

BMJ Open Criminalisation of suicide and suicide rates: an ecological study of 171 countries in the world

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ABSTRACT

Objective In the last half of the 20th century, many countries have already abolished antisuicide laws; however, more than 20 countries still adopt them. This paper is the first to systematically explore the association between criminalisation of suicide and national suicide rates in 171 countries/regions to examine the deterring effects of the antisuicide laws.

Design A cross-sectional ecological study.

Setting 171 countries in the world.

Participants In 2012, 25 countries were identified to carry antisuicide laws. A linear regression analysis was adopted to explore the association between national suicide rates (log transformed) and criminalisation of suicide in the world in 2012, having controlled for the Human Development Index (HDI), majority religious affiliations and the national unemployment rate.

Main outcome measure Sex-specific age standardised suicide mortality rates.

Results Criminalisation of suicide was associated with slightly increased national suicide rates (β estimate=0.29, 95% CI -0.04 to 0.61). Stronger association was found in women (β estimate=0.40, 95% CI 0.06 to 0.74), connecting criminalisation of suicide and higher suicide rates. The harmful effect of antisuicide laws on women was particularly prominent in non-Muslim countries and countries with lower HDI.

Conclusions Laws penalising suicide were associated with higher national suicide rates and even more so in the female population in the low HDI, non-Muslim countries. The non-supportive patriarchal culture with laws penalising suicide may render women vulnerable to suicidality. Instead of criminalising suicide, alternative approaches such as providing good mental healthcare and adjusting the socioeconomic, legal and cultural factors that contribute to suicide should be considered.

INTRODUCTION

In the 19th century, suicide and attempted suicide were considered criminal offences in many countries in the world.¹⁻³ Those laws have largely been repealed in the 20th century, as suicide and suicidal behaviours are now more often considered as symptoms of mental disorder, despair and socioeconomic and public health problems rather than as a felony or misdemeanour.^{1 2 4} However,

Strengths and limitations of this study

- This is the first study to assess whether laws penalising suicide had suicide deterring effects.
- Special attention was paid to the impact of laws on women and countries with lower level of development; an area that has not been explored previously.
- Under-reporting or misclassification of suicides was possible.
- The ecological design might affect causal inference.

according to a recent review by Mishara and Weisstub,¹ up until 2012, there remained 25 countries maintaining statutes penalising attempted suicide. Those who support penalising suicide still argue that legal punishments can deter suicidal acts, serve as a social condemnation of unacceptable behaviours and ensure justice is done.^{1 2}

In May 2020, the International Association for Suicide Prevention issued its policy recommending that attempted suicide be decriminalised.⁵ The statement asserts that decriminalisation of attempted suicide can reduce social stigma, help remove barriers in obtaining adequate mental healthcare, increase access to emergency medical services, foster suicide prevention activities and improve the well-being of those vulnerable to suicidal behaviours.⁵ Arguments in defence of antisuicide laws have since gradually weakened, particularly in more secular parts of the world that accommodate diverse religious and moral interpretations of suicide. Yet, despite widespread calls to decriminalise suicide, at a global level, there has been neither systematic research nor empirical analyses on the suicide deterrent effect of antisuicide laws.

Studies based on a single country comparing suicide rates before and after abolition of the antisuicide laws have not shown consistent results.^{4 6} No increase in suicides was reported in New Zealand and

Canada after abolishing the laws.⁴ Pooling data from seven nations together (Canada, New Zealand, England and Wales, Finland, Sweden and Hong Kong), decriminalisation of suicide was shown to be associated with an increase of official suicide rates.⁴ In a study examining the impact of abolition of the Irish antisuicide law in 1993, Osman *et al* found that the law did not influence the national trend (1970–2000) of male and female suicide rates, but the rates of undetermined death had significantly diminished.⁶ On the contrary, it was originally expected that the official suicide rates would have had a short-term increase after decriminalisation, as concealments of suicides would be fewer.⁶ In a previous qualitative study that reviewed 20 attempted suicide prosecutions reported by the media in Ghana, Adinkrah concluded that criminal prosecutions of suicide attempt survivors exacerbated the suicidal persons' risk of depression and anxiety, and heightened their risk of death.⁷ Further, stigmatising suicide by law might arouse shameful and indignant emotions in suicide attempters and suicide survivors. In the long run, repealing the laws was expected to have beneficial effects through decreasing the labelling effect of suicide, encouraging professional help seeking and removing the burden of criminal prosecution from suicide attempters.

Religiosity and the development level of a given country are also known to be important factors associated with suicide.⁸ The 'maqasid al-shariah' (goals and purposes of Islamic law) values life, which is the second of the five pillars of maqasid, and thus, maqasid forbids suicide.⁹ The Holy Qu'ran explicitly forbids suicide, stating 'do not kill yourself' in Surah 4, verses 29 and 30.¹⁰ Muslim countries were therefore found to have the lowest national suicide rates¹¹ and lower acceptance of suicide.¹² Christianity has explicitly regarded suicide as a sin based on the sixth Commandment '[T]hou shall not kill'. In addition, until late 20th century, many countries with different Christian denominations adopted antisuicide criminal laws.¹³ Buddhism and Hinduism, also dominant religions in the world, however, do not have strong condemnation against suicide.^{13 14} It is thus important to examine whether it is the law, majority religious affiliations, or both, that had impact on the national/regional suicide rates.

In addition, national development and socioeconomic factors were found to be associated with national suicide rates.^{15 16} Though with some contradictory results, Human Development Index (HDI) was shown to be positively associated with national suicide rates.¹⁵ Rising national unemployment rate was also associated with increased national suicide rate.¹⁷

The current study explored whether countries with penal codes punishing suicide were associated with lower suicide rates. The hypothesis is such codes were not associated with lowered suicide rates. Further, whether criminalisation of suicide might have differential effects based on gender, majority religious affiliations and country-specific development level were also considered.

METHOD

Data

Predictor: criminalisation of suicide

Based on the review article conducted by Mishara and Weisstub,¹ of the 192 countries reviewed, 25 had coded laws criminalising attempted suicide in 2012; and 23 out of the 25 countries reported suicide data to the WHO. The two countries that penalised attempted suicide but did not report their suicide data to the WHO were Saint Lucia and Tonga. There was no further updated review on antisuicide laws when this manuscript was being prepared.

The suicide rates, majority religious affiliations (Islam, Christianity and other religions) and the development level based on the HDI of these 23 countries are listed in [table 1](#). World maps illustrating those countries with anti-suicide laws, majority religious affiliations and the HDI are presented in online supplemental figures 1–3 ([table 1](#) here).

Outcome variable: suicide rate

The suicide mortality data in 2012 were obtained from the WHO Global Health Observatory dataset,¹⁸ and the death records from Taiwan's Department of Health. A total of 171 countries were included in the current analyses. The year of the suicide mortality data was chosen to fit the year of the review by Mishara and Weisstub on the data. Suicide mortality was identified using the International Classification of Diseases, 10th revision (ICD-10) code of X60–X84 (intentional self-harm). The list of ICD-10 codes for 'intentional self-harm' (ie, suicide) is provided in online supplemental table 1.

Control variables

We used 'The Global Religious Landscape Report' conducted by the Pew Research Center to identify the majority religious affiliations of a given country.¹⁹ As the teachings of Islam and Christianity were firmly against suicide, majority religious affiliations were categorised as Islam, Christianity and others (Hinduism, Buddhism, Judaism or others). Countries which did not have majority religious affiliations were categorised as Unaffiliated.

The HDI compiled by the United Nations Development Programme (UNDP)²⁰ was used as an indicator of the development level of a given country in 2012. Four categories of HDI were identified by the UNDP: Very High HDI, High HDI, Medium HDI and Low HDI.²⁰

The unemployment rates data were obtained from the World Bank.²¹ The continuous variable was used as a proxy for the economic condition of each country in 2012.

Analytic strategies

Suicide rates were age-standardised using the world standard population structure in 2012. Using a linear regression model, whether criminalisation of suicide was associated with suicide rates before and after adjusting for the control variables was assessed. As the distribution of

Table 1 Age-standardised suicide rates, proportions of the Muslim population and the Human Development Index (HDI) in countries that criminalised suicide in 2012

Countries	Suicide rates (per 100 000 population)	Majority religious affiliations	HDI
Bahamas	2.3	Christianity	High Human Development
Bangladesh	7.8	Islam	Medium Human Development
Brunei Darussalam	6.4	Islam	Very High Human Development
Cyprus	4.7	Christianity	Very High Human Development
Ghana	3.1	Christianity	Medium Human Development
Guyana	44.2	Christianity	Medium Human Development
India	21.1	Others	Medium Human Development
Kenya	16.2	Christianity	Medium Human Development
Lebanon	0.9	Islam	High Human Development
Malawi	16.0	Christianity	Low Human Development
Malaysia	3.0	Islam	High Human Development
Myanmar	13.1	Others	Medium Human Development
Nigeria	6.5	Others	Low Human Development
Pakistan	9.3	Islam	Medium Human Development
Papua New Guinea	12.4	Christianity	Low Human Development
Qatar	4.6	Islam	Very High Human Development
Singapore	7.4	Others	Very High Human Development
Somalia	12.4	Islam	Low Human Development
South Sudan	19.8	Christianity	Low Human Development
Sri Lanka	28.8	Others	High Human Development
Sudan	17.2	Islam	Low Human Development
Tanzania	24.9	Christianity	Low Human Development
Uganda	19.5	Christianity	Low Human Development

suicide rates was skewed, the dependent variable was log-transformed. Sex subgroup analyses were also performed to explore whether the effect of criminalisation of suicide was gender sensitive. Further, stratified analyses were conducted to examine whether the association between criminalisation of suicide and suicide rates differed by Muslim versus non-Muslim majority religious affiliations and the levels of development. Wilcoxon-Mann-Whitney Tests were conducted to assess whether criminalisation of suicide affected the median suicide rates in each subgroup.

Role of the sources of funding

The sources of funding played no role in the design of this study and would not have any role during its execution, analyses, interpretation of the data or decision to submit the results.

The corresponding authors confirm that they have full access to all the data in the study and have final responsibility on the decision to submit this paper for publication.

Patients and public involvement

The current study used aggregated secondary data available from public resources. No patient participation was involved.

RESULTS

In the univariate model, criminalisation of suicide was positively associated with suicide rates, although not statistically significant. Sex-stratified analysis indicated that the association was statistically significant in women, but not in men (table 2). In models adjusted for majority religious affiliations, HDI and unemployment rates, the association between suicide criminalisation and suicide rates in women persisted. Compared with the unaffiliated, countries with Islam as the major religion were associated with lower suicide rates in both men and women. In contrast to the Very High HDI countries, the High HDI countries were found to have lower suicide rates, particularly in men. Although the estimate value was small, higher unemployment rates were found to be associated with lower suicide rates, especially in women (table 2).

Figure 1 shows stratified analyses based on religious affiliations. Since Islam was the only religion associated with lower suicide rates, the stratified analyses assessed whether the association between criminalisation of suicide and suicide rates differed in Muslim versus non-Muslim countries. Criminalisation of suicide seemed to impose suicide risk on women in non-Muslim countries

Table 2 Linear regression analysis to assess the impact of criminalisation of suicide and suicide rates in the world, by gender

	Univariate model			Adjusted model		
	Beta	95% CI	P value	Beta	95% CI	P value
Total						
Criminalisation of suicide	0.26	(−0.09 to 0.62)	0.148	0.29	(−0.04 to 0.61)	0.088
Religion (ref: Unaffiliated)						
Islam				−1.08**	(−1.84 to −0.31)	0.006
Christianity				−0.34	(−1.07 to 0.40)	0.370
Others				−0.26	(−1.07 to 0.55)	0.533
HDI (ref: Very High)						
High				−0.33 [†]	(−0.63 to −0.02)	0.034
Medium				−0.13	(−0.45 to 0.20)	0.439
Low				0.03	(−0.28 to 0.34)	0.839
Unemployment rate				−0.02 [†]	(−0.04 to 0.00)	0.042
Male						
Criminalisation of suicide	0.16	(−0.22 to 0.53)	0.408	0.22	(−0.12 to 0.56)	0.205
Religion (ref: Unaffiliated)						
Islam				−1.12**	(−1.92 to −0.33)	0.006
Christianity				−0.25	(−1.02 to 0.51)	0.513
Others				−0.17	(−1.01 to 0.67)	0.697
HDI (ref: Very High)						
High				−0.35 [†]	(−0.67 to −0.04)	0.028
Medium				−0.21	(−0.54 to 0.12)	0.217
Low				0.00	(−0.32 to 0.33)	0.986
Unemployment rate				−0.01	(−0.03 to 0.01)	0.339
Female						
Criminalisation of suicide	0.48 [†]	(0.11 to 0.85)	0.012	0.40 [†]	(0.06 to 0.74)	0.022
Religion (ref: Unaffiliated)						
Islam				−0.90 [†]	(−1.70 to −0.11)	0.026
Christianity				−0.43	(−1.20 to 0.33)	0.263
Others				−0.30	(−1.14 to 0.54)	0.476
HDI (ref: Very High)						
High				−0.21	(−0.52 to 0.11)	0.196
Medium				0.15	(−0.18 to 0.49)	0.366
Low				0.28	(−0.04 to 0.61)	0.086
Unemployment rate				−0.03***	(−0.05 to −0.01)	<0.001

Note: the dependent variable was log transformed.

[†]p<0.05, **p<0.01, ***p<0.001.

HDI, Human Development Index.

(p<0.001) but did not seem to affect suicide rates in the Muslim countries (figure 1).

As shown in figure 2, in countries with Very High HDI, criminalisation of suicide was associated with lower suicide rates, particularly in men (figure 2). In the High HDI countries, no association between suicide criminalisation and suicide rates was found. In the Medium HDI countries, criminalisation of suicide was found to be associated with higher suicide rates in women, but not in men. However, in countries with Low HDI, criminalisation of suicide was associated with higher suicide rates in both men and women (figure 2). The positive association of suicide criminalisation

with suicide rate was particularly strong among women in less developed countries (p<0.0001).

DISCUSSION

Summary of main findings

This study reveals that, consistent with the present hypotheses, in general, suicide rates in countries with laws penalising suicide were not associated with lower suicide rates. Furthermore, the adoption of antisuicide laws was associated with higher suicide rates in women. The adverse impact of the laws criminalising suicide remained when

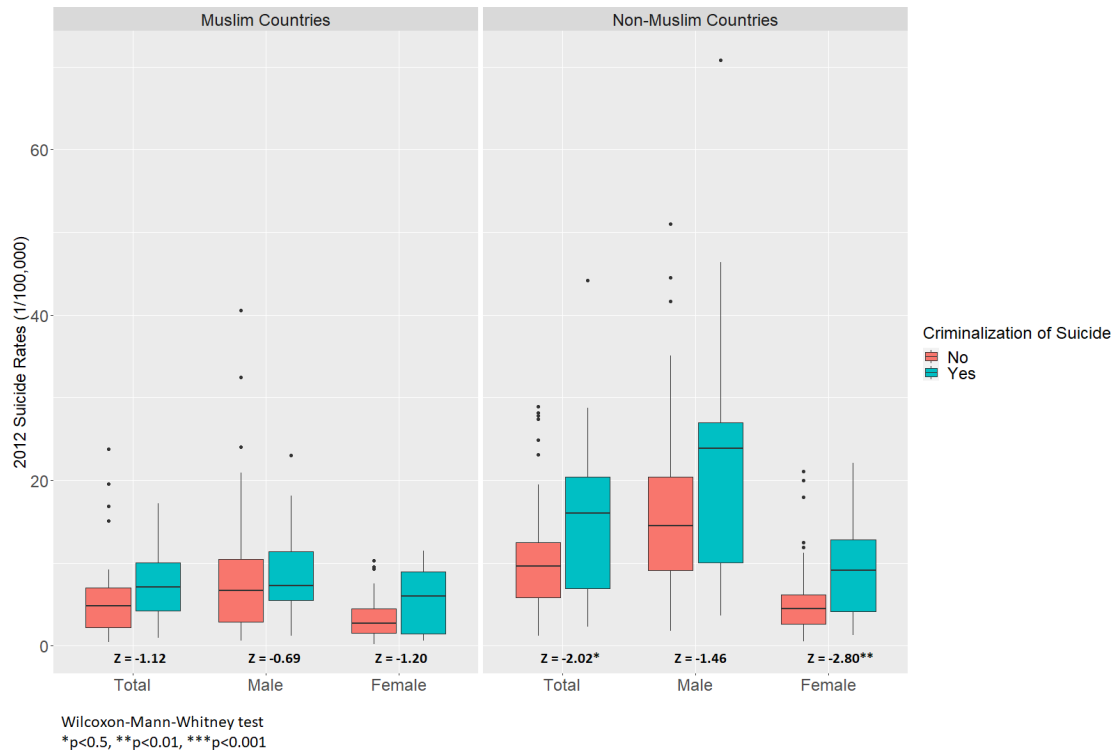


Figure 1 Criminalisation of suicide and suicide rates by countries with Muslim and non-Muslim religions. Note: Information on Muslim countries were based on Global Religious Landscape Report (<https://www.pewforum.org/2012/12/18/global-religious-landscape-exec/>).

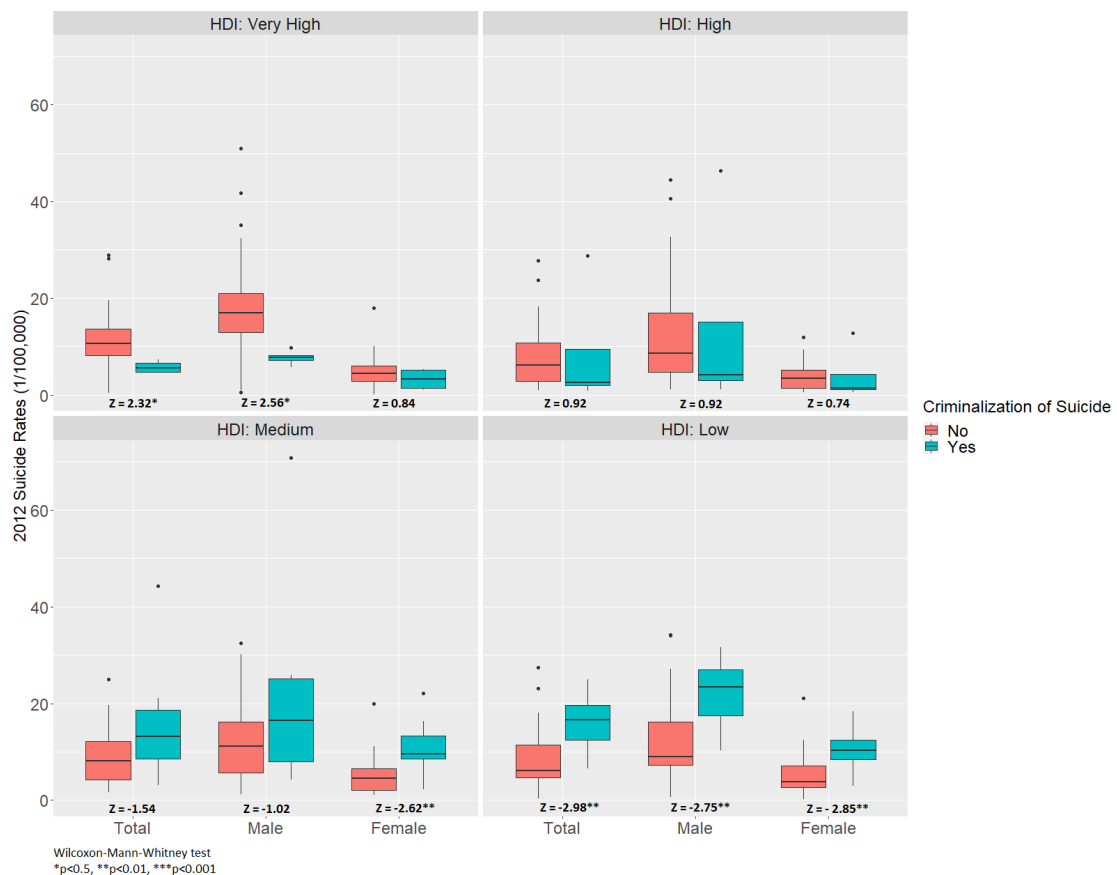


Figure 2 Criminalisation of suicide and suicide rates by Human Development Index (HDI).

the majority religious affiliation, the HDI and the unemployment rates were controlled for. Countries where Islam was the major religion generally had lower suicide rates, with or without the laws penalising suicide. However, in countries where Islam was not a major religion, criminalisation of suicide was associated with higher female suicide rates. In lower HDI countries, however, criminalisation of suicide was significantly associated with higher suicide rates, particularly in women. Exceptionally, the Very High HDI countries with antisuicide laws tended to have lower suicide rates, especially in men.

Explanation and comparison with previous findings

This is the first study that systematically examined the association between criminalisation of suicide and suicide rates on a worldwide scale. Suicide deterrent effect was not detected in countries with antisuicide laws; conversely, suicide rates tended to be higher in countries with criminal punishment on suicidal behaviours, particularly in women. The 'paradoxical' effects of such laws demonstrate that in addition to stigma reduction, facilitation of help seeking and mental healthcare, welfare support and decriminalisation of suicide should be the favourable suicide prevention policy. The negative emotions induced by antisuicide laws may not only increase the suicidal persons' urge to die by suicide, but also reduced their willingness to seek and receive help.

Moreover, this study shows that antisuicide laws and religiosity may have different effects on suicide rates. Countries with Islam as the major religion tended to have lower suicide rates than those that are not. While antisuicide laws had no effect in lowering suicide rates in Muslim countries, they were associated with increased female suicide rates in non-Muslim countries. Prevalent cultural and religious beliefs with low acceptance of suicide seemed to be more powerful than the stipulation of antisuicide laws in suicide rate reduction.³

The present findings indicated that women were particularly sensitive to the adverse effects of criminalisation of suicide, though it was not known exactly why the association between the antisuicide laws and suicide rates was stronger in women. It is also possible that suicide attempt rates were higher in women than in men²²; hence, women would be more likely to be the victims of such laws.

Criminal punishment in law on suicidal behaviours might further inadvertently reduce the suicidal women's willingness to receive help and force them to take more lethal actions to avoid possible criminal prosecutions. In other words, instead of being a deterrent to suicide, the law might paradoxically increase suicide risk, particularly in women.

Literature has further shown that antisuicide statutes may not be reliably enforced.^{1 2} For example, in the past, Singapore, Nigeria, England and Wales were reported not to have prosecuted suicide attempters rigorously.²³ Thus, the 'full' suicide deterrent effect of antisuicide laws when rigorously enforced might be attenuated. On the other hand, law is often a reflection of the culture in a

country; even if it is not rigorously enforced, it may still symbolically represent the cultural heritage and norms of that country.²⁴ Emphasis of the antisuicide law on individual responsibility for suicidality implies the country's neglect on the social, economic and other cultural conditions that contribute to suicide. This could be the reason the antisuicide laws seemed to be harmful even when not enforced reliably.

A non-supportive, patriarchal culture in countries with antisuicide laws may render life miserable for vulnerable women and consequentially increase their risk of suicide. Local analyses of how women may be especially harmed by laws such as the criminalisation of suicide, even if not regularly enforced, would thus be a positive step towards gender equality.

Compatible with previous studies, the present analyses show that a larger Muslim population was associated with lower national suicide rates. Since the current analyses did not include sharia law as part of coded laws penalising suicide, sharia laws might be partially represented by the larger Muslim population. Reasons for the lower reported risk of suicide in Islamic countries or regions may include the following: (1) high social integration through intense religious Islamic life practices reduced the national suicide rate; (2) sharia law firmly opposing suicide reduced the national suicide rate; and (3) stigmatisation of suicide in Islam rendered under-reporting of suicide.¹³ As shown in [figure 1](#), in Islamic countries where religious sanctions against suicide were strong, coded laws had no influence on the suicide rates. Under-reporting of suicide might further downplay the harmful effects of coded antisuicide laws on women in Muslim countries. Nonetheless, the present results indicated that the internalised cultural practices of the Muslim religion (including the sharia law) and social integration could compensate for the possible harmful effect (especially on women) of the coded law in a culture unfavourable to women.²⁵

Results of the studies using HDI to predict suicide rate have been mixed.¹⁵ In [table 2](#), HDI did not have a linear relationship with suicide rates in that High HDI countries had the lowest suicide rate as the Very High HDI countries did not have different suicide rates from countries with lower HDI. This is different from the finding in [Khazaei et al](#)¹⁵ that higher HDI countries had higher suicide rates than the lower HDI ones. Hence, further exploration of potential unobserved confounding factors is necessary for clarifying the effect of HDI on suicide rates in different categories of countries.

Women in countries with lower HDI often suffer from a lack of resources and are disadvantaged within patriarchal cultural institutions.^{26 27} As the disadvantage accumulated through their life course, it is possible that suicide could be a way out.^{28 29} Thus, as shown in [figure 2](#), coded antisuicide laws could be particularly harmful to women (rather than men) in countries with lower HDI. It is thus imperative to further investigate the ideological links of the antisuicide laws to the national level patriarchal systems that

are unfriendly or hostile to women. Exceptionally, anti-suicide laws seemed to have suicide deterrent effect on men in the Very High HDI countries, including Brunei, Cyprus, Qatar and Singapore. Further case studies of each country might therefore be helpful to explore how that happened.

Unemployment on the other hand was noted to have positive association with suicidality at the individual level,³⁰ but depending on the regions, the time periods and analytic strategies, no consistent relationship was discovered between unemployment rates and suicide rates at the ecological level.³¹ Results of the present analyses were compatible with Khazaei *et al* in that the national female suicide rate was found to be negatively associated with the national unemployment rate.¹⁵ If working women were discriminated against in the work place and bore the burden of family care, unemployment might paradoxically have a protective effect on women in some countries.³² On the other hand, Simpson's paradox has shown that positive correlation at subgroup analysis might become negative at the aggregate analysis, and vice versa.³³ Therefore, even if small-scale analysis of unemployment rate was correlated with increased suicide rate in women, at the aggregate level, the correlation between women unemployment and suicide rate might be reversed due to some hidden sociocultural confounders. Further delicate subgroup analyses in the future could thus elucidate which factors contribute to the correlation between unemployment rates and lower suicide rates in women.

Finally, coded laws penalising suicide not only revealed no association of lower suicide rates, but also contributed to higher suicide rates in women. Instead, other laws and regulations have been shown to have suicide prevention effects without the penalty. Laws that restrict access to lethal suicide means (pesticides, guns and so forth)³⁴ or provide welfare and financial support to persons in the economic downturns¹⁷ were found to be effective in reducing suicide rates. On the other hand, more and more countries and regions are permitting physician-assisted suicide or medical aid in dying, which might unwittingly promote the public acceptance of suicide and thus increase suicide rates.³⁵ In the future, it is an important task to integrate different laws to construct evidence-based and justified suicide prevention policies.

Limitations

The present results should be interpreted with the following limitations. First, results of the present ecological analyses might have ecological fallacies and would not sustain at the individual level.³⁶ Further quantitative and qualitative research of individual level data collection and analyses are necessary for avoiding ecological fallacies. Second, either due to underreporting or misclassification, the suicide data must be reviewed with caution. However, this limitation actually indicated that the positive association between coded antisuicide laws and national level suicide rates might be stronger. Third, countries with antisuicide laws were identified based

on the paper by Mishara and Weisstub,¹ but the list of countries might be incomplete. Fourth, literature has shown that chronic poverty and acute economic events might have different impacts on the national suicide rates.³⁷ However, the present cross-sectional data could not differentiate whether the association was due to static or dynamic economic effects of the HDI. Fifth, literature has shown that penalties on other suicide-related crimes (aiding, abetting or driving someone to suicide) might be related to the differences in suicide rates.^{35 38} In the USA, those states that penalised physician-assisted suicide tended to have lower suicide rates.³⁵ Due to the complicated variation of related local statutes even within a country, the variable at the country level was not included in the present study. Finally, the present cross-sectional data could not tease out whether coded antisuicide laws had direct impact on the national suicide rates.

CONCLUSIONS

Coded antisuicide laws were not associated with an effect of deterring suicide at the country level; conversely, suicide rates in countries with such laws were found to be higher, especially in women in the non-Muslim countries with Low HDI. Hence, results of the present research support countries to take a *prima facie* legal stance that coded antisuicide laws are based on empirically unsound legal policies. Antisuicide laws as a strong cultural symbol stigmatising and retributing suicide not only hinder suicide prevention from a humanitarian perspective, but also fail in deterring suicide from a policy standpoint. An alternative approach, common to countries that have demonstrably reduced suicide as part of their strategic initiatives, involves the provision of good mental healthcare and adjusting of the socioeconomic and cultural factors that contribute to suicide. Thus, to reduce suicide risk, it is important to reduce socioeconomic deprivation³⁹ and change the cultural attitudes and beliefs that stigmatise suicide and help seeking or praise and accept suicide.^{40–42} As India has restricted and Singapore has abolished their criminal statutes punishing suicide in recent years, it is hoped that more countries would follow suit considering the lack of evidence in antisuicide laws to have suicide deterrence effect. Currently, more than 40 countries, including Australia, New Zealand, the USA, the Netherlands, Sweden, have developed their national suicide prevention strategies.⁴² Moreover, Japan, South Korea and Taiwan also have comprehensive legislations on suicide prevention policy-making. However, parallel to this development, increasingly more countries or regions, including Victoria State in Australia, New Zealand and some states in the USA, are adopting laws permitting physician-assisted suicide or medical aid in dying. These clashing trends might create a 'moral crisis' in how to differentiate suicides that should be prevented from those that could not.⁴³ Furthermore, it is possible that laws permitting assisted suicide might render suicide acceptable to countries that adopt such laws and increase the suicide rates there.^{35 44} In the future, it is important therefore to integrate



the discourses of these different trends of legal policy-making for justified and evidence-based suicide prevention.

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1. The list of countries that had coded laws penalizing suicide in 2012 was retrieved from the article - Mishara BL, Weisstub DN. The legal status of suicide: a global review. *Int J Law Psychiatry* 2016;44:54–74. doi: 10.1016/j.ijlp.2015.08.032.2. The suicide mortality data in 2012 were obtained from the WHO Global Health Observatory dataset (<https://www.who.int/data/gho/data/themes/mental-health/suicide-rates>). 3. The majority religious affiliation data were obtained from The Global Religious Landscape Report conducted by the Pew Research Center (<https://www.pewforum.org/2012/12/18/global-religious-landscape-exec/>). 4. The Human Development Index data were obtained from the United Nations Development Programme website (<http://hdr.undp.org/en/content/human-development-index-hdi>). 5. The unemployment rate data were obtained from the World Bank databank website (<https://databank.worldbank.org/reports.aspx?source=2&series=SL.UEM.TOTL.MA.ZS&country=>).

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REFERENCES

- Mishara BL, Weisstub DN. The legal status of suicide: a global review. *Int J Law Psychiatry* 2016;44:54–74.
- Adinkrah M. Anti-suicide laws in nine African countries: criminalization, prosecution and penalization. *Afr J Criminol Just Stud* 2016;9:279–92 https://www.umes.edu/uploadedFiles/_WEBSITES/AJCS/Content/VOL9.%20ADINKRAH%20FINAL.pdf
- Chen JA, Courtwright A, Wu KC-C. The role of stigma and denormalization in suicide-prevention laws in East Asia: a sociocultural, historical, and ethical perspective. *Harv Rev Psychiatry* 2017;25:229–40.
- Lester D. Decriminalization of suicide in seven nations and suicide rates. *Psychol Rep* 2002;91:898.
- International Association for Suicide Prevention. The decriminalisation of attempted suicide policy position statement, 2020. Available: https://www.iasp.info/pdf/iasp_decriminalisation_policy_2020.pdf [Accessed 01 Nov 2020].
- Osman M, Parnell AC, Haley C. "Suicide shall cease to be a crime": suicide and undetermined death trends 1970–2000 before and after the decriminalization of suicide in Ireland 1993. *Ir J Med Sci* 2017;186:201–5.
- Adinkrah M. Criminal prosecution of suicide attempt survivors in Ghana. *Int J Offender Ther Comp Criminol* 2013;57:1477–97.
- Stack S. Suicide: a 15-year review of the sociological literature. Part II: modernization and social integration perspectives. *Suicide Life Threat Behav* 2000;30:163–76.
- Abdel YM, Tarshany R. Protection of life in Islamic law. *Int J Bus Econ Law* 2016;9:45–51.
- Shah A, Chandia M. The relationship between suicide and Islam: a cross-national study. *J Inj Violence Res* 2010;2:93–7.
- Gearing RE, Lizardi D. Religion and suicide. *J Relig Health* 2009;48:332–41.
- Stack S, Kposowa AJ. Religion and suicide acceptability: a cross-national analysis. *J Sci Study Relig* 2011;50:289–306.
- Gearing RE, Alonzo D. Religion and suicide: new findings. *J Relig Health* 2018;57:2478–99.
- Promta S, homyangkoon P. A Buddhist perspective on suicide. In: *Oxford textbook of Suicidology and suicide prevention*. New York: Oxford University Press, 2020: 95–139.
- Khazaei S, Armanmehr V, Nematollahi S, et al. Suicide rate in relation to the human development index and other health related factors: a global ecological study from 91 countries. *J Epidemiol Glob Health* 2017;7:131–4.
- Rehkopf DH, Buka SL. The association between suicide and the socio-economic characteristics of geographical areas: a systematic review. *Psychol Med* 2006;36:145–57.
- Shand F, Duffy L, Torok M. Can government responses to unemployment reduce the impact of unemployment on suicide? *Crisis* 2022;43:1–8.
- World Health Organization. The who global health Observatory, 2012. Available: <https://www.who.int/data/gho/data/themes/mental-health/suicide-rates>
- Pew Research Center. The global religious landscape, 2012. Available: <https://www.pewforum.org/2012/12/18/global-religious-landscape-exec/>
- United Nations Development Programme. Human development index (HDI), 2017. Available: <http://hdr.undp.org/en/content/human-development-index-hdi> [Accessed 01 Nov 2020].
- The World Bank. Unemployment, total (% of total labor force) (modeled ILO estimate), 2019. Available: <https://databank.worldbank.org/reports.aspx?source=2&series=SL.UEM.TOTL.MA.ZS&country=> [Accessed 01 Nov 2020].
- Canetto SS, Lester D. The epidemiology of women's suicidal behavior. In: *Women and suicidal behavior*. New York, NY: Springer, 1995: 35–57.

- 23 Holt G. When suicide was illegal, 2011. Available: <https://www.bbc.com/news/magazine-14374296> [Accessed 01 Nov 2020].
- 24 Cotterrell R. *Law, Culture and Society: Legal Ideas in the Mirror of Social Theory*. Routledge, 2017.
- 25 Cherif FM. Culture, Rights, and Norms: Women's Rights Reform in Muslim Countries. *J Polit* 2010;72:1144–60.
- 26 Maselko J, Patel V. Why women attempt suicide: the role of mental illness and social disadvantage in a community cohort study in India. *J Epidemiol Community Health* 2008;62:817–22.
- 27 Morgan R, Ayiasi RM, Barman D, *et al*. Gendered health systems: evidence from low- and middle-income countries. *Health Res Policy Syst* 2018;16:58.
- 28 Chen Y-Y, Wu KC-C, Yousuf S, *et al*. Suicide in Asia: opportunities and challenges. *Epidemiol Rev* 2012;34:129–44.
- 29 Canetto SS. Prevention of suicidal behavior in females: opportunities and obstacles. In: *Oxford textbook of Suicidology and suicide prevention: a global perspective*. Oxford: Oxford University Press, 2009: 241–7.
- 30 Stack S. Suicide: a 15-year review of the sociological literature. Part I: cultural and economic factors. *Suicide Life Threat Behav* 2000;30:145–62.
- 31 Breuer C. Unemployment and suicide mortality: evidence from regional panel data in Europe. *Health Econ* 2015;24:936–50.
- 32 Chen Y-Y, Chen M, Lui CSM, *et al*. Female labour force participation and suicide rates in the world. *Soc Sci Med* 2017;195:61–7.
- 33 Tu Y-K, Gunnell D, Gilthorpe MS. Simpson's Paradox, Lord's Paradox, and Suppression Effects are the same phenomenon--the reversal paradox. *Emerg Themes Epidemiol* 2008;5:2.
- 34 Mann JJ, Michel CA, Auerbach RP. Improving suicide prevention through evidence-based strategies: a systematic review. *Am J Psychiatry* 2021;178:611–24.
- 35 Jones DA, Paton D. How does legalization of physician-assisted suicide affect rates of suicide? *South Med J* 2015;108:599–604.
- 36 Piantadosi S, Byar DP, Green SB. The ecological fallacy. *Am J Epidemiol* 1988;127:893–904.
- 37 Lemmi V, Bantjes J, Coast E, *et al*. Suicide and poverty in low-income and middle-income countries: a systematic review. *Lancet Psychiatry* 2016;3:774–83.
- 38 Mäkinen IH. Suicide-related crimes in contemporary European criminal laws. *Crisis* 1997;18:35–47.
- 39 Platt S. Inequalities and suicidal behaviour. In: O'Connor RC, Platt S, Gordon J, eds. *International Handbook of suicide prevention: research, policy and practice*. Wiley Blackwell, 2011: 11–34.
- 40 US Department of Health and Human Services. *National strategy for suicide prevention: goals and objectives for action*. Washington, DC: Health and Human Services, 2012.
- 41 World Health Organization. Preventing suicide: a global imperative, 2014. Available: <https://www.who.int/publications/i/item/9789241564779>
- 42 World Health Organization. National suicide prevention strategies: progress, examples and indicators, 2018. Available: <https://apps.who.int/iris/bitstream/handle/10665/279765/9789241515016-eng.pdf>
- 43 Kious BM, Battin MP. Physician aid-in-dying and suicide prevention in psychiatry: a moral crisis? *Am J Bioeth* 2019;19:29–39.
- 44 Stack S, Kposowa AJ. Culture and suicide acceptability: a cross-national, multilevel analysis. *Sociol Q* 2016;57:282–303.