Economic Development and Suicide in Thailand

Sunti Tirapat

Nida Business School, National Institute of Development Administration, Bangkok, Thailand
Email: sunti@cbs.chula.ac.th

Abstract—After the recent pandemic, suicide has emerged as one of the serious public concerns in Thailand. While suicide rates experienced a peak immediately after the 1997 financial crisis and subsequently declined steadily until 2019, a recent trend indicates a disconcerting resurgence. Suicides can be attributed to the psychosocial, social, and economic stress encountered by individuals, all of which are influenced by the extent of economic development. This study aims to investigate socio-economic factors and their impacts related to suicide rates in Thailand during the period of 2012–2021. Based on the provincial-level panel data, the results show a robust negative association of suicide rate with both income and population density. It also finds that the mitigating impacts on suicide are more pronounced among males compared to females. This finding may reflect Thai cultural norms where males are considered the heads of households. With respect to social factors, the results show a negative association between school density and suicide rates, while intriguingly, temple density and the level of financial development exhibit a positive influence. When considering the potential impact of austerity measures implemented during COVID-19 on suicide, it is found that the negative effect of population density on suicide lessens during the pandemic. A plausible explanation may be due to the fear of contagion and the spread of the virus. Furthermore, it reveals that Thai males are more responsive to the pandemic than females. Overall, the study provides insights into Thai suicide rates and the findings underscore the complexity of suicide. Lastly, given inherent data constraints, these findings remain preliminary, and a more extensive inquiry is needed to offer an effective suicide prevention policy.

Keywords—suicide, economic development, Thailand

I. INTRODUCTION

Suicide has become an increasing public and global health problem, with a 60% increase in global suicide rates over the last 45 years [1]. Suicide rates can be attributed to a combination of psychosocial, social, and economic stress experienced by individuals. The impact of economic downturns on suicide has attracted academic attention, particularly in the wake of the recent pandemic crisis. Austerity measures implemented during such crisis periods can have detrimental effects on mental health, ultimately leading to an increase in suicide rates [2]. Although the economic consequences resulting from income and unemployment can directly impact suicide rates, it is crucial to acknowledge that other factors, including inequality, urbanization, disparities in education, the healthcare system, and different forms of government support, also exert substantial influences on suicide [3, 4]. Specifically, the association between population density (urbanization level) and suicide has been a subject of investigation in diverse contexts [5].

In Thailand, since the Asian crisis in 1997, suicide has also been a subject of interest. Following the crisis, the suicide rate in the country reached its peak at 8.6 per 100,000 population in 1999. Since then, it has been on a declining

trend, stabilizing around 6%. However, in 2020, there was a notable increase, with the rate rising to 7.3, an increase of 22% from the preceding year (see Fig. 1). Most suicide studies typically focus on examining descriptive statistics of suicide rates at an overall level. There has been relatively limited research into the socio-demographic factors associated with suicide at the provincial level within the population. An exception to this is [6], which conducted a one-year cross-sectional analysis at the provincial level.
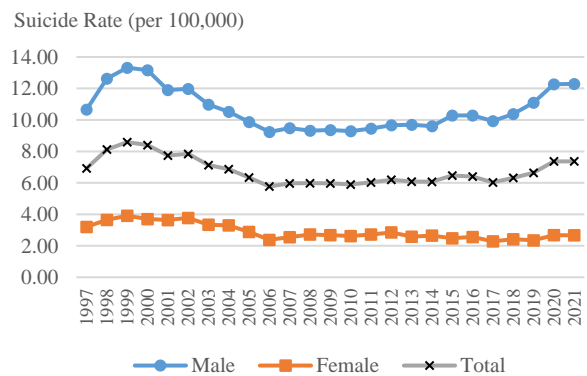

Fig. 1. Suicide in Thailand 1997−2021.

Amid the recent rise in suicide rates in Thailand, there is a heightened interest in gaining a deeper understanding of the relationship between social and economic structures. The objective of this study is to examine socio-economic factors related to suicide rates using the panel data at provincial level during 2012–2021. In addition, the study will cover the recent pandemic period to examine the effect of austerity during the pandemic.

II. LITERATURE REVIEW

A. Determinants of Suicide

Suicide is a complex phenomenon influenced by a wide range of individual, social, and economic factors. Inequality, urbanization, globalization, the education divide, and the health system have caused a rise in death rates, particularly in poor rural communities (see a review by Stack [7]). Motivated by the dramatic social changes in China, Cai *et al.* [8] investigate socio-economic factors and how their impacts on suicide rates changed overtime. The results show that there were negative associations between GDPs per capita and urbanization on suicide rate in 1990, however, these effects were negligible by 2015. Among economic factors, studies generally find the negative relation of income and suicide [9–11]. Also, most of the studies find the inverse relationship between suicide and population density [5, 12, 13]. These findings contradict the living conditions typically associated with urban settings, including factors like healthcare accessibility and social isolation. Using the

county-level social vulnerability measures, Liu *et al.* [14] investigate whether social vulnerability is associated with suicide rates. The study finds a strong association between social vulnerability and suicide. The results suggest a possible approach to reduce suicide rates through targeted interventions of social vulnerability. Social environments also play an important role in suicide [15].

B. Recession, Pandemic, and Suicide

Economic downturns can have severe effects on suicide rates. By reviewing the evidence relating to suicide risk and measures for suicide prevention, Sinyor, Tse, and Pirkis [16] indicate that during economic recessions, mental health deteriorates, and the risk of suicide increases. The adverse influence of the economic downturn on mental health and suicidal risks could be exacerbated or mitigated by government actions [3]. Based on significant changes in fiscal policy between 2001 and 2014 in Japan, it revealed that an increase of 1% in the per capita local government expenditures was associated with a decrease of 0.2% in the suicide rates among males and females aged between 40 and 64 and that this correlation was strengthened as the unemployment rate increased, particularly among males.

The outbreak of the COVID-19 pandemic has raised concern that social isolation, financial stress, depression, and limited access to health care services may contribute to an increase in suicidal behaviors. An increase in the risk of psychiatric disorders and chronic stress, which eventually resulted in an increase in suicides [17]. The link between pandemics and suicide is investigated by Banerjee, Kosagisharaf, and Rao [18] and Efstathiou [19]. In addition, Ivbijaro [20] provides a narrative review to examine the relationship of COVID-19 and existing mental illness or history of mental illness, suicide prevention strategies, and changes in overall suicide rates. It concludes that an increase in suicide is not inevitable and suicide prevention during pandemics and post COVID-19 pandemics requires a collaborative whole system approach. We require real time data to inform dynamic action planning.

C. Selected Thai Studies

While suicide has drawn attention in Thailand, most studies have taken a descriptive approach. For example, Lotrakul [21] and Lotrakul [22] primarily offer descriptive statistics concerning suicide characteristics such as age, gender, and methods. According to Ref. [23], the underlying reasons behind the suicide issue can be attributed to a preference for capitalism and the evolving social structures and values. The study by Hataiyusuk and Apinuntavech [24] focuses on adolescent suicide. These studies, however, do not provide empirical evidence to support their assertions. In contrast, Chanagul [6] conducts an empirical examination of the factors influencing suicide rates. Nevertheless, this study is constrained by data limitation as it relies solely on one-year cross-sectional provincial data. Consequently, this limitation may lead to the counter-intuitive findings of the study that there is a positive association between household income and suicide rates while household debt has a negative effect on suicide. Hence, there is a need to examine the association of socioeconomic variables and suicide rates at the provincial level to further understand the effect of developments on suicide rates in Thailand.

III. METHODS

The conceptual framework to examine the association of economic development suicide rates is shown in Fig. 2.
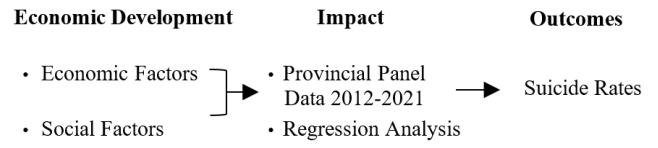

Fig. 2. The conceptual framework.

A. Model Specification

To investigate socio-economic factors related to provincial suicide rates, the regression is based on the regional fixed effect in order to take into account of variation in regions in Thailand. The baseline specification is as follows.

$$Y_{it} = \alpha_0 + \sum_j \beta_j E_{itj} + \sum_k \beta_k C_{itk} + FE + \varepsilon_{it} \qquad (1)$$

where, Y_{it} = suicide rates of province i (total, male, female suicide rates); E_{jit} = economic variable j of province i; C_{kit} = social variable k of province i; β = coefficient; FE = regional fixed effect terms; ε_{it} = error term, t = time (year).

In addition, the impact of the austerity period and economic conditions are investigated by:

$$Y_{it} = \alpha_0 + \alpha_1 P + \sum_j \beta_j E_{itj} + \sum_j \beta_j E_{itj} \times P + \sum_k \beta_k C_{itk} + FE + \varepsilon_{it}$$
$$\qquad (2)$$

Y_{it} = suicide rates of province i (total, male, female suicide rates); E_{jit} = economic variable j of province i; P = indicator variable of the pandemic period; C_{kit} = social variable k of province i; λ, δ, β = coefficients; FE = fixed effect terms by region or time; ε_{it} = error term, t = time (year).

B. Data and Variables

The panel data consists of suicide rates and socioeconomic variables from 77 provinces in Thailand during 2012–2021. The provincial-level suicide data is from the Department of Mental Health, Ministry of Public Health of Thailand. The social and economic data are from National Statistics Office and Bank of Thailand. To adjust for the variations of their scales, most variables in the study are logarithmically transformed. The detailed description of each variable is summarized in Table 1.

1) Economic factors

The economic factors of interest in this paper are the provincial income level (GPP), as measured by the gross provincial production per capita, and the Provincial Population Density (POPDEN). Low income often results in financial stress and economic hardship, which can contribute to hopelessness and despair, potentially increasing the risk of suicide. While numerous studies, such as Refs. [11, 10], indicate a greater suicide risk within low-income populations compared to high-income groups, the impact of population density as a mediating factor in suicide risk is less clear and not easily discerned. On the one hand, the population density reflects cultural diversity, economic growth, or demand for

goods and services. But on the other hand, population density can suggest limited resources, increased levels of pollution, social problems, and pressure on the natural environment. Other economic variables included in the regression are energy usage (FUEL) which indicates the degree of industrialization and the level of Poverty Line (POVLINE) which indicates the challenges in terms of living conditions.

2) Social factors

Similar to other developing countries, the Thai social provincial level data are scarce. Despite the inherent limitation, the proportion of individuals aged 60 or over (AGEING) is employed to capture the provincial aging population, as in Ref. [8]. The other social variables include the density of temples (TEMPLE), and schools (SCHOOL) are used to reflect the degree of cultural elements and urbanization. In addition, the number of drugs convicted cases at provincial level is employed to capture the extent of law enforcement. Finally, as there exists a possible connection between financial well-being and suicide [25, 26], the regression incorporates the degree of provincial financial development, which is proxied by the density of government banks (BANK).

Table 1. Variable descriptions

Variables		Description
Dependent variables	SUICIDE-T	The provincial total suicide rate per 100,000 individuals.
	SUICIDE-M	The provincial male suicide rate per 100,000 individuals.
	SUICIDE-F	The provincial female suicide rate per 100,000 individuals.
Independent variables	GPP	A natural log of gross provincial per capita. The variable indicates provincial economic development or level of income.
	POPDEN	A natural log of provincial population density. The variable reflects cultural diversity, economic growth, or demand for goods and services.
	ENERGY	A natural log of provincial fuel usage (1,000 liters). The variable suggests the degree of industrialization within the province.
	FACTORY	A natural log of the ratio of number of factories to population. The variable suggests the degree of industrialization within the province.
	POVLINE	A natural log of provincial poverty line (estimated total costs of one year's worth of necessities for the average adult). A higher level indicates greater challenges in terms of living conditions.
	AGEING	A natural log of the number of individuals aged 60 and over to total population. The variable indicates population aging.
	BANK	A natural log of the number of government savings bank's branches (per 1,000 individuals) to total population. The variable reflects the financial development.
	SCHOOL	A natural log of the number of schools (per 1,000 individuals) to total population. The variable may denote the degree of urbanization.
	TEMPLE	A natural log of the number of temples (per 1,000 individuals) to total population. The variable reflects the configuration of social and cultural elements.
	DRUG	A natural log of the number of drugs convicted cases (per 1,000 individuals) to total population. The variable represents the extent of law enforcement.
	YEAR	An indicator variable equals one if the year (t) is after 2020 and zero otherwise.

IV. RESULT AND DISCUSSION

A. The Association of Economic and Social Factors and Suicide Rates

This section presents the main findings from the regression analysis. The main factors of interest are the income per capital (GPP) and the population density (POPDEN). Table 2 presents the results of the baseline regression (1). Columns (1) to (3) of the table report the results of total suicide, male suicide, and female suicide, respectively. Results of column (1) show that there is a negative association of income and population density with the overall provincial suicide, statistically significant at 95% and 99% confidence level, respectively. This indicates that an increased income level plays a role in diminishing provincial suicide rates in Thailand, in line with the results in most previous studies. It also documents that the population density has a strong inverse relation with provincial suicide, again consistent with those of previous studies. Being socially connected may be the "Thai way" which leads to better physical and mental health, less social isolation, and resulting in a decreased suicide rate. Moreover, as expected, both the level of living conditions (POVLINE) and the degree of industrialization within the province (ENERGY) are positively related to the suicide rate.

Regarding the social factors, the results indicate that there are negative associations of the extent of law enforcement (DRUG) and the school density (SCHOOL) with suicide. These variables reflect the degree of government support at the provincial level, which helps reduce suicide in the same way of government spending found in Matsubayashi *et al.* (2020). But surprisingly, there is a strong positive effect of the social and cultural elements (TEMPLE). This finding seems to be at odds with the notion of Buddhism principles. Since the variable does not reflect the quantity not quality of temple, it is plausible that most temples do not follow the genuine Buddha's teachings of virtues. As in Thailand, it is a well-known fact that popular temples are often associated with superstitious rituals or the selection of lottery gambling numbers. Nevertheless, a more rigorous inquiry should be pursued to clarify this connection.

Despite Thailand's swift transformation into an aging society, there is no association between AGEING and overall suicide rate. In relation to the level of provincial financial development measured by bank density (BANK), the findings suggest a positive impact on suicide rates. The ease of access to banks may lead to high indepthness, which in turn contributes to anxiety and, ultimately, suicide. Nevertheless, there is also the possibility that access to formal financial institutions can alleviate financial stress when needed.

When examining suicide rates by gender, the findings in columns (2) and (3) reveal that income and population density have negative effects on both male and female suicide rates. However, the coefficients of both variables are higher for males than for females. The results indicate that economic factors have a more significant impact on decreasing suicide rates among Thai males in comparison to females. This suggests that Thai males are more responsive to economic conditions. This pattern can be attributed to the Thai cultural norm where males traditionally bear the role of

the family's primary provider, leading to increased economic stress for males compared to females.

The relationships between other socioeconomic variables are similar to those found in the total suicide rates presented in column (1). It is worth noting that the demographic variable (AGEING) exhibits a notably negative impact on female suicide rates. This outcome may be attributed to the

higher level of social engagement and participation in community clubs among elderly women compared to men, especially in rural areas. In summary, the baseline regression results indicate that in Thailand, higher provincial income levels and population density are associated with lower suicide rates, with a more pronounced effect observed in the case of male suicides.

Table 2. The baseline regression

Variables	Overall (1)		Male (2)		Female (3)	
	Coeff.	P	Coeff.	P	Coeff.	P
GPP	−0.410***	0.004	−0.528**	0.020	−0.242***	0.008
POPDEN	−1.388***	0.000	−1.632***	0.000	−0.725***	0.000
POVLINE	2.986**	0.040	5.723**	0.014	−1.070	0.256
ENGERGY	0.453***	0.000	0.672***	0.000	0.211***	0.001
DRUG	−0.343***	0.000	−0.416***	0.001	−0.189***	0.000
SCHOOL	−0.845*	0.058	−1.718**	0.016	−0.225	0.434
TEMPLE	1.574***	0.000	2.783***	0.000	0.607***	0.001
AGEING	−1.043	0.152	−0.368	0.752	−0.929**	0.049
BANK	0.543**	0.032	0.780*	0.054	0.416**	0.012
Intercept	−5.904	0.619	−18.626	0.326	17.185**	0.026
Fixed Effect	Yes		Yes		Yes	
Observations	770		770		770	
Adjusted R^2	0.568		0.542		0.429	
F-statistic	68.38		61.73		39.41	
Log-Likelihood	−1590		−1952		−1254	
AIC	3213		3936		2541	

Note: *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

B. The Effect of Austerity on Suicide Rates

To further investigate the effect of austerity during the COVID-19 pandemic, Table 3 presents the estimated regression coefficients in Eq. (2). The coefficients of primary interest are those of the interaction terms, GPP*YEAR and POPDEN*YEAR. The findings reveal that the GPP and POPDEN remain negatively associated with suicide rates. However, the coefficient of the interaction term, GPP*YEAR, is not statistically significant while the POPDEN*YEAR is positive and statistically significant. This indicates that the

negative effect of POPDEN on suicide lessens during the pandemic.

One plausible explanation for this result is that, due to the fear of contagion and the spread of the virus, highly populated provinces could experience an increased suicide rate. Furthermore, when examining columns (2) and (3), the coefficient of the population density interaction term is twice as high for males as compared to females. This implies that Thai males may be more responsive to external conditions than females.

Table 3. The interaction effect of the pandemic

Variables	Total		Male		Female	
	Coeff.	P	Coeff.	P	Coeff.	P
GPP	−0.366**	0.013	−0.456*	0.053	−0.248***	0.010
GPP * YEAR	−0.104	0.729	−0.210	0.663	0.001	0.996
POPDEN	−1.376***	0.000	−1.633***	0.000	−0.792***	0.000
POPDEN * YEAR	0.463**	0.034	0.763**	0.029	0.326**	0.023
POVLINE	2.496*	0.088	5.029**	0.032	−0.986	0.300
ENGERGY	0.436***	0.000	0.648***	0.000	0.212***	0.001
DRUG	−0.278***	0.001	−0.317**	0.018	−0.173***	0.002
SCHOOL	−0.706	0.112	−1.505**	0.034	−0.190	0.510
TEMPLE	1.784***	0.000	3.090***	0.000	0.619***	0.001
AGEING	−1.640**	0.032	−1.226	0.315	−0.913*	0.066
BANK	0.591**	0.019	0.851**	0.035	0.412**	0.012
YEAR	−0.496	0.882	−0.480	0.928	−1.607	0.459
Intercept	−3.581	0.762	−15.392	0.417	16.853**	0.029
Fixed Effect	Yes		Yes		Yes	
Observations	770		770		770	
Adjusted R^2	0.573		0.547		0.431	
F-statistic	58.27		52.54		33.3	
Log-Likelihood	−1584		−1947		−1251	
AIC	3207		3931		2541	

Note: *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

C. Robustness

To confirm the results in the previous section, Table 4 Panel A presents the results of regression using the number of factories (FACTORY) as a proxy for the industrialization,

while Panel B provides the results using provincial household income survey data (HHICOME) as a proxy for the income. With the FACTORY (Panel A), the overall results are consistent with those in Table 2. On the contrary, findings in

Panel B suggest a lack of association between HHICOME and suicide. Nonetheless, in both panels, the coefficients of POPDEN and the interaction, POPDEN*YEAR are significantly negative and positive, respectively. The results reaffirm the earlier findings that male suicide rates are more responsive to economic factors and more susceptible to external influences during the pandemic.

Table 4. Further analysis

Variables		Total (1)		Male (2)		Female (3)	
		Coeff.	P	Coeff.	P	Coeff.	P
Panel A: Number of Factories as Degree of Industrialization	GPP	−0.259*	0.081	−0.304	0.200	−0.201**	0.036
	GPP * YEAR	−0.049	0.871	−0.150	0.758	0.029	0.881
	POPDEN	−1.099***	0.000	−1.242***	0.000	−0.658***	0.000
	POPDEN * YEAR	0.532**	0.017	0.787**	0.028	0.370**	0.011
	POVLINE	1.876	0.206	4.210*	0.077	−1.369	0.153
	FACTORY	0.050	0.642	0.095	0.578	0.062	0.372
	DRUG	−0.272***	0.001	−0.323**	0.018	−0.172***	0.002
	SCHOOL	−0.252	0.566	−0.828	0.239	0.037	0.896
	TEMPLE	1.798***	0.000	3.070***	0.000	0.607***	0.002
	AGEING	−0.904	0.248	−0.214	0.865	−0.469	0.353
	BANK	0.857***	0.001	1.232***	0.002	0.527***	0.001
	YEAR	−1.440	0.670	−1.184	0.827	−2.137	0.329
	Intercept	5.624	0.639	−2.519	0.896	22.170***	0.004
	Fixed Effect	Yes		Yes		Yes	
	Observations	769		769		769	
	Adjusted R^2	0.558		0.534		0.419	
	F-statistic	54.79		49.82		31.78	
	Log-Likelihood	−1590		−1953		−1252	
	AIC	3217		3944		2542	
		Total		**Male**		**Female**	
		Coeff.	P	Coeff.	P	Coeff.	P
Panel B: Household Income as Provincial Income	HHICOME	0.763	0.118	1.190	0.128	0.638**	0.045
	HHICOME* YEAR	−0.114	0.875	−0.032	0.978	−0.387	0.412
	POPDEN	−1.385***	0.000	−1.651***	0.000	−0.815***	0.000
	POPDEN * YEAR	0.550**	0.012	0.896***	0.010	0.416***	0.004
	POVLINE	1.829	0.209	4.147*	0.075	−1.448	0.126
	ENGERGY	0.364***	0.000	0.543***	0.000	0.165***	0.007
	DRUG	−0.258***	0.002	−0.289**	0.031	−0.161***	0.004
	SCHOOL	−0.481	0.272	−1.234*	0.078	−0.023	0.935
	TEMPLE	1.922***	0.000	3.260***	0.000	0.712***	0.000
	AGEING	−1.731**	0.024	−1.351	0.269	−0.976**	0.050
	BANK	0.394	0.148	0.557	0.200	0.254	0.153
	YEAR	−0.900	0.900	−3.135	0.785	1.923	0.681
	Intercept	−10.921	0.390	−26.568	0.190	10.653	0.198
	Fixed Effect	Yes		Yes		Yes	
	Observations	768		768		768	
	Adjusted R^2	0.571		0.546		0.428	
	F-statistic	57.64		52.28		32.83	
	Log-Likelihood	−1583		−1943		−1250	
	AIC	3204		3923		2539	

Note: *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

V. CONCLUSION

The recent surge in suicide highlights the need for gaining a better understanding of factors associated with suicide. This paper examines the relations of socioeconomic factors and suicide at the provincial level during 2012–2021 in Thailand. Based on the panel data with regional fixed effect, the results show that the income and population density have a strong negative association with suicide, consisting with most previous studies. It also shows that Thai men are more sensitive to these factors than Thai women. This finding may stem from the Thai culture that men are expected to be the head of households and responsible for the well-being of the family. Further investigation into the effect of austerity during the COVID-19 pandemic shows the negative effect of POPDEN on suicide lessens during the pandemic. Due to the fear of contagion and adverse implications for healthcare access may result in higher suicide rate in the highly populated province. The lessen impact is also higher for Thai men than that of women. The findings from this study emphasize the need for a multifaceted approach to suicide prevention, considering the specific sensitivies of different demographics and the challenges brought about by events like the COVID-19 pandemic. Although economic support is essential, the effective suicide prevention effort should place greater emphasis on diverse demographic groups, with particular attention to gender disparities. Lastly, because of the inherent limitations in provincial data availability in Thailand, these findings should be considered preliminary. Further research is needed to explore the relationship between suicide and socioeconomic factors influenced by Thai culture and values.

CONFLICT OF INTEREST

The author declares no conflict of interest.

REFERENCES

[1] M. Oyesanya, J. Lopez-Morinigo, and R. Dutta, "Systematic review of suicide in economic recession," *World Journal of Psychiatry*, vol. 5, no. 2, pp. 243–254, June 2015. https://doi.org/10.5498/wjp.v5.i2.243

[2] I. Backhaus, H. Hoven, C. D. Tecco, *et al.*, "Economic change and population health: Lessons learnt from an umbrella review on the great recession," *BMJ Open*, vol. 12, no. 4. pp 1–10, April 2022. https://doi.org/10.1136/bmjopen-2021-060710

[3] T. Matsubayashi, K. Sekijima, and M. Ueda, "Government spending, recession, and suicide: Evidence from Japan," *BMC Public Health*, vol. 20, no. 243, pp. 1–8, February 2020. https://doi.org/10.1186/s12889-020-8264-1

[4] A. Case and A. Deaton, *Deaths of Despair and the Future of Capitalism*, illustrated edition, USA: Princeton University Press, 2020.

[5] B. Vitiello, M. Vichi, C. Davico, S. Ghirini, and M. Pompili, "Population density and suicide risk," in *Suicide Risk Assessment and Prevention*, M. Pompili, Ed., Switzerland: Springer, 2022, pp. 703–716.

[6] C. Chanagul, "Determinants of suicide rates in Thailand," *Journal of Community Development Research (Humanities and Social Sciences)*, vol. 12, no. 1, pp. 15–24, January-March 2019.

[7] S. Stack, "Contributing factors to suicide: Political, social, cultural and economic," *Preventive Medicine*, vol. 152, pp. 1–13, November 2021. https://doi.org/10.1016/j.ypmed.2021.106498

[8] Z. Cai, M. Chen, P. Ye, and P. S. F. Yip, "Socio-economic determinants of suicide rates in transforming China: A spatial-temporal analysis from 1990 to 2015," *The Lancet Regional Health Western Pacific*, vol. 19, pp. 1–12, February 2022. https://doi.org/10.1016/j.lanwpc.2021.100341

[9] S. U. Lee, I. H. Oh, H. J. Jeon, and S. Roh, "Suicide rates across income levels: retrospective cohort data on 1 million participants collected between 2003 and 2013 in South Korea," *Journal of Epidemiology*, vol. 27, no. 6, pp. 258–264, June 2017. https://doi.org/10.1016/j.je.2016.06.008

[10] Y. Choi, "The effect of income level on all-cause mortality and suicide among patients using antidepressants: A population-based cohort study," *Psychiatry Research*, vol. 299, pp. 1–10, May 2021. https://doi.org/10.1016/j.psychres.2021.113838

[11] A. F. Näher, C. Rummel-Kluge, and U. Hegerl, "Associations of suicide rates with socioeconomic status and social isolation: Findings from longitudinal register and census data," *Frontiers in Psychiatry*, vol. 10, pp. 1–9, January 2020. https://doi.org/10.3389/fpsyt.2019.00898

[12] M. Vichi, B. Vitiello, S. Ghirini, and M. Pompili, "Does population density moderate suicide risk? An Italian population study over the last 30 years," *European Psychiatry*, vol. 63, no. 1, pp. 1–7, July 2020. https://doi.org/10.1192/j.eurpsy.2020.69

[13] I. O. Farrell, P. Corcoran, and I. Perry, "The area level association between suicide, deprivation, social fragmentation and population density in the Republic of Ireland: A national study," *Social Psychiatry Psychiatric Epidemiology*, vol. 51, pp. 839–847, April 2016. https://doi.org/10.1007/s00127-016-1205-8

[14] S. Liu, S. B. Morin, N. M. Bourand, *et al.*, "Social vulnerability and risk of suicide in US adults, 2016–2020," *JAMA Network Open*, vol. 6, no. 4, pp. 1–9, April 2023. https://doi.org/10.1001/jamanetworkopen.2023.9995

[15] H. Jang, W. Lee, Y. Kim, and H. Kim, "Suicide rate and social environment characteristics in South Korea: The roles of socioeconomic, demographic, urbanicity, general health behaviors, and other environmental factors on suicide rate," *BMC Public Health*, vol. 22, no. 410, pp. 1–10, March 2022. https://doi.org/10.1186/s12889-022-12843-4

[16] M. Sinyor, R. Tse, and J. Pirkis. "Global trends in suicide epidemiology," *Current Opinion in Psychiatry*, vol. 30, no. 1, pp. 1–6, January 2017. https://doi.org/10.1097/YCO.0000000000000296

[17] World Health Organization. (April 2020). COVID-19 and violence against women: What the health sector/system can do. [Online]. pp. 1–3. Available: https://apps.who.int/iris/handle/10665/331699

[18] D. Banerjee, J. R. Kosagisharaf, and T. S. S. Rao, "The dual pandemic' of suicide and COVID-19: A biopsychosocial narrative of risks and prevention," *Psychiatry Research*, vol. 295, pp. 1–8, January 2021. https://doi.org/10.1016/j.psychres.2020.113577

[19] V. Efstathiou, M.-I. Stefanou, N. Siafakas, *et al.*, "Suicidality and COVID-19: Suicidal ideation, suicidal behaviors and completed suicides amidst the COVID-19 pandemic (Review)," *Experimental and Therapeutic Medicine*, vol. 23, no. 1, pp. 1–8, January 2022. https://doi.org/ 10.3892/etm.2021.11030

[20] G. Ivbijaro, L. Kolkiewicz, D. Goldberg, *et al.*, "Suicide prevention and COVID-19," *Asia Pac Psychiatry*, vol. 13, no. 3, pp. 1–12, September 2021. https://doi.org./10.1111 /appy.12482

[21] M. Lotrakul, "Suicide in the north of Thailand," *J. Med. Assoc. Thai*, vol. 88, no. 7, pp. 944–948, July 2005.

[22] M. Lotrakul, "Suicide in Thailand during the period 1998–2003," *Psychiatry and Clinical Neurosciences*, vol. 60, no. 1, pp. 90–95, February 2006.

[23] S. Khiewphiw and T. Janlek, "Suicide in capitalist society of Thailand today," *Thammasat Journal*, vol. 40. no. 3, pp. 140–160, 2021.

[24] S. Hataiyusuk and S. Apinuntavech, "Adolescent suicide in Thailand: Incidence, causes and prevention," *Siriraj Med. Bull.*, vol. 13, no. 1, pp. 40–47, January-March 2020.

[25] A. Sadanandan, "Political economy of suicide: Financial reforms, credit crunches and farmer suicides in India," *The Journal of Developing Areas*, vol. 48, no. 4, pp. 287–307, 2014. http://www.jstor.org/stable/24241261

[26] E. B. Elbogen, M. Lanier, A. E. Montgomery, *et al.*, "Financial strain and suicide attempts in a nationally representative sample of US adults," *American Journal of Epidemiology*, vol. 189, no. 11, pp. 1266–1274, July 2020. https://doi.org/10.1093/aje/kwaa146