0.70	0.58–0.84***	0.74	0.60–0.91**
Received monetary compensation								
Yes (referent)	1.0		1.0		1.0		1.0	
No	1.43	1.13–1.80**	0.90	0.65–1.24	1.04	0.84–1.28	0.90	0.77–1.06
Was in detention in the destination country								
No (referent)	1.0		1.0		1.0		1.0	
Yes	1.17	0.92–1.49	1.04	0.87–1.25	1.61	1.23–2.11***	1.48	1.22–1.78***

*$p \le 0.05$; **$p \le 0.01$; ***$p \le 0.001$

[a]Females adjusted model: age, sector of exploitation, threats, living conditions, length of work hours in a day, identity or travel documents, and monetary compensation

[b]Males adjusted model: age, sector of exploitation, threats, living conditions, length of work hours in a day, identity or travel documents, monetary compensation, and detained in destination country

[c]PR: Prevalence ratio

[d]95% Confidence interval

the association of living and working conditions with anxiety, depression, and PTSD for females and males.

Table 2 shows that after adjustment and compared to females with zero or one adverse living condition during trafficking, the prevalence of anxiety among those with two or three or four or more adverse living conditions was more than 50% (PR = 1.59; 95% CI 1.24–2.04) and 70% (PR = 1.72; 95% CI 1.33–2.24) higher, respectively. In contrast, males had a twofold greater prevalence of anxiety with two or three (PR = 2.05; 95% CI 1.00–4.22), or four or more (PR = 2.21; 95% CI 1.24–3.96), adverse living conditions, compared to males with none or one adverse living event during trafficking.

In the adjusted model, men and boys who worked indefinite work hours (>24 h) had a 50% (PR = 1.53; 95% CI 1.02–2.27) higher prevalence of anxiety compared to those working less than eight hours. Males who worked 8–10 h had more than a 60% greater prevalence for anxiety (PR = 1.65; 95% CI 1.01–2.70). Similarly, females who worked 8–10 h (PR = 1.58; 95% CI 1.27–1.97) and more than 10 h (PR = 1.55; 95% CI 1.19–2.02) a day had more than a 50% higher prevalence of anxiety when compared to those working less than 8 h a day and after adjustment.

In adjusted models, males without documents had 26% (PR = 0.74; 95% CI 0.60–0.91) lower prevalence of anxiety compared to those with identity or travel documents. Men and boys placed in detention in the destination country had almost a 50% elevated prevalence of anxiety (PR = 1.48; 95% CI 1.22–1.78) compared to males not in detention. Legal and economic insecurity conditions during trafficking were not associated with anxiety among females.

Table 3 shows that the prevalence of depression was more than twice as high among males that suffered two or

Table 3 Association of living and working conditions with depression for trafficked females ($n = 569$) and males ($n = 446$): crude and adjusted prevalence ratios: the study on trafficking, exploitation and abuse in the Mekong Subregion (Cambodia, Vietnam, Thailand 2011–2013)

	Females depression				Males depression			
	Unadjusted model		Adjusted[a] model		Unadjusted model		Adjusted[b] model	
	PR[c]	95% CI[d]	PR	95% CI	PR	95% CI	PR	95% CI
Living and working conditions								
Number of adverse living conditions during trafficking								
0–1 (referent)	1.0		1.0		1.0		1.0	
2–3	1.37	1.12–1.68**	1.23	1.06–1.44**	3.10	1.47–6.54***	2.55	1.64–3.95***
4 or more	1.38	1.23–1.56***	1.15	1.02–1.29*	3.17	1.55–6.47***	2.63	1.62–4.26***
Length of usual work day (hours)								
< 8 h (referent)	1.0		1.0		1.0		1.0	
8 to 10 h	1.32	1.14–1.52***	1.29	1.16–1.44***	2.59	2.20–3.04***	1.92	1.23–2.99**
> 10 h	1.54	1.34–1.75***	1.47	1.25–1.74***	2.00	1.58–2.53***	1.42	0.98–2.06
No fixed time (> 24 h)	1.27	1.09–1.47**	1.23	1.09–1.38***	2.11	1.69–2.62***	1.53	0.97–2.41
Legal and economic conditions								
Had identity or travel documents								
Yes (referent)	1.0		1.0		1.0		1.0	
No	1.07	0.97–1.18	0.92	0.83–1.02	0.73	0.60–0.88***	0.77	0.71–0.83***
Received monetary compensation								
Yes (referent)	1.0		1.0		1.0		1.0	
No	1.17	1.02–1.34	0.98	0.84–1.14	0.99	0.83–1.18	0.85	0.74–0.97**
Was in detention or jail								
No (referent)	1.0		1.0		1.0		1.0	
Yes	1.06	0.89–1.26	1.00	0.84–1.19	1.34	1.10–1.63**	1.30	1.17–1.44***

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

[a]Females adjusted model: age, sector of exploitation, threats, living conditions, length of work hours in a day, identity or travel documents, monetary compensation, and detained in destination country

[b]Males adjusted model: age, sector of exploitation, threats, living conditions, length of work hours in a day, identity or travel documents, monetary compensation, and detained in destination country

[c]PR: Prevalence ratio

[d]95% Confidence interval

three (PR = 2.55; 95% CI 1.64–3.95) or four or more (PR = 2.63; 95% CI 1.62–4.26) adverse living conditions, compared to those reporting none or one adverse living event during trafficking after adjustment. In contrast, for females, the prevalence of depression was more than 10% in those reporting two or three adverse living conditions (PR = 1.23; 95% CI 1.06–1.44) or four or more poor living conditions (PR = 1.15; 95% CI 1.02–1.29), compared to those reporting none or one adverse living conditions.

After adjustment, all the categories of excessive working time in females were significantly associated with a higher prevalence of depression of more than 20%. Particularly, women and girls working more than 10 h had a 47% elevated prevalence of depression after adjustment (PR = 1.47; 95% CI 1.25–1.74) compared to those working fewer than eight hours. For males, only those working 8 to

10 h had a 90% (PR = 1.92; 95% CI 1.23–2.99) higher prevalence of depression.

For males, there was a 15% (PR = 0.85; 95% CI 0.74–0.97) and 23% (PR = 0.77; 95% CI 0.71–0.83) lower prevalence of depression among those who did not receive any monetary compensation and those who did not have travel or identity documents during the time they were being trafficked, respectively. For men and boys in detention centers, the prevalence of depression was about 30% greater (PR = 1.30; 95% CI 1.17–1.44) than among those who were not in detention after adjustment. No statistically associations were observed between legal and economic insecurity conditions and depression in females.

Table 4 shows that males, after adjustment, the prevalence of PTSD more than doubled among those with two or three (PR = 2.93; 95% CI 1.65–5.19), and four or more (PR = 2.39; 95% CI 1.39–4.10) adverse living events,

Table 4 Association of living and working conditions with post-traumatic stress disorder (PTSD) for trafficked females (*n* = 569) and males (*n* = 446): crude and adjusted prevalence ratios: The study on trafficking, exploitation and abuse in the Mekong Subregion (Cambodia, Vietnam, Thailand 2011–2013)

	Females PTSD[a]				Males PTSD			
	Unadjusted model		Adjusted[b] model		Unadjusted model		Adjusted[c] model	
	PR[d]	95% CI[e]	PR	95% CI	PR	95% CI	PR	95% CI
Living and working conditions								
Number of adverse living conditions during trafficking								
0–1 (referent)	1.0		1.0		1.0		1.0	
2–3	1.95	1.41–2.70***	1.74	1.04–2.90*	3.77	1.86–7.63***	2.93	1.65–5.19***
4 or more	2.02	1.44–2.85***	1.73	0.91–3.30	3.51	1.52–8.11*	2.39	1.39–4.10***
Length of usual work day (hours)								
< 8 h (referent)	1.0		1.0		1.0		1.0	
8–10 h	1.46	1.18–1.79***	1.49	1.26–1.77***	6.09	3.62–10.24***	4.47	2.30–8.67***
> 10 h	2.35	1.45–3.80***	2.06	1.11–3.81*	4.92	3.20–7.57***	3.35	1.90–5.92***
No fixed time (> 24 h)	1.59	1.07–2.35*	1.70	1.04–2.79*	5.33	2.14–13.28***	3.84	1.79–8.25***
Legal and economic conditions								
Had identity or travel documents								
Yes (referent)	1.0		1.0		1.0		1.0	
No	1.02	0.80–1.29	0.97	0.75–1.26	0.83	0.57–1.21	0.96	0.81–1.15
Received monetary compensation								
Yes (referent)	1.0		1.0		1.0		1.0	
No	1.15	0.94–1.40	0.69	0.46–1.05	1.28	0.96–1.73	1.04	0.79–1.35
Was in detention in the destination country								
No (referent)	1.0		1.0		1.0		1.0	
Yes	1.00	0.73–1.37	0.79	0.58–1.08	1.53	1.18–1.99***	1.49	1.21–1.83***

*p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001

[a]PTSD: Post-traumatic stress disorder symptoms

[b]Females adjusted model: age, sector of exploitation, threats, living conditions, length of work hours in a day, identity or travel documents, monetary compensation, and detained in destination country

[c]Males adjusted model: age, sector of exploitation, threats, living conditions, length of work hours in a day, identity or travel documents, monetary compensation, and detained in destination country

[d]PR: Prevalence ratio

[e]95% Confidence interval

compared to males with none or one adverse living conditions. For females, with two to three adverse living conditions, the prevalence of PTSD was greater than 70% compared to those with none or one adverse living event.

After adjustment, men and boys working 8 to 10 h had more than four times higher prevalence of PTSD when compared to those working less than eight hours (PR = 4.47; 95% CI 2.30–8.67). Likewise, males working more than 10 h (PR = 3.35; 95% CI 1.90–5.92) or no fixed time (PR = 3.84; 95% CI 1.79–8.25) had more than a threefold elevated prevalence of PTSD.

Compared to females working less than eight hours per day, the prevalence of PTSD doubled among females working more than 10 h (PR = 2.06; 95% CI 1.11–3.81). Females working 8 to 10 h or indefinite work time (> 24 h)

had more than a 40% and 70% greater prevalence of PTSD, respectively. Overall, the associations of working hours and PTSD were stronger in males than females. Males in detention centers had almost a 50% elevated prevalence of PTSD compared to those not placed in detention. Having identity or travel documents or being compensated was not associated with PTSD symptoms in females and males.

Discussion

We assessed how conditions experienced during trafficking were associated with the mental health of female and male survivors exploited in different labor sectors. Our results indicate a strong association between living and working

conditions and poor mental health for both females and males, but these relationships differ by gender. For males in particular, the prevalence of anxiety, PTSD, and depression was strongly influenced by adverse living conditions. These findings are consistent with prior research with non-trafficked populations that report that psychosocial stressors and substandard living conditions may influence the development of stress-related disorders, such as anxiety, PTSD, and depression (Cohen et al. 2007; Evans and Cohen 1987; Song et al. 2018).

A key finding was that excessive working hours and an indefinite number of work hours during trafficking elevated the prevalence of anxiety, depression, and especially PTSD symptoms in males. For females, such working hours were particularly associated with a higher prevalence of depression and PTSD. Remarkably, we found a three- and fourfold greater prevalence of PTSD in males working an excessive and indefinite number of work hours.

These findings are consistent with the exploitative nature of trafficking and the fact that in Asia and the Pacific region, legal working time standards are not well regulated or do not exist (Labour Department Hong Kong 2012; Pearson et al. 2006). However, to our knowledge, the strong association between working hours and mental health of males has not been previously documented in trafficking research.

Our findings concur with longitudinal and cross-sectional studies in non-trafficked working populations, which report a relationship between long working hours and symptoms of anxiety and depression (Afonso et al. 2017; Virtanen et al. 2011). Long working hours can jeopardize the health and safety of workers as they increase the risk of physical exhaustion, sleep deprivation, insomnia, and suicide (Afonso et al. 2017; Kiss et al. 2015b; Pearson et al. 2006).

In terms of legal and economic insecurity, we found that males who kept their identity or travel documents or received some monetary compensation had a greater prevalence of anxiety and depression. While this may seem counter-intuitive, it is common for trafficked individuals to be deceived about the job or to stay in the exploitative situation because they are receiving some income, as they often have large financial debts or are in desperate situations (Zimmerman et al. 2014; Pearson et al. 2006). A report of the STEAM showed that more than 45% of individuals reported not leaving the trafficking situation because they were making some money (Zimmerman et al. 2014). Exploited workers are grossly underpaid below the minimum wage standard, and they are often extorted and forced to pay extra money for their accommodations and food or charged for "mistakes" while working or when they are ill (Kiss et al. 2015a; Pearson et al. 2006). Thus, providing monetary compensation does not necessarily

reduce the risk of suffering adverse events and poor mental health.

Overall, our findings contradict the belief that having legal documentation or being compensated is protective for trafficked individuals or individuals in at high risk occupations for labor exploitation and trafficking. Our finding of a higher prevalence of anxiety, PTSD, and depression in men and boys placed in detention centers or jails, which are common sites of human right abuses, is consistent with the previous literature on the poor mental health of migrants, refugees, and asylum seekers (Keller et al. 2003; Silove 1999).

The results highlight strong associations between living and workplace conditions during trafficking with poor mental health in survivors of trafficking. In terms of prevention, these results indicate the need for better enforcement of labor standards and inspections in work sectors known for exploitation (e.g., sex work, domestic work, fishing, and agriculture). Specifically, training for labor inspectors should include the identification of indicators of labor exploitation and forced labor or human trafficking.

Mental health providers and stakeholders need to recognize the complex mental health trauma of the different effects of living and working conditions for female and male survivors in order to provide a more holistic assessment and treatment approach. Information on the living and working conditions during trafficking is also valuable to support recovering efforts and facilitate transition into long-term social and economic self-sufficiency.

Limitations

The present study has some limitations. The study population represents a sample of trafficking survivors using post-trafficking services. People in post-trafficking services represent a small segment of trafficked individuals that either escape or were rescued. Therefore, we likely missed individuals under the most severe forms of exploitation or those who are difficult to reach due to the sector of exploitation (e.g., domestic workers), who potentially have worse mental health and maybe less likely to be reached in post-trafficking services. In this case, prevalence ratio estimates will be underestimated. Screening instruments were not validated with the study population, but they had been used with survivors of trafficking (Hossain et al. 2010; Tsutsumi et al. 2008), validated and used in cross-cultural settings and among Southeast Asian populations (Kleijn et al. 2001; Mollica et al. 1993; Mollica et al. 1987).

Conclusions

We found that the association of living and working conditions with mental health was different in female and male trafficking survivors. These gender-specific associations

with mental health are important for research and policy efforts as today, most of antitrafficking interventions have been focused on females and sex trafficking. Research and policies need to include males to broaden the scope of our understanding of human trafficking in various labor sectors. This knowledge is critical to develop gender-inclusive policies and mental health services for survivors of trafficking. Post-trafficking mental health providers and stakeholders need to consider the mental health-related trauma associated with the working and living conditions of survivors to tailor their interventions and facilitate recovery and integration into society.

International and country-level legal labor procedures and policies could enforce stricter provisions and occupational regulatory standards to protect workers particularly in sectors known to be at high risk of forced labor or trafficking.

From a public health perspective, our efforts to prevent and address human trafficking need to include research and policy actions that seek to achieve global health equity (e.g., improving gender health equity, fair employment and decent working conditions, and creating and strengthening social protection systems and policies) (Commission on the Social Determinants of Health 2008). These are fundamental steps to address some of the structural layers of modern slavery and improve the mental health needs of people affected by forced labor and human trafficking.

Compliance and ethical standards

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