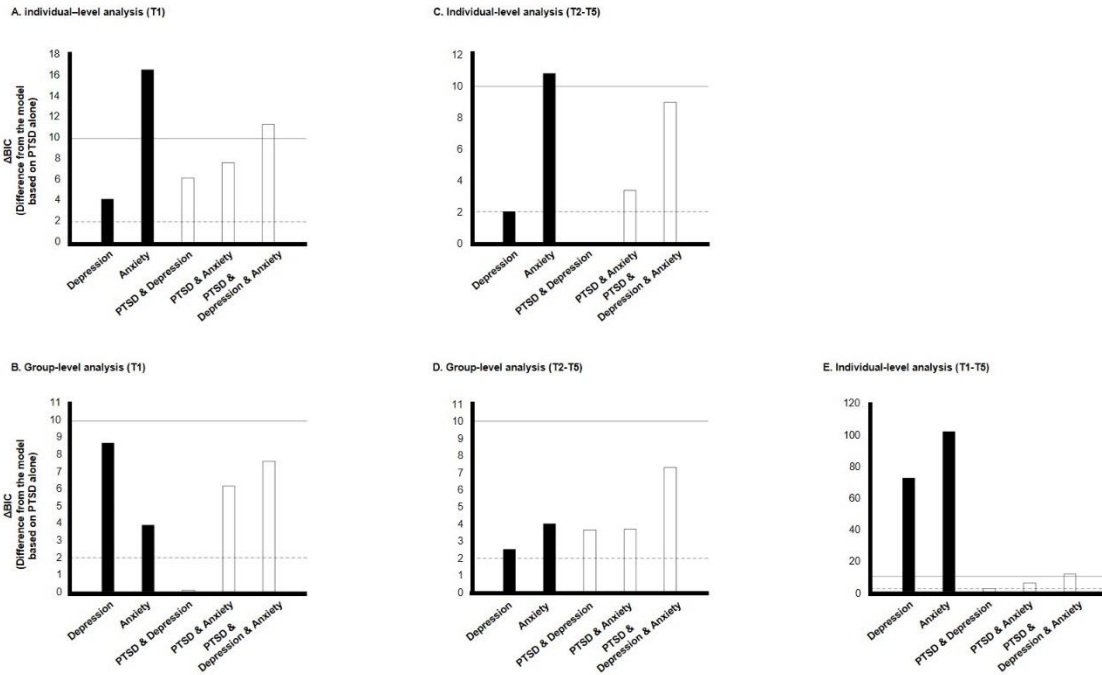


Event-related PTSD symptoms as a high-risk factor for suicide: longitudinal observational study

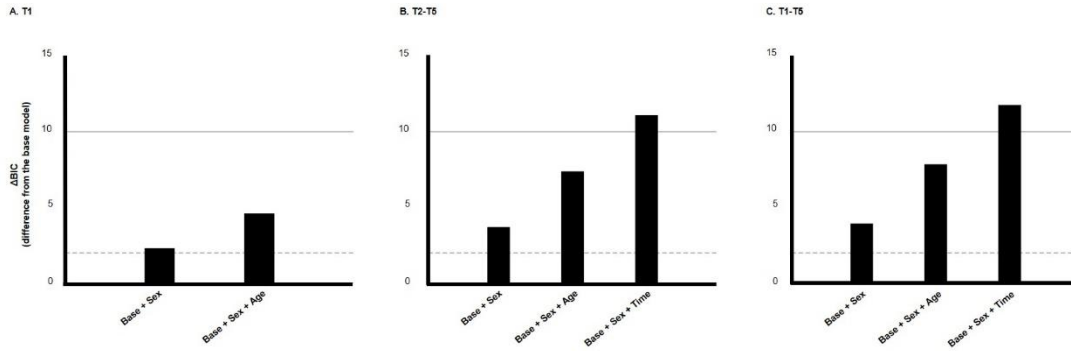
In the format provided by the authors and unedited



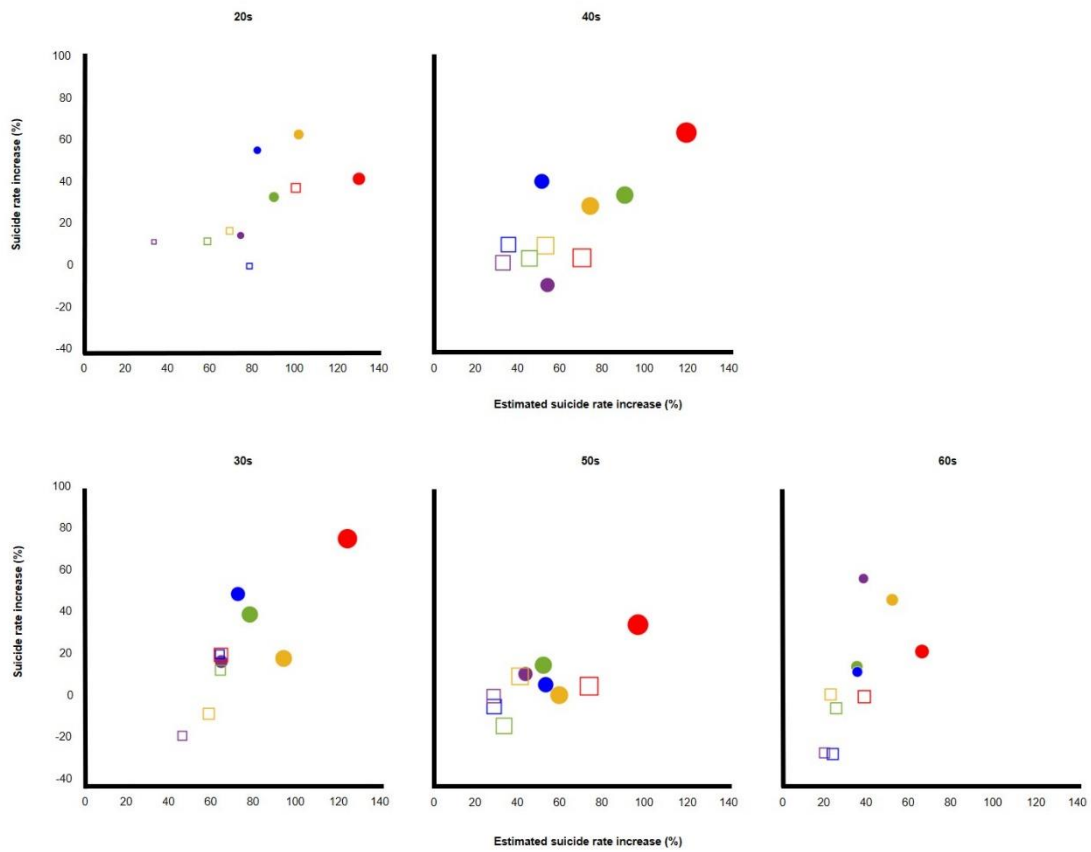
Supplementary Fig. 1. Comparison of models that test associations between psychiatric states and an increased suicide rate in the T1, T2-T5 and T1-T5 data, separately. The BIC of each model is presented as a difference from the model based on PTSD symptoms alone (PTSD model). Larger values indicate that the PTSD model is superior to models shown by each bar. Δ BIC values larger than 2 (dashed line) are considered significant differences from the PTSD model, whereas differences larger than 10 (solid line) are considered “very strong” differences. Black bars represent models based on depression, or anxiety, while white bars represent models based on combinations of PTSD, depression and/or anxiety scores. (BIC values for each figure from left to right, A:4.19 16.57 6.23 7.69 11.37, B:8.71 3.91 0.11 6.19 7.65, C:2.00 10.82 0.02 3.36 8.98, D:2.52 4.02 3.64 3.69 7.31, E:72.64 102.31 1.93 5.73 11.35)

Supplementary table 1. Result of the mixed-effect analyses. Examining the prediction of psychiatric status and suicide rates at the individual and group levels for T1, T2-T5, and T1-T5, respectively. These analyses were conducted using mixed-effects model analysis (two-tailed test).

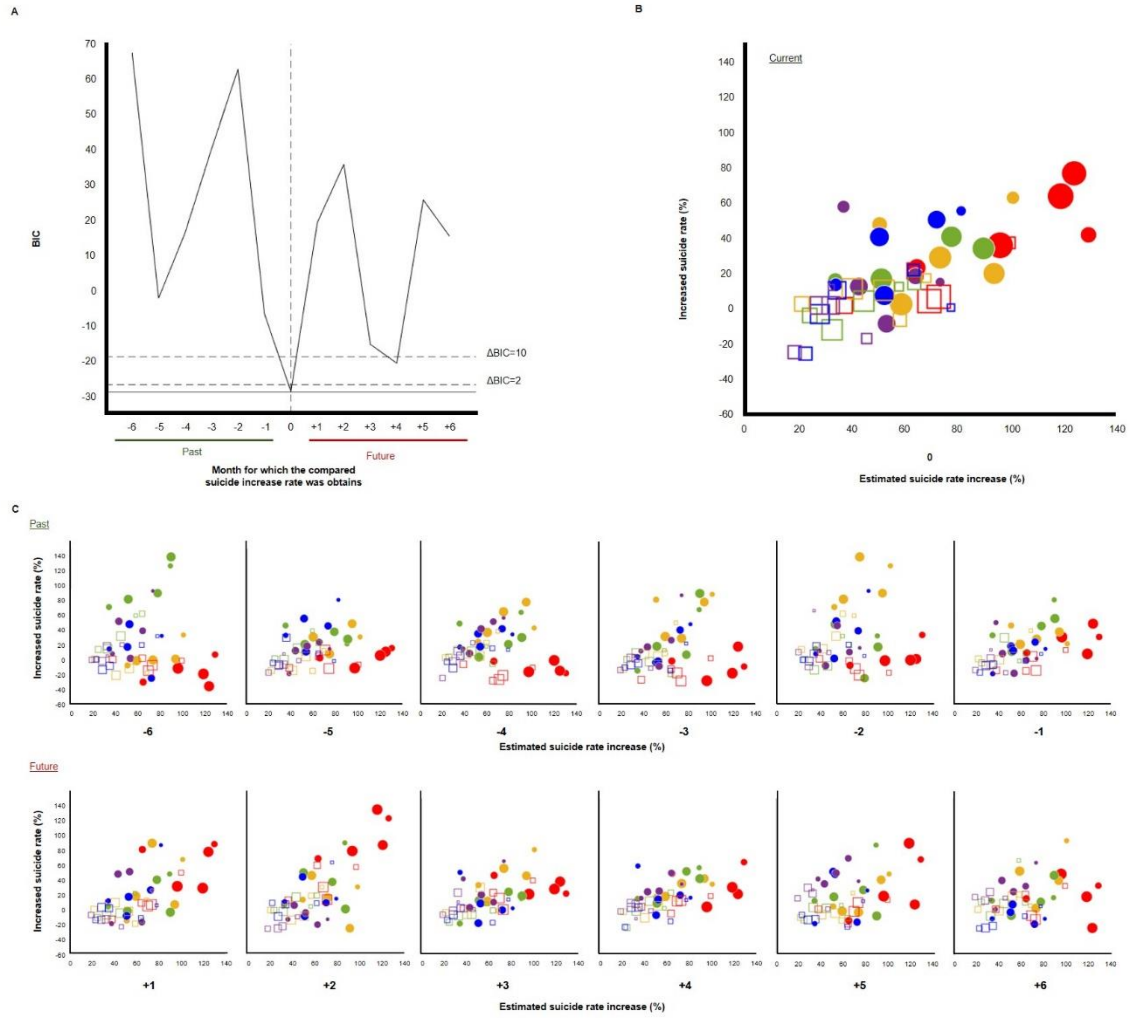
	random	data	Fixed	β	SE	t- stat	p-value	BIC	L95	L95
Effects of psychiatric states on the suicide rate										
(Individual-analysis)										
		T1		6.60x10 ⁻⁴	1.50x10 ⁻⁴	4.41	<.001	-3255.4	3.67x10 ⁻⁴	9.54x10 ⁻⁴
		T2-T5	PTSD	5.87x10 ⁻⁴	1.05x10 ⁻⁴	5.60	<.001	-8819.2	3.81x10 ⁻⁴	7.92x10 ⁻⁴
		T1-T5		1.23x10 ⁻³	9.81x10 ⁻⁵	12.50	<.001	-8516.8	1.03x10 ⁻³	1.42x10 ⁻³
		T1		9.24x10 ⁻⁴	2.37x10 ⁻⁴	3.90	<.001	-3251.2	4.60x10 ⁻⁴	1.39x10 ⁻³
		T2-T5	Depression	7.73x10 ⁻⁴	1.43x10 ⁻⁴	5.42	<.001	-8817.2	4.93x10 ⁻⁴	1.05x10 ⁻³
		T1-T5		1.28x10 ⁻³	1.41x10 ⁻⁴	9.11	<.001	-8444.1	1.01x10 ⁻³	1.56x10 ⁻³
		T1		4.24x10 ⁻⁴	2.52x10 ⁻⁴	1.68	0.09	-3238.8	-6.96x10 ⁻⁵	9.17x10 ⁻⁴
		T2-T5	Aixiety	6.19x10 ⁻⁴	1.37x10 ⁻⁴	4.53	<.001	-8808.4	3.51x10 ⁻⁴	8.87x10 ⁻⁴
		T1-T5		1.01x10 ⁻³	1.39x10 ⁻⁴	7.29	<.001	-8414.5	7.40x10 ⁻⁴	1.29x10 ⁻³
		T1	PTSD	4.85x10 ⁻⁴	1.96x10 ⁻⁴	2.48	<.05		1.01x10 ⁻⁴	8.68x10 ⁻⁴
			Depression	4.30x10 ⁻⁴	3.09x10 ⁻⁴	1.39	0.16	-3249.2	-1.76x10 ⁻⁴	1.04x10 ⁻³
		T2-T5	PTSD	4.03x10 ⁻⁴	1.21x10 ⁻⁴	3.33	<.001	-8819.2	1.66x10 ⁻⁴	6.40x10 ⁻⁴
			Depression	4.97x10 ⁻⁴	1.65x10 ⁻⁴	3.02	<.01		1.74x10 ⁻⁴	8.20x10 ⁻⁴
		T1-T5	PTSD	1.05x10 ⁻³	1.17x10 ⁻⁴	8.97	<.001	-8514.9	8.21x10 ⁻⁴	1.28x10 ⁻³
			Depression	4.60x10 ⁻⁴	1.68x10 ⁻⁴	2.74	<.01		1.31x10 ⁻⁴	7.89x10 ⁻⁴
sex		T1	PTSD	7.22x10 ⁻⁴	1.75x10 ⁻⁴	4.13	<.001	-3247.7	3.80x10 ⁻⁴	1.07x10 ⁻³
			Anxiety	-2.01x10 ⁻⁴	2.93x10 ⁻⁴	-0.69	0.49		-7.76x10 ⁻⁴	3.73x10 ⁻⁴
		T2-T5	PTSD	4.70x10 ⁻⁴	1.15x10 ⁻⁴	4.07	<.001	-8815.9	2.44x10 ⁻⁴	6.96x10 ⁻⁴
			Anxiety	3.61x10 ⁻⁴	1.50x10 ⁻⁴	2.40	<.05		6.60x10 ⁻⁵	6.56x10 ⁻⁴
		T1-T5	PTSD	1.13x10 ⁻³	1.10x10 ⁻⁴	10.32	<.001	-8511.1	9.17x10 ⁻⁴	1.35x10 ⁻³
			Anxiety	2.98x10 ⁻⁴	1.55x10 ⁻⁴	1.93	0.05		-5.11x10 ⁻⁴	6.01x10 ⁻⁴
		T1	PTSD	5.28x10 ⁻⁴	1.97x10 ⁻⁴	2.68	<.01		1.41x10 ⁻⁴	9.15x10 ⁻⁴
			Depression	7.84x10 ⁻⁴	3.70x10 ⁻⁴	2.12	<.05	-3244.0	5.85x10 ⁻⁵	1.51x10 ⁻³
			Anxiety	-6.10x10 ⁻⁴	3.51x10 ⁻⁴	-1.74	0.08		-1.30x10 ⁻³	7.78x10 ⁻⁵
		T2-T5	PTSD	4.00x10 ⁻⁴	1.21x10 ⁻⁴	3.30	<.001	-8810.2	1.62x10 ⁻⁴	6.38x10 ⁻⁴
			Depression	4.33x10 ⁻⁴	2.32x10 ⁻⁴	1.87	0.06		-2.12x10 ⁻⁵	8.88x10 ⁻⁴
			Anxiety	0.83x10 ⁻⁵	2.12x10 ⁻⁴	0.39	0.70		-3.32x10 ⁻⁴	4.98x10 ⁻⁴
		T1-T5	PTSD	1.05x10 ⁻³	1.17x10 ⁻⁴	8.94	<.001	-8505.4	8.19x10 ⁻⁴	1.28x10 ⁻³
			Depression	4.41x10 ⁻⁴	2.26x10 ⁻⁴	1.95	0.05		-1.63x10 ⁻⁴	8.84x10 ⁻⁴
			Anxiety	0.26x10 ⁻⁵	2.08x10 ⁻⁴	0.13	0.90		-3.81x10 ⁻⁴	4.34x10 ⁻⁴
Effects of psychiatric states on the suicide rate										
(group-analysis)										
		T1		0.06	0.02	2.98	<.05	1.5	0.01	0.11
		T2-T5	PTSD	0.03	0.01	2.79	<.01	-17.7	8.01x10 ⁻³	0.05
		T1-T5		0.04	0.01	5.29	<.001	-23.7	0.02	0.05
		T1		0.07	0.05	1.26	0.24	10.2	-0.05	0.19
		T2-T5	Depression	0.03	0.01	2.19	<.05	-15.2	1.98x10 ⁻³	0.05
		T1-T5		0.04	0.01	3.59	<.001	-13.2	0.02	0.06
		T1		0.13	0.05	2.95	<.05	5.4	0.03	0.24
		T2-T5	Aixiety	0.02	0.01	1.78	0.08	-13.7	-2.70x10 ⁻³	0.04
		T1-T5		0.03	0.01	2.88	<.01	-9.3	0.01	0.06
		T1	PTSD	0.12	0.04	3.11	<.05	1.6	0.03	0.21
			Depression	-0.08	0.05	-1.67	0.14		-0.19	0.03
		T2-T5	PTSD	0.03	0.02	1.65	0.11	-14.1	-6.09x10 ⁻³	0.06
			Depression	3.79x10 ⁻³	0.02	0.21	0.83		-0.03	0.04
		T1-T5	PTSD	0.04	0.01	3.46	<.01	-19.8	0.02	0.06
			Depression	-4.02x10 ⁻³	0.02	-0.24	0.81		-0.04	0.03
sex		T1	PTSD	5.98x10 ⁻³	0.04	0.17	0.87	7.7	-0.08	0.09
			Anxiety	0.13	0.05	2.79	<.05		0.02	0.24
		T2-T5	PTSD	0.03	0.01	2.10	<.05	-14.0	9.63x10 ⁻⁴	0.06
			Anxiety	-1.65x10 ⁻⁴	0.01	-0.01	0.99		-0.03	0.03
		T1-T5	PTSD	0.04	0.01	4.16	<.001	-19.8	0.02	0.06
			Anxiety	-3.13x10 ⁻³	0.01	-0.23	0.82		-0.03	0.02
		T1	PTSD	0.06	0.07	0.91	0.40		-0.11	0.24
			Depression	-0.10	0.11	-0.93	0.39	9.1	-0.36	0.16
			Anxiety	0.18	0.07	2.68	<.05		0.02	0.34
		T2-T5	PTSD	0.03	0.02	1.65	0.11	-10.4	-6.10x10 ⁻³	0.06
			Depression	5.73x10 ⁻³	0.02	0.26	0.79		-0.04	0.05
			Anxiety	-2.72x10 ⁻³	0.02	-0.16	0.87		-0.04	0.03
		T1-T5	PTSD	0.04	0.01	3.46	<.01		0.02	0.06
			Depression	-2.47x10 ⁻³	0.02	-0.13	0.90	-15.9	-0.04	0.04
			Anxiety	-1.85x10 ⁻³	0.02	-0.11	0.91		-0.04	0.03
Testing the predictive power of estimated suicide risk										
(group-analysis)										
	-	T1		0.85	0.14	6.31	<.001	-6.7	0.54	1.16
		T2-T5		0.60	0.11	5.49	<.001	-23.8	0.38	0.83
		T1-T5		0.63	0.07	8.77	<.001	-32.8	0.49	0.78
sex		T1		0.85	0.14	6.31	<.001	-4.4	0.54	1.16
		T2-T5		0.60	0.11	5.49	<.001	-20.1	0.38	0.83
		T1-T5		0.63	0.07	8.77	<.001	-28.9	0.49	0.78
sex+age		T1	Estimated-suicide increase (based on PTSD prevalence)	0.85	0.14	6.31	<.001	-2.1	0.54	1.16
		T2-T5		0.60	0.11	5.49	<.001	-16.4	0.38	0.83
		T1-T5		0.63	0.07	8.77	<.001	-25.0	0.49	0.78
sex+age+timepoint		T1		0.85	0.14	6.31	<.001	0.2	0.54	1.16
		T2-T5		0.60	0.11	5.49	<.001	-12.8	0.38	0.83
		T1-T5		0.63	0.07	8.77	<.001	-21.1	0.49	0.78



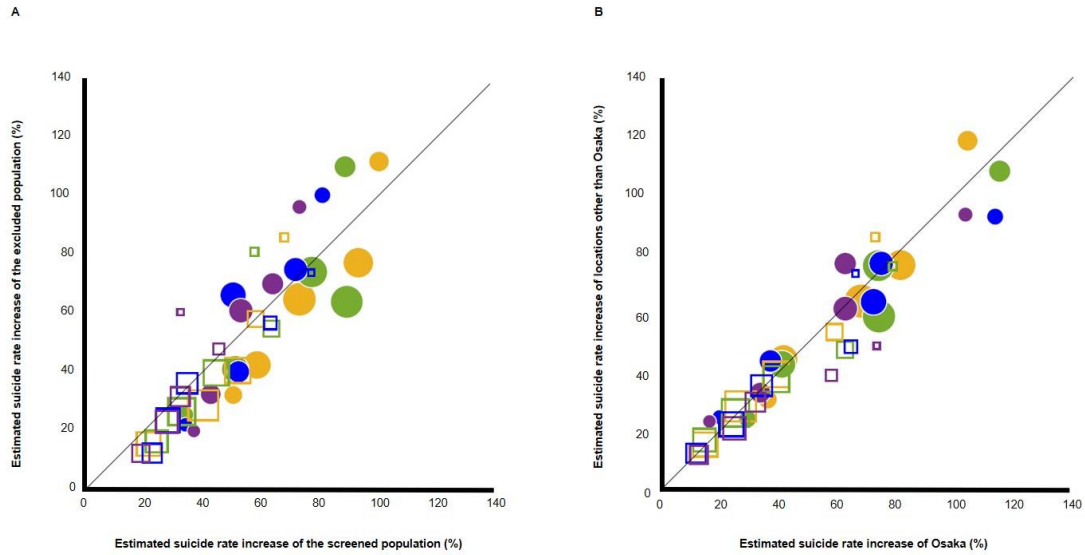
Supplementary Fig. 2. Comparison of models that test associations between psychiatric states and suicide rates in the T1, T2-T5 and T1-T5 data. The BIC of each model is presented as a difference from the base model. Larger values indicate that the base model is superior to the model shown by each bar. Δ BIC values larger than 2 (dashed line) are considered significant differences from the base model, whereas differences larger than 10 (solid line) are considered “very strong” differences. (BIC values for each figure from left to right, A:2.30 4.61, B:3.69 7.38 11.07, C:3.91 7.82 11.74)



Supplementary Fig. 3. Stratified association between the estimated suicide risk and the actual suicide rate. Panels in Fig. 3 represent age groups. Circles and squares represent the suicide rate increase estimated from PTSD probability (X-axis) and the suicide rate increase (Y-axis) for each age group. Circles and squares represent female and male data, respectively. Colours of circles and squares represent data acquisition timing, whereas sizes of circles and squares represent the number of online participants.



Supplementary Fig. 4. Cross-lagged relationships analyses A. Time-shifted BIC from models predicting the "current" suicide increase from those predicting "past" or "future" suicide increases. B. Association between the estimated increase in the suicide rate based on COVID-19-related PTSD symptoms and the actual increase in the suicide rate at the time of PTSD score monitoring (Corresponding to Fig .3). C. Association of the estimated increase in the suicide rate with actual increase in the suicide rate in the past and the future.



Supplementary Fig. 5. Analyses of bias. A. Association between the estimated increase in the rate of suicide in screened and those in excluded, based on COVID-19-related PTSD symptoms. B. Association between the estimated increase in the rate of suicide in Osaka and those in areas other than Osaka, based on COVID-19 related PTSD symptoms. Circles and squares represent the estimated increase of the suicide rate in screened (X-axis) and excluded population (Y-axis) in Figure A, and those in Osaka (X-axis) and elsewhere (Y-axis) in Figure B. Colors of circles and squares represent data acquisition timing (T2: yellow, T3: green, T4: blue, T5: violet), whereas sizes of circles and squares represent numbers of online participants.

Supplementary table 2. Variables used in the mixed-effect analyses

	independent variables			dependent variables	data	level
	fixed	random	weight			
Psychiatric states	PTSD (severity)			Suicide Increase	1)T1 2)T2-T5 3)T1-T5	1)Individual-level 2)Group-level
	Depression (severity)					
	Anxiety (severity)					
	PTSD+Depression (severity)	sex				
	PTSD+Anxiety (severity)		sample size (group-level only)			
Estimated suicide risk	Estimated-suicide increase (based on PTSD prevalence)	1)NA, 2)sex, 3)sex+age	sample size	Suicide Increase	1)T1 2)T2-T5 3)T1-T5	Group-level
		1)NA, 2)sex, 3)sex+age, 4)sex+age+Timepoint				
Time specificity	Estimated-suicide increase (based on PTSD prevalence)	NA	sample size	current (0), future (+1~+6), past (-1~-6) suicide increase	T1-T5	Group-level
		Distance	NA	NA	Pearson-correlation	T1-T5
	Distance+(Distance:Direction)	NA	NA			