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Author(s)	Ni, MY; Li, KL; Pang, HMH; Chan, BHY; Yuan, BY; Kawachi, I; Schooling, CM; Leung, GM
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Direct participation in and indirect exposure to “Occupy Central” and depressive symptoms: a longitudinal study of Hong Kong adults

Michael Y. Ni¹, MBBS, MPH; Tom K. Li¹, MSc; Herbert Pang¹, PhD; Brandford HY Chan¹, PhD; Betty Y. Yuan¹, MPH; Ichiro Kawachi^{2,3}, MBChB, PhD.; C. Mary Schooling^{1,4}, PhD; Gabriel M. Leung¹, MD, MPH

Affiliations:

1. School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong Special Administrative Region, China.
2. Department of Social & Behavioral Sciences, Harvard T. H. Chan School of Public Health, Boston, Massachusetts, United States of America
3. Channing Division of Network Medicine, Department of Medicine, Brigham and Women’s Hospital, Boston, Massachusetts, United States of America
4. School of Public Health, Hunter College and CUNY, New York, New York, United States of America

Corresponding author:

Dr. Michael Y. Ni, School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong SAR, People’s Republic of China.

Tel: +852 3917 6776; Fax: +852 3520 1945; email: nimy@hku.hk.

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Abbreviations:

CI: Confidence interval

IRR: Incidence rate ratio

PHQ-9: The Patient Health Questionnaire

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ABSTRACT

Despite the extensive history of social movements around the world, the evolution of population mental health before, during and after a social movement remains sparsely documented. We sought to assess over time the prevalence of depressive symptoms during and after the “Occupy Central” movement in Hong Kong, and to examine the association of direct and indirect exposures to Occupy Central with depressive symptoms. We longitudinally administered interviews at six time points for 909 adults randomly sampled from the population-representative FAMILY Cohort from March 2009 to March 2015: twice each before, during and after the Occupy Central protests. The Patient Health Questionnaire-9 was used to assess depressive symptoms and probable major depression (Patient Health Questionnaire-9 \geq 10). The absolute prevalence of probable major depression increased by 7% after Occupy Central, regardless of personal involvement in the protests. Higher levels of depressive symptoms were associated with online and social media exposure to protest-related news (IRR 1.28, 95% CI 1.06-1.55) and more frequent Facebook (Facebook Inc., Menlo Park, California) use (IRR 1.38, 95% CI 1.12-1.71). Higher intra-familial socio-political conflict (IRR 1.05, 95% CI 1.01-1.09) were associated with more depressive symptoms. The Occupy Central protests resulted in substantial and sustained psychological distress in the community.

Keywords: Depression, epidemiology, longitudinal, social movement, protest, social media, social psychiatry

Despite the extensive history of social movements around the world, their impact on population mental health has been seldom documented. By comparison, the mental health consequences of other large-scale population events such as natural disasters (1-4), terrorist attacks (5-8) and epidemics (9) have been much better documented (2-4). These studies indicate a significant toll of psychopathology associated with mass community trauma; however whether similar findings apply to social movements remains unclear. Attributes that are common to both categories of events may include disruption of services and social networks (2, 3). On the other hand, disaster or terrorist attacks which threaten the entire community can be occasions for increased solidarity, whereas social movements might exacerbate ideological divisions within the community.

Demographic factors such as younger age, female sex and lower socioeconomic status have been identified as risk factors for post-disaster mental illness (2, 10), although the association with age appears to be contextually specific (3). In comparison, the degree of exposure to a disaster has consistently predicted post-disaster mental illness (2, 3). Indirect exposures to terrorist attacks, such as the number of hours of television (TV) coverage viewed, has been linked to psychological distress (7, 11). Rumination on negative events such as repeated viewing of distressing images could perpetuate activation of the fear circuitry in the brain, thus contribute to the development of stress responses (12, 13). As psychologically vulnerable individuals may tend to ruminate on media coverage of disasters, this could potentially confound associations between media exposure and psychological distress (7). To control for these potential confounding influences, pre-event mental health data would

be required. However, the majority of the disaster- and social movement-related literature consists of cross-sectional studies in the aftermath of the event with limited pre-event data (2, 3, 14). In cross-sectional studies, it is also difficult to determine if psychopathology was directly related to the event or preceded the event (15). To address these limitations, longitudinal studies have been recommended to prospectively measure exposures and health outcomes before, during and after the event (2, 4).

From September 28 to December 15 2014, a civil disobedience campaign “Occupy Central” (latterly also known as the “Umbrella Movement”) calling for genuine universal suffrage took place in Hong Kong (Web Figure 1). Major transport arteries were blocked by camping protesters throughout the 79-day period. Contemporaneous surveys indicated that 17.6 to 20.1% of respondents had participated in one way or another (16, 17). What began as a largely peaceful movement was punctuated by escalating violent episodes as the campaign wore on (18). Although hundreds of mostly minor injuries and emergency room visits related to Occupy Central were recorded (19, 20), the protests did not result in any deaths, shootings, or arson.

In the present study, we took advantage of an ongoing population-representative cohort in Hong Kong to track the evolution of psychological reactions to Occupy Central. We administered interviews at six time points (waves): twice each before, during and after Occupy Central. We sought to assess (1) the prevalence of depressive symptoms and probable major depression in response to Occupy Central; and (2) to examine the association of demographic factors and exposures to Occupy Central (direct and indirect) with depressive symptoms and probable major depression.

METHODS

Study design and participants

The sample was drawn from the FAMILY Cohort, a prospective population-representative cohort study described in detail elsewhere (21). The sampling unit of the FAMILY Cohort was a family living in the same household. The sample was obtained by stratified random sampling of households from all 18 districts in Hong Kong with sample sizes proportionate to each of the district populations. Wave 1 of household visits (n=17 002 adults) was conducted from March 2009 to April 2011, and wave 2 (n=12 448 adults) took place from August 2011 to June 2013. The follow-up rate of wave 1 participants in wave 2 was 73.2%, and the Cohen's w effect size for socio-demographic differences by response status in wave 3 were small to medium (<0.3) (21). Information on individual demographics (age, sex, marital status, education, employment, and household income) was obtained from participants at wave 2 using a structured questionnaire.

A randomly drawn sample of 909 adult participants aged ≥ 18 years (no more than one participant was enrolled from each eligible household) who completed both waves 1 and 2 were surveyed within the first month of Occupy Central (wave 3). This panel of individuals was followed up during Occupy Central (waves 3 and 4) and after Occupy Central (waves 5 and 6) using computer-assisted telephone interviews (Web Figure 2). Wave 5 deliberately only contacted a subset of participants as the survey was conducted to estimate the prevalence of depressive sequelae in the immediate aftermath of Occupy

Central and to reduce response fatigue. We calculated cooperation and response rates according to prevailing accepted standards (22). Informed consent was obtained from all individual participants included in the study. This study was approved by the Institutional Review Board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster.

Depressive symptoms and probable major depression

Depressive symptoms during the two weeks previous to the time of the telephone interviews were assessed using the Patient Health Questionnaire-9 (PHQ-9) in waves 1 to 6. We focused on depression as it is one of the most commonly studied psychological sequelae of trauma and disasters (2, 3). The PHQ-9 is a standardised nine-item scale consistent with the diagnostic criteria for major depressive episode in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*. The PHQ-9 is a reliable and valid measurement for depressive symptoms in the Hong Kong population (23). We considered PHQ-9 as a continuous depressive symptoms score (range=0-27) and a binary indicator for probable major depression (PHQ-9 \geq 10) (24). We use the term *probable* as the PHQ-9 is a screening instrument and not a diagnostic interview. A score of 10 or greater has a sensitivity of 85% and specificity of 89% for the diagnosis of major depression (24). Participants' mental health histories pre-dating the Occupy Central protests (waves 1, 2 and 6) were also ascertained using a dichotomous index for the presence of any one of doctor-diagnosed depression, anxiety disorder or schizophrenia.

Exposure variables

We assessed direct exposures to Occupy Central during the protests, i.e., during the first month, second month, and final two weeks of Occupy Central. Degree of participation by respondents and their family members was assessed including frequency of visiting, assembling (e.g. sitting down at protest sites) and staying overnight.

During the telephone interviews, we assessed indirect exposure during and after the protests by the hours per day spent on watching or reading about Occupy Central via traditional media (TV, newspaper, radio) and new media (online and social media). We specifically measured self-reported use of Facebook (Facebook Inc., Menlo Park, California), which has been the dominant form of social media in Hong Kong (25), including frequency of Facebook access, and number of people 'unfriended' and 'unfollowed' due to Occupy Central. As social movements may result in interpersonal conflicts beyond the protest sites, we also assessed intra-familial socio-political conflict using the item "Have you had any disputes or conflicts with family members due to social or political reasons over a defined time period? (i.e. past 3 months or 1 month or 2 weeks)". The severity of the dispute or conflict was rated from 1 (very mild) to 10 (very severe).

Statistical analysis

We estimated the prevalence of direct and indirect exposure to Occupy Central, and depressive symptoms and probable major depression across the six waves. We used generalized estimating equations with log/logit link function to estimate the incidence rate ratios (IRRs)/odds ratios for depressive symptom

score/probable major depression. The log link was used as the distribution of depressive symptom score was similar to that of a count variable and was right-skewed. We accounted for overdispersion by assuming a negative binomial variance in the generalized estimating equations model (26). In the model assessing change in depressive symptom score and probable major depression before and after Occupy Central, waves 1 and 2 were grouped into one category to serve as the baseline reference. We investigated the associations of baseline characteristics, acute direct and indirect exposures to Occupy Central and changes in intra-familial socio-political conflict with depressive outcomes during the six months following Occupy Central (waves 3, 4 and 6). We adjusted the models for age, sex, marital status, education, household income, occupation, baseline depressive symptom score and the presence of pre-existing doctor-diagnosed depression, anxiety disorder or schizophrenia. We used multiple imputation to handle incomplete data for exposures and confounders, and combined the results from 20 imputed datasets using Rubin's rule (27). We carried out sensitivity analyses with complete case data and with inverse probability weighting to account for non-response during follow-up and post-stratification weighting. Censoring weights were created to account for the differential probability of dropout. The weights were defined as the inverse of the probability of participating in the follow-up surveys, estimated using logistic regression (26) with baseline characteristics including sociodemographics and PHQ-9. Post-stratification weighting was then applied using raking (28) so that each wave was representative of the Hong Kong population. All analyses were done using R version 3.2.1 and SAS University Edition 2014 (SAS Institute, Inc., Cary, North Carolina) .

RESULTS

Sample

In total, 909, 719, 353 and 684 participants were followed up in waves 3, 4, 5 and 6, respectively (Web Figure 2). The cooperation rate for wave 3 was 71.5%, and the response or cooperation rates for waves 4, 5 and 6 were over 70% (Web Figure 2). Cohen's *w* effect size for socio-demographic differences by response status in wave 3 were small to medium (<0.3). Incomplete data for each variable was less than 8%. Benchmarked against the census, poorer households and those living in public housing were over-represented, although this conformed to the demographic distribution of the original cohort. Each wave was similar to census data after post-stratification weighting (Web Table 1).

Direct and indirect exposures to Occupy Central

For direct exposures to Occupy Central, 51.8%, 13.6% and 2.3% of the sample visited, assembled, or stayed overnight in "Occupy" areas, respectively. In comparison, 16.1% of the sample reported that family members had assembled or stayed overnight. Among those who assembled in Occupy areas during the first month, the median total number of hours assembled was 3.3 (interquartile range 2.2-6.7). Among those who stayed overnight, the median total number of overnight stays was 2.0 (interquartile range 1.0-5.8).

For indirect exposures to Occupy Central, 24% spent 1 to 2 hours per day, 15.5% spent 2 to 3 hours per day, and 23.0% spent more than 3 hours per day on Occupy Central-related news during the first month of the protests (Web Table 2). Among users (50.9% of the sample), 23.9%, 52.5% and 23.6% accessed

Facebook less than daily, 1-9 times per day, and 10 times per day or more, respectively. 5.5% and 7.9% of Facebook users had 'unfriended' and 'unfollowed' people due to Occupy Central. Intra-familial socio-political conflict peaked in the first month of Occupy Central then declined thereafter. (Figure 1).

Depression

The weighted prevalence of probable major depression in waves 1 to 6 were 1.5% (95% CI 1.0-3.0), 1.6% (1.0-3.0), 6.7% (5.0-9.0), 6.3% (4.5-9.0), 6.8% (4.3-11.0) and 8.5% (6.4-11.0), respectively. The absolute prevalence of probable major depression increased by 5.1% (95% CI, 3.3-6.9), 4.8% (2.8-6.7), 5.3% (2.5-8.0), and 7.0% (4.7-9.2), during the first, second, third and sixth months following the start of the protests compared to before Occupy Central (average of waves 1 and 2), respectively (Web Table 2). In the fully adjusted models, depressive symptom scores were higher during and after Occupy Central compared to before the protests (Table 1). The odds of probable major depression was more than four times higher during and after Occupy Central than previously (Table 1).

Predictors of depression

Table 2 shows that age, sex, marital status, and education in the wave immediately preceding Occupy Central (wave 2) were not independently associated with depressive symptoms or probable major depression. Unemployment was associated with more depressive symptoms during and after Occupy Central.

Increased depressive symptoms were found regardless of whether the respondents personally participated in the protests (i.e. assembled or stayed overnight) or not (Table 3). Discordant protest participation status between respondents and their family members appeared to be associated with more depressive symptoms although this was only evident in the sensitivity analysis with inverse probability weighting to account for non-response during follow-up (IRR 1.32, 95% CI 1.06-1.64). Time spent on Occupy Central-related news via traditional media of television, newspaper and radio was not associated with depressive outcomes. By contrast, in the fully adjusted model, more intense social media use concerning Occupy Central-related news predicted greater depressive symptoms (Table 3). A one unit increase in intra-familial socio-political conflict from before Occupy Central to the first month of the protests was associated with a higher depressive symptom score by 5% during the six months following Occupy Central.

We repeated our analyses with complete cases only and with inverse probability weighting, both of which yielded similar findings (results not shown).

DISCUSSION

To our knowledge, this is one of the first longitudinal studies to examine the psychological sequelae of a major social movement. In our population-representative sample, enrolled prospectively several years prior to Occupy Central, we found a significant proportion of respondents had directly taken part in this social movement, in addition to having been intensively exposed via traditional and social media. Our findings show a substantial increase in psychological distress associated with Occupy Central which persisted for at

least six months in the aftermath of the protests. Moreover, the mental health consequences were pervasive across most socioeconomic strata and spilled over to individuals who did not personally take part in the protests.

Direct exposure to Occupy Central, defined as the degree of participation in the protests, was not associated with depressive outcomes six months after the protests. This diverges from disaster studies, where greater exposure to the event is consistently a strong predictor of psychopathology (2, 7). Disaster exposure may serve as a proxy for the level of exposure to highly stressful or traumatic events such as threats to life and witnessing of disturbing events (2, 3). However, this may not apply to social movements, especially when the protests are largely non-violent. The absence of large-scale violence may also explain the null association between time spent on TV coverage of Occupy Central and depressive symptoms. Our findings contrast the mental health consequences attributed to watching TV coverage of terrorist attacks, where images are often more graphic and gruesome (7).

On the other hand, we found that intensity of social media use during Occupy Central predicted increased depressive symptomatology. This is consistent with the finding of increased post-traumatic stress symptoms among social media users following Hurricane Sandy (29), and provides support to the hypothesis of massive-scale emotional contagion through social networks (30), especially during major events (29). An additional explanation for the association between social media use during Occupy Central and depressive symptoms relates to interactions with other online users with different ideological views (31), thereby possibly leading to interpersonal conflict

amongst friends and acquaintances. This is consistent with our finding of 'unfriending' and 'unfollowing' due to Occupy Central among Facebook users.

Our study has limitations. First, the original cohort was susceptible to sampling bias. The FAMILY Cohort enrolled complete households in which all adult members agreed to participate, thus potentially selecting better-functioning family units. However, the 'healthy volunteer effect' could still have occurred if individuals were sampled instead (21). Sensitivity analysis with censoring weights showed that loss to follow-up had little influence on our results. Second, even with our true cohort design, as opposed to a serial cross-sectional design involving different individuals, causality between Occupy Central and depression cannot be definitively inferred. It is however difficult to wholly attribute the dramatic findings to other causes. Third, findings on interpersonal socio-political conflict and social media are subject to reverse directionality. Depressed individuals during the protests might have experienced poorer social relations and ruminated on Occupy Central-related news. However, we adjusted for past mental health history and baseline depressive symptoms to mitigate confounding by pre-existing psychological vulnerabilities. Fourth, we assessed depressive symptoms and major depression through a self-reported scale rather than diagnostic interviews. However, depressive symptoms are associated with functional impairment (32), and predict the onset of major depression (33). Moreover, PHQ-9 has a diagnostic validity comparable to clinician-administered assessments (34). Fifth, waves 1 and 2 were conducted via face-to-face interviews while waves 3 to 6 were conducted by telephone interviews. Although the same PHQ-9 was administered in all waves, the difference in mode of interview administration could have potentially led to

reporting bias. However, good agreement between face-to-face and telephone administered standardized scales assessing depression has been reported (35), and classification of major depression by telephone-based interview showed generally good agreement with face-to-face interview in the Hong Kong Chinese population (36).

Probable major depression remained elevated by 7.0% six months after the start of the protests, which roughly translates into an estimated 360 000 excess cases of probable major depression among Hong Kong adults. However, this is likely an overestimate of the excess psychiatric burden as probable major depression may represent substantial psychological distress in response to an abnormal event as opposed to true psychopathology (4, 15). Nevertheless, health care professionals need to be vigilant in recognising symptoms of possible psychological distress during widespread social protests and their aftermath. Clinicians and public health professionals should be particularly aware of potential 'community spillover effects', where even those who did not take part in the protests can experience adverse mental health outcomes.

In conclusion, the mental health consequences of Occupy Central appear to be substantial and pervasive, which is remarkable given the largely non-violent nature of the protests. As social movements vary considerably, longitudinal studies are needed on the health impact of future social movements. Studies should consider leveraging existing cohorts (1, 8) such that pre-event exposures and medical history have been prospectively assessed and to facilitate early data collection from a population-representative sample. Factors that predict psychological responses during a social movement could be identified including social media behaviours. With the decline in armed conflicts and the

continued emergence of social movements globally (37), the mental health impact of social movements could become a timely and important field of inquiry.

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FIGURE LEGENDS

Figure 1. Trends in Intra-Familial Socio-Political Conflict Before (white), During (light grey) and After (medium grey) Occupy Central, FAMILY Cohort 2009-2015. Mean values from weighted samples presented. Vertical bars represent standard errors. Higher scores indicates more intra-familial socio-political conflict.

Web Figure 1. A Chronology of Occupy Central-related events and Depressive Symptoms, FAMILY Cohort 2009-2015. Circles represent the monthly prevalence of depressive symptoms, with size of the circles size proportional to the sample size. We stratified waves 1 and 2 by month and weighted prevalence of depressive symptoms based on age, sex, housing type and household income. A weighted LOESS curve is plotted, where points with a larger sample size had correspondingly greater influence on the shape of the curve. For waves 3-6, a line of best fit using linear regression. NPC = National People's Congress. HKSAR = Hong Kong Special Administrative Region.

Web Figure 2. Sampling and Retention of Participants in Waves 1-6, FAMILY Cohort 2009-2015.

^a 909 participants who were followed up in wave 3. Sample size of original pool in wave 1 (n=17 002). ^b 909 participants who were followed up in wave 3. Sample size of original pool in wave 2 (n=12 448). ^c Wave 5 only contacted a small subset of wave 3 participants (n=134) and successfully followed up 101 participants as the survey was conducted immediately after clearance of the

main protest sites (day 1-5). An additional 252 participants from the original pool in wave 2 were randomly sampled to supplement the sample size for wave 5 (sample size and response/cooperation rates for additional participants in brackets) in order to more precisely estimate the prevalence of depressive sequelae in the immediate aftermath of Occupy Central. ^d Sum of completed interviews, refusals and premature terminations.

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Author affiliations: School of Public Health, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong Special Administrative Region, China (Michael Y. Ni, Tom K. Li, Herbert Pang, Brandford H. Y. Chan, Betty Yuan, C. Mary Schooling, Gabriel M. Leung); the Department of Social & Behavioral Sciences, Harvard T. H. Chan School of Public Health, Boston, Massachusetts, United States of America (Ichiro Kawachi); Channing Division of Network Medicine, Department of Medicine, Brigham and Women's Hospital, Boston, Massachusetts, United States of America (Ichiro Kawachi); and School of Public Health, Hunter College and CUNY, New York, New York, United States of America (C. Mary Schooling).

Gabriel M. Leung is principal investigator of the FAMILY Cohort and conceived the present study. Michael Y. Ni and Gabriel M. Leung designed the study and planned the analyses. Michael Y. Ni, Brandford H. Y. Chan, and Betty Yuan collected data. Michael Y. Ni, Tom K. Li, Herbert Pang, Ichiro Kawachi, C. Mary Schooling, and Gabriel M. Leung analysed data. Michael Y. Ni wrote the first draft, and all authors contributed to revising the manuscript.

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All authors report no competing interests.

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Figure 1. Trends in Intra-Familial Socio-Political Conflict Before (white), During (light grey) and After (medium grey) Occupy Central, FAMILY Cohort, 2009-2015.

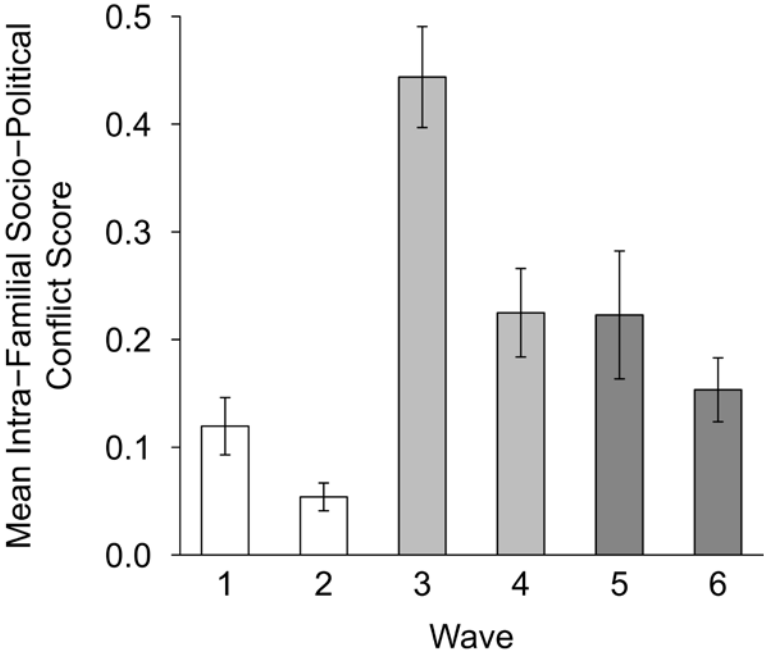


Table 1. Association between Depressive Symptoms (PHQ-9 scores) and Probable Major Depression with Survey Wave, FAMILY Cohort 2009-2015

Wave	Time Since Occupy Central, months	Depressive Symptoms ^a (PHQ-9 scores)		Probable major depression ^a	
		IRR	95% CI	OR	95% CI
1 and 2	Baseline ^b	1.00	reference	1.00	reference
3	1	1.83	1.67, 2.01	4.38	2.85, 6.74
4	2	1.75	1.60, 1.92	3.97	2.52, 6.26
5	3	1.97	1.72, 2.26	4.18	2.40, 7.27
6	6	2.23	2.04, 2.44	5.62	3.63, 8.70

Abbreviations: PHQ-9, Patient Health Questionnaire-9; IRR, Incidence rate ratio; OR, Odds ratio; CI, Confidence interval.

^a Models were adjusted for age, sex, marital status, education, employment and household income.

^b Baseline denotes waves 1 and 2 as the reference category.

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Table 2. Association of Demographic Characteristics with Depressive Symptom Score and Probable Major Depression During and after Occupy Central, FAMILY Cohort 2009-2015

Baseline characteristics (wave 2)	Depressive symptom score						Probable major depression	
	Unadjusted		Adjusted model 1 ^a		Adjusted model 2 ^b		Adjusted model 2 ^b	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	OR	95% CI
Age group, years^c								
18-24	1.00	reference	-	-	-	-	1.00	reference
25-34	1.00	0.78, 1.28	-	-	-	-	0.90	0.43, 1.88
35-44	0.99	0.79, 1.25	-	-	-	-	0.73	0.35, 1.49
45-64	1.05	0.84, 1.30	-	-	-	-	0.86	0.44, 1.66
≥65	1.26	0.92, 1.73	-	-	-	-	1.18	0.50, 2.79
Female sex^c	1.03	0.90, 1.19	-	-	-	-	0.78	0.53, 1.18
Marital status								
Married	1.00	reference	1.00	reference	1.00	reference	1.00	reference
Never married	1.14	0.98, 1.33	1.26	1.03, 1.54	1.12	0.92, 1.36	1.16	0.62, 2.16
Widowed/divorced/ separated	1.39	1.13, 1.70	1.23	0.99, 1.53	1.14	0.93, 1.40	1.60	0.88, 2.91
Employment								
Unemployed	1.00	reference	1.00	reference	1.00	reference	1.00	reference
Economically inactive	0.72	0.46, 1.15	0.68	0.43, 1.07	0.60	0.38, 0.95	0.40	0.12, 1.34
Employed	0.61	0.39, 0.97	0.64	0.41, 1.00	0.59	0.38, 0.92	0.49	0.15, 1.58
Education								
Primary	1.00	reference	1.00	reference	1.00	reference	1.00	reference
Secondary	0.86	0.71, 1.04	0.93	0.76, 1.14	0.94	0.77, 1.14	0.95	0.54, 1.66
Tertiary	0.76	0.63, 0.93	0.84	0.66, 1.06	0.85	0.67, 1.06	0.76	0.36, 1.61
Household income								
<10 000	1.00	reference	1.00	reference	1.00	reference	1.00	reference
10 000-19 999	0.83	0.69, 1.00	0.90	0.74, 1.09	0.95	0.80, 1.13	0.96	0.56, 1.64
20 000-39 999	0.69	0.58, 0.82	0.75	0.62, 0.89	0.83	0.70, 0.99	0.61	0.34, 1.08
≥40 000	0.68	0.56, 0.84	0.79	0.63, 1.00	0.89	0.71, 1.11	0.50	0.22, 1.15

Abbreviations: IRR, Incidence rate ratio; OR, Odds ratio; CI, Confidence interval.

^a Model 1 adjusted for age, sex, marital status, education, household income, occupation.

^b Model 2 additionally adjusted for baseline depressive symptom score and the presence of pre-existing doctor-diagnosed depression, anxiety disorder or schizophrenia prior to Occupy Central.

^c We present unadjusted models only for age and sex as these covariables could not be common causes of the exposures and outcomes.

Table 3. Association of Direct and Indirect Exposures to Occupy Central with Depressive Symptom score and Probable Major Depression During and after Occupy Central, FAMILY Cohort 2009-2015

Exposures to Occupy Central (wave 3)	Depressive symptom score						Probable major depression	
	Unadjusted model		Adjusted model 1 ^a		Adjusted model 2 ^b		Adjusted model 2 ^b	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	OR	95% CI
Direct exposures								
Self participation								
Did not visit	1.00	reference	1.00	reference	1.00	reference	1.00	reference
Visited	0.95	0.80, 1.11	1.03	0.87, 1.22	0.99	0.85, 1.15	1.04	0.62, 1.75
Assembled or stayed overnight	1.01	0.82, 1.24	1.16	0.92, 1.46	1.10	0.88, 1.37	0.84	0.37, 1.87
Family participation								
Concordant	1.00	reference	1.00	reference	1.00	reference	1.00	reference
Discordant	1.13	0.94, 1.36	1.20	0.99, 1.45	1.16	0.98, 1.37	1.23	0.70, 2.16
Indirect exposures								
Television (daily)								
None	1.00	reference	1.00	reference	1.00	reference	1.00	reference
1-59 min	0.80	0.60, 1.09	0.81	0.60, 1.08	0.89	0.67, 1.17	0.51	0.25, 1.06
≥ 60 min	0.93	0.68, 1.27	0.94	0.69, 1.27	1.00	0.74, 1.34	0.65	0.30, 1.39
Newspaper / Radio (daily)								
None	1.00	reference	1.00	reference	1.00	reference	1.00	reference
1-59 min	1.04	0.89, 1.22	1.05	0.90, 1.24	1.07	0.92, 1.25	0.92	0.56, 1.51
≥ 60 min	1.09	0.89, 1.34	1.11	0.91, 1.37	1.11	0.91, 1.35	0.96	0.52, 1.77
Online / Social media (daily)								
None	1.00	reference	1.00	reference	1.00	reference	1.00	reference
1-59 min	0.87	0.74, 1.02	1.01	0.85, 1.20	1.05	0.89, 1.23	0.88	0.53, 1.47
≥ 60 min	1.11	0.93, 1.32	1.40	1.15, 1.70	1.28	1.06, 1.55	1.12	0.60, 2.09
Facebook usage								
None	1.00	reference	1.00	reference	1.00	reference	1.00	reference
1-6 times a week	1.05	0.84, 1.32	1.14	0.90, 1.43	1.23	0.98, 1.54	2.19	1.18, 4.07
Daily (< 10 times)	0.79	0.66, 0.94	0.88	0.72, 1.06	0.92	0.76, 1.10	0.63	0.31, 1.28
Daily (≥ 10 times)	1.09	0.90, 1.31	1.31	1.05, 1.63	1.38	1.12, 1.71	1.74	0.84, 3.62

Abbreviations: IRR, Incidence rate ratio; OR, Odds ratio; CI, Confidence interval.

^a Model 1 adjusted for age, sex, marital status, education, household income, occupation.

^b Model 2 additionally adjusted for baseline depressive symptom score and the presence of pre-existing doctor-diagnosed depression, anxiety disorder or schizophrenia prior to Occupy Central.

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