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RESEARCH ARTICLE

Gambling to public health in ageing populations: a life expectancy evaluation perspective

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ABSTRACT

Objective: Gambling is a complex topic in relation to health systems. It is always unclear how to strike a balance between the gambling economy and the impact of gambling on public health or social wellbeing at any age. There are limited studies considering the association between determinants of gambling and the life expectancy of the ageing population in a country. From an evaluation perspective, this article aims to demonstrate the correlation between life expectancy and gambling and public health systems.

Methods: The approach of analysis has two parts. One is the influence of gambling prevalence in populations on life expectancy among old adults. Another is the association between the effect of changes in legal gambling provisions within public health systems and life expectancy among old adults. Healthy adjusted life expectancy at age 60 from the World Health Organization and gross gambling yield were used. ANOVA was performed with SPSS.

Results: The population groups with HALE at age 60 of 15 years or over are likely more active in gambling than the population groups with smaller HALE at age 60 of 14 years or less. On the other hand, the influence of a health policy may be sidelined when it is implemented for older adult populations because the resource distribution magnitude or number of strategical techniques may not be the same for younger adult populations. The study here is marked as a good practical start, and there is room for further research with big data analysis on additional gambling variables against other life expectancy variables, quality of life variables or public health system variables.

Conclusion: Associations between the determinants of gambling and the life expectancy of the ageing population in a country have not yet been identified. Continuous measurements of policy implementation and effectiveness and assessments of health equity, while gambling policies worldwide continue to change, have not yet been performed. Researchers and policy makers should understand the importance of holistic integration of the gambling economy and policy within a public health and social paradigm with the help of big data insights to achieve sustainability in their cities and health equity in their communities.

1. Introduction

Gambling is a complex topic in relation to health systems that leads to ongoing debates from legislation and economics to medical and social science. The debates mainly focus on different approaches to preventing harm. Efforts to prevent harm are targeted at high priority among vulnerable individuals who are experiencing gambling disorders,[1–3] or are targeted systematically at the population level with an extensive public health prevention strategy.[4–6] Gambling disorder is a risk factor for increased mortality, suicidality and associated comorbidities.[7] This indirectly impacts healthy life expectancy in the elderly population.

Moreover, there are limited studies from big data analysis on ageing populations or old adult populations of a country or a region to consider the association between the determinants of gambling and public health in terms of their impact on health or wellbeing and life expectancy. The influence can be quantitatively positive, negative or both at different scales. As Chater et al. noted,[8] public policies (for example, about obesity and health-care financing) on societal challenges and their solutions are ongoingly competitive, and the societal impacts of gambling are always intersective and multi-disciplinary.

On the other hand, populations have progressively aged over the last decade. Rapid ageing in the coming years is an unquestionable trend. According to United Nations statistics, as of November 2022, the world's population surpassed 8 billion people, having grown by 1 billion since 2010. Reaching this milestone raises important questions concerning the impact of human activities.[9] In 2021, 761 million people worldwide were aged 65 and older, and this number is expected to increase to 1.6 billion by 2050. The number of people aged 80 years or older is growing

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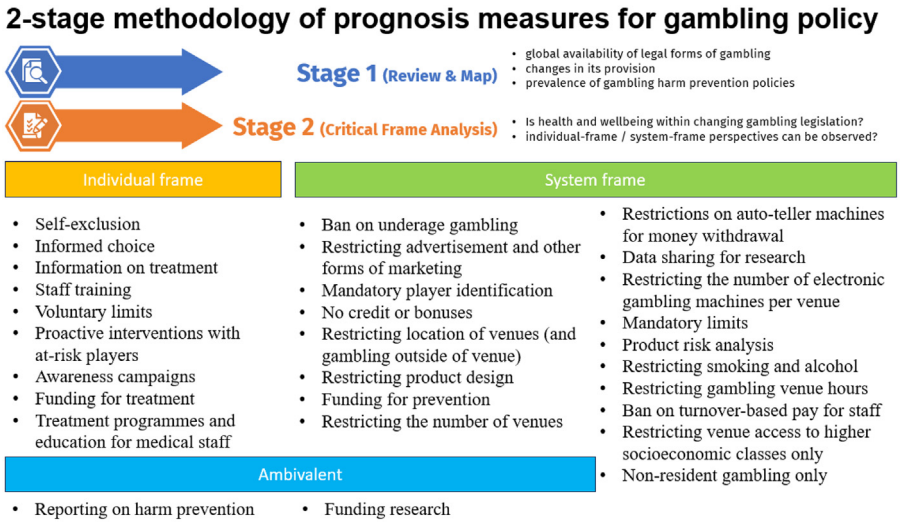

Fig. 1. 2-stage methodology of prognosis measures for gambling policy.

even faster.[9] The above-mentioned human activities include all what can be found in social and cultural networks. Gambling is one of them and it is essential to understand how this impacts quality of life or life sustainability for humans while people are living longer.

Gambling itself is not just one side of the coin. Its harms include problem gambling or pathological gambling, while its positive behaviours are regarded as responsible gambling,[10,11] or safer gambling. From the policy perspective of sociology and public health, among individual-frame policies and interventions through responsible gambling awareness campaigns or education about gambling harm, it is always advisable to collect data from personal consumption patterns and data on behaviour styles to identify eligible people at risk,[12] as the first safeguard line of prevention activities.[13] System-frame approaches usually focus on systems, rules and norms governing our institutions. These approaches include the regulation of gambling products (including their design and characteristics), their nature and extent of advertising and marketing, their accessibility and availability on premises, and their taxation.[12]

Individual-frame approaches are dominant among researchers and policy makers because governments can more easily develop policy solutions to place onus on individuals and defer to the need for more systemic interventions that may be politically unpalatable.[8] Few systematic attempts have been made on both individual-frame and system-frame perspectives within gambling legislation worldwide to examine how they are changing. Using a two-stage methodology, Ukhova et al. conducted a global review of legislative changes in gambling policy from year 2018 to year 2021,[14] as illustrated in Fig. 1. The Stage 1 level maps the global availability of legal forms of gambling, the changes in their provision, and the prevalence of gambling harm prevention policies. The Stage 2 level uses critical frame analysis to identify whether health and wellbeing are the focus of changing gambling legislation and to explore the extent to which individual-frame and system-frame perspectives can be observed. The review results, as also summarized in Fig. 1, were formulated into prognosis measures from the individual-frame, system-frame and ambivalent (that means either the individual-frame or system-frame depending on the jurisdiction context) sectors.

However, Ukhova et al. did not further consider how to implement and evaluate the effectiveness of any public health policy surveillance projects at different policy adoption stages from preceding and succeeding policy outputs or how to collect feedback from stakeholders to assess their health equity.[14-16] This article tries to fill this gap by quantifying the prognosis measures, which Ukhova et al. conducted.[14]

2. Methodology

The approach of analysis has two parts. One is the influence of gambling prevalence in populations on life expectancy among old adults. Another is the association between the effect of changes in legal gambling provisions within public health systems and life expectancy among old adults.

An economic research paper, written by Lee,[17] provided general advice for using gross gambling yields and gross domestic product (GDP) from countries around the world to identify correlations. Riding on this sense of big data analysis, from an evaluation perspective here, the first study was driven to use healthy adjusted life expectancy (HALE) at age 60 from the World Health Organization (WHO) and gross gambling yield to check for their influence.

Gambling expenditure is represented by gross gambling yield or gross win (i.e., stakes or bets less player wins). In the first part of this study, the gross gambling yield per capita was obtained from Lee,[17] who consolidated the raw gambling market data from year 2000 from a report by Global Betting & Gaming Consultants.[18]

The HALE is used instead of life expectancy because life expectancy does not mean healthy ageing. Life expectancy at an age only summarizes the overall mortality level or pattern of a population with the assumption that they are kept at the same healthy level onwards as at the measuring age.

The HALE of WHO is a modified version of life expectancy after adjustment (often reduction),[19] or in other words carrying the meaning of total burden in disability adjusted life years (DALY). The HALE and DALY both consider disease burden in a population by combining estimates of the non-fatal burden in years lost due to disability and the fatal burden in years of life lost. The HALE data from year 2000 for this study were sourced from the WHO (Table 1).

The use of HALE at age 60 aims to reflect the expectation of life from age 60 onwards (i.e. up to how many more years to live at age 60) with rolling health states or burdens or mortality chances caused by health or non-health diseases, accidents, suicides or pathological disorders including harms from gambling.

The data of gross gambling yield per capita and HALE at age 60 for different countries around the world were imported into SPSS Statistics for Windows version 29.0 of IBM Corporation for influence analysis.[20] The samples were grouped into different HALE year range clusters. ANOVA was performed. All the statistical data were accompanied by 95 % confidence intervals. $P < 0.05$ was considered to indicate statistical significance.

Table 1
Research data on the HALE at age 60 and the gross gambling yield per capita dated to year 2000.[17,19]

Country	HALE at age 60 (year)	Gross gambling yield per capita (GBP)
Argentina	15.65	25.29
Australia	17.31	283.98
Austria	16.73	60.89
Belgium	16.57	30.57
Brazil	14.76	6.22
Canada	17.32	160.94
Chile	16.38	8.96
China	14.03	1.58
Colombia	16.25	5.37
Czech Republic	14.63	25.26
Denmark	15.98	60.19
Finland	16.54	95.28
France	17.98	66.86
Germany	16.78	34.37
Greece	16.76	51.43
Hungary	13.59	21.65
India	11.33	3.59
Ireland	15.71	84.93
Israel	17.09	39.57
Italy	17.07	77.93
Japan	18.74	145.95
Malaysia	13.48	34.99
Mexico	15.81	2.23
Netherlands	16.62	51.76
New Zealand	16.88	110.14
Norway	16.68	235.15
Panama	17.58	44.82
Philippines	13.26	6.31
Poland	14.68	21.8
Portugal	16.25	32.36
Republic of Korea	15.94	18.54
Singapore	16.61	230.31
South Africa	11.88	13.86
Spain	17.29	130.02
Sweden	17.40	102.64
Switzerland	17.66	60.66
Thailand	15.62	3.80
Turkey	16.34	5.66
United Kingdom	16.26	116.76
United States	15.72	252.62

HALE: healthy adjusted life expectancy.

The second part of this study used the list of 29 prognosis measures, which Ukhova et al. conducted,[14] as the determinants of change in the provision of legal gambling (Table 2). A 1-point score is assigned to each determinant carrying a positive answer. The summation of all the scores for the 29 total determinants was calculated to generate the final aggregated prognosis score between 0 (minimum) and 29 (maximum). ANOVA was performed with SPSS Statistics for Windows version 29.0 of IBM Corporation to evaluate the influence of the aggregated prognosis score on the HALE at age 60 (sourcing the HALE database from the year 2019 from the WHO). Post-hoc comparison of ANOVA was applied to evaluate the moving trend of influence among the groups of different years of the HALE at age 60 or how the groups were different from each other. All the statistical data were accompanied by 95 % confidence intervals. $P < 0.05$ was considered to indicate statistical significance.

In addition, countries across the world are further classified as “All countries”, “High-income”, “Upper middle-income”, “Lower middle-income” and “Middle-income”. For operational and analytical purposes, economies are divided among income groups according to 2022 gross national income (GNI) per capita sourced from the World Bank: low-income (USD 1,135 or less); lower middle-income (USD 1,136 to USD 4,465); upper middle-income (USD 4,466 to USD 13,845); and high-income (USD 13,846 or more).[20] Pearson correlations between the aggregated prognosis score and the HALE at age 60 for those groups were then verified to identify how the legal gambling provisions are associated with the life expectancy.

3. Assumptions and limitations

The methodology of this study involved the use of publicly available secondary data sources from peer-reviewed papers or well-known databases that are trustworthy. It is assumed that data cleansing was already used to eliminate missing data and outliers, and the robustness of those downloaded data was primarily proven with statistical tests.

For the first part of the study, the data from Lee were collected in year 2000 and were collected from a single year.[17] There may be some data pattern gaps in other years to fully understand the full time-span. The selection of the countries and the different number of countries to be selected for the measurements can affect the overall results. Therefore, the results from this part of the study serve as novel thinking.

For the second part of the study, 29 indicators were used as factors for evaluation. They serve as examples. The methodology used to select those indicators and the justification of their relevance are not the scope of this article. This article illustrates an experimental procedure for quantifying the factors according to an aggregated score. This approach would be convenient for performing influence analysis with other variables. Generally, from a statistical point of view, the aggregated score can simulate reality when the number of indicators is high.

Table 2
Research data on the HALE at age 60 and the Prognosis scores in 2019.

Country in different income group[a]	HALE at age 60 (year)	Prognosis measure sectors[b]																												Aggregated score
		(A) Individual frame									(B) System frame																	(C) Ambivalent		
		A01	A02	A03	A04	A05	A06	A07	A08	A09	B01	B02	B03	B04	B05	B06	B07	B08	B09	B10	B11	B12	B13	B14	B15	B16	B17	B18	C01	C02	
High-income																														
Germany	18.47	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	-	1	-	1	1	1	-	-	1	1	24
Switzerland	19.52	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	-	-	1	1	-	1	-	-	-	-	-	1	1	20
Japan	20.39	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1	15
Netherlands	18.44	1	1	1	1	-	1	1	-	-	1	1	1	1	-	-	-	-	-	1	-	1	1	-	-	-	-	-	1	-	14
Sweden	18.86	1	1	1	1	-	-	-	-	-	1	1	1	1	-	1	-	1	-	-	1	1	-	-	-	-	-	-	-	-	12
Canada	18.99	1	1	1	1	1	1	1	-	-	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
USA[c]	16.35	1	1	1	1	1	1	1	1	1	1	1	-	1	-	1	1	-	1	-	1	-	-	-	-	-	-	-	1	1	18
Panama	18.14	1	1	1	-	1	-	-	-	-	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
Trinidad and Tobago	17.24	-	-	1	-	-	-	-	1	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Upper Middle-income																														
Botswana	11.79	1	1	1	1	-	1	1	-	1	1	1	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	12
Belarus	15.11	1	1	1	-	1	-	-	-	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
Gabon	12.77	1	1	-	-	-	-	-	-	-	1	-	-	1	1	-	-	1	1	-	-	-	-	-	-	-	-	-	1	-	8
Venezuela	16.29	-	1	1	1	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	7
Argentina	16.27	1	1	-	-	1	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Paraguay	16.48	-	-	-	-	-	1	1	1	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Albania	16.58	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Lower Middle-income																														
Ukraine	14.97	1	1	1	1	1	1	1	-	-	1	1	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	14
Cote d'Ivoire	14.97	1	1	-	1	1	1	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	9
Tanzania	13.37	1	1	1	1	1	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Viet Nam	14.76	1	1	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	7
Kenya	13.06	-	-	-	-	-	-	-	-	1	1	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Myanmar	13.59	-	-	-	-	-	-	-	-	-	1	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	5
India	13.25	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

HALE: healthy adjusted life expectancy; -: not applicable. A01: self-exclusion; A02: informed choice; A03: Information on treatment; A04: staff training; A05: voluntary limits; A06: proactive interventions with at-risk players; A07: awareness campaigns; A08: funding for treatment; A09: treatment programmes and education for medical staff; B01: ban on underage gambling; B02: restricting advertisement and other forms of marketing; B03: mandatory player identification; B04: no credit or bonuses; B05: restricting location of venues (and gambling outside of venue); B06: restricting product design; B07: funding for prevention; B08: restricting the number of venues; B09: restrictions on auto-teller machines for money withdrawal; B10: data sharing for research; B11: restricting the number of electronic gambling machines per venue; B12: mandatory limits; B13: product risk analysis; B14: restricting smoking and alcohol; B15: restricting gambling venue hours; B16: ban on turnover-based pay for staff; B17: restricting venue access to higher socioeconomic classes only; B18: non-resident gambling only; C01: reporting on harm prevention; C02: Funding research.

[a] Economies are divided among income groups according to 2022 gross national income (GNI) per capita sourced from World Bank—low income, USD 1,135 or less; lower middle-income, USD 1,136 to USD 4,465; upper middle-income, USD 4,466 to USD 13,845; and high-income, USD 13,846 or more.

[b] The score is 1 or 0.

[c] Ukhova et al. mentioned USA by 3 counties - Illinois, Pennsylvania and Virginia, for simplicity to regard data as a whole country, their records are merged into a single record, whenever a county has a positive answer, it is assigned with a 1-point score at most.

Table 3
One-way ANOVA for the influence of the gross gambling yield per capita and the HALE at age 60.

Group	HALE at age 60 (year)	Country (n)	Gross gambling yield (Mean ± SD, GBP)	F	P	η^2	Post-hoc comparison (mean difference among groups)
1	< 12	2	8.7250 ± 7.26199	3.107*	0.038	0.206	102.61200[a]
2	12–< 15	7	16.8300 ± 12.27863	-	-	-	94.50700[b]
3	15–< 17	21	72.2195 ± 77.98807	-	-	-	63.49452[c]
4	≥ 17	10	111.3370 ± 73.88145	-	-	-	55.38952[d]

HALE: healthy adjusted life expectancy; n: number of countries within group; -: not applicable; η^2: Partial Eta Squared of ANOVA to measure effect size; SD: standard deviation. *$P < 0.05$.
[a] Group 4 > Group 1.
[b] Group 4 > Group 2.
[c] Group 3 > Group 1.
[d] Group 3 > Group 2.

Table 4
Statistical analysis on the prognosis measures aggregated score and the HALE at age 60 in year 2019.

Income group	Country (n)	HALE at age 60 (Mean ± SD, year)	Aggregated score* (Mean ± SD)
High-income	9	18.00 ± 1.118	14.11 ± 5.947
Upper middle-income	7	14.57 ± 2.149	7.29 ± 3.200
Lower middle-income	7	13.14 ± 0.690	7.14 ± 4.100
Middle-income	14	13.86 ± 1.703	7.21 ± 3.534
All countries	23	15.48 ± 2.548	9.91 ± 5.664

HALE: healthy adjusted life expectancy; SD: standard deviation. *Total aggregated score is out of 29.

4. Results

For the first part of the study, the statistical results of one-way ANOVA for the influence of the gross gambling yield per capita and HALE at age 60 are shown in Table 3.

The F value of the HALE at age 60 was 3.107 ($P < 0.05$, $\eta^2 = 0.206$), which was statistically significant, and showed that there were significant differences in the gross gambling yield per capita for different HALE at age 60. The Pearson correlation coefficient is equal to 0.443.

Statistically speaking from the post-hoc comparison of ANOVA, across countries around the world in year 2000, the population groups with HALE at age 60 of over 15 years had higher gambling yields or were likely more active in gambling than the population groups with smaller HALE at age 60 of 14 years or less.

The statistical results of the second part of this study can be found in Table 4. Income groups are classified as “All countries”, “High-income”, “Upper middle-income”, “Lower middle-income” and “Middle-income”. They are not actually independent of each other except the “High-income” group, the “Upper middle-income” group and the “Lower middle-income” group. The “All countries” group combines the countries from these 3 independent groups while the “Middle-income” group combines the countries from the “Upper middle-income” group and the “Lower middle-income” group. Among all the income groups, there was no statistically significant difference according to the influence analysis (via ANOVA) between the Prognosis Measure Aggregated Score and the HALE at age 60. Nevertheless, according to Table 5, the Pearson correlation coefficients are between −0.706 and 0.449. Except for the correlation of the “All countries” group, which measured a positive Pearson correlation coefficient of 0.449, the other income stratifications could not pass the test of significance. The relationship between the Prognosis Measure and the HALE at age 60 has no income effect at this time but remains questionable. Their patterns can also be viewed from the scattered plots in Fig. 2.

Table 5
Pearson correlations for the prognosis measure aggregated score and the HALE at age 60.

Income group	Country (n)	Pearson correlation	P
All countries	23	0.449*	0.032
High-income	9	0.169	0.663
Upper middle-income	7	−0.706	0.076
Lower middle-income	7	0.286	0.534
Middle-income	14	−0.301	0.295

HALE: healthy adjusted life expectancy; n: number of countries within group; *$P < 0.05$.

5. Discussion

The gross gambling yield can represent how much loss the adult population who is active in gambling will experience. The prevalence of gambling in a population positively influences the life expectancy of older adults. Older adults may not be able to participate in activities they had previously enjoyed because access to stimulating activities for leisure and pleasure is likely to decrease with age.[21] One hypothesis is that gambling fills a void in the lives of older adults and may be a substitute for social support.[22]

According to the results of the first part of this study, gambling may not be prone to problems worldwide. This finding seems to contradict common sense. Among old adults, improving cognitive skills is one of the motives for gambling.[23] A general population study from Martins et al. has even shown that people who had gambled during the past year had better subjective health than those who had not gambled.[24] Its influence on different cohorts (with people from different age groups) can be quantitatively positive, negative or both at different scales.

For the results of the second part of this study, the sample size ($n = 23$) was comparatively small (compared with $n = 40$ for the first part of the study) when the study focused on the whole world. It is logical that the results of the hypothesis test cannot be passed for statistical analysis. In addition, the score weight for each prognosis measure in the study was assumed to be the same, with a maximum 1-point score. When the policy is implemented for old adult populations, the resource distribution magnitude or number of strategical techniques may not be the same as those for young adult populations. Therefore, their influence may be sidelined. The research data are sourced from Ukhova et al.[14] who also suggested that further research with a larger sample of jurisdictions, including those that witnessed substantial regulatory shifts (without changes in the legal provision of gambling), could address limitations.

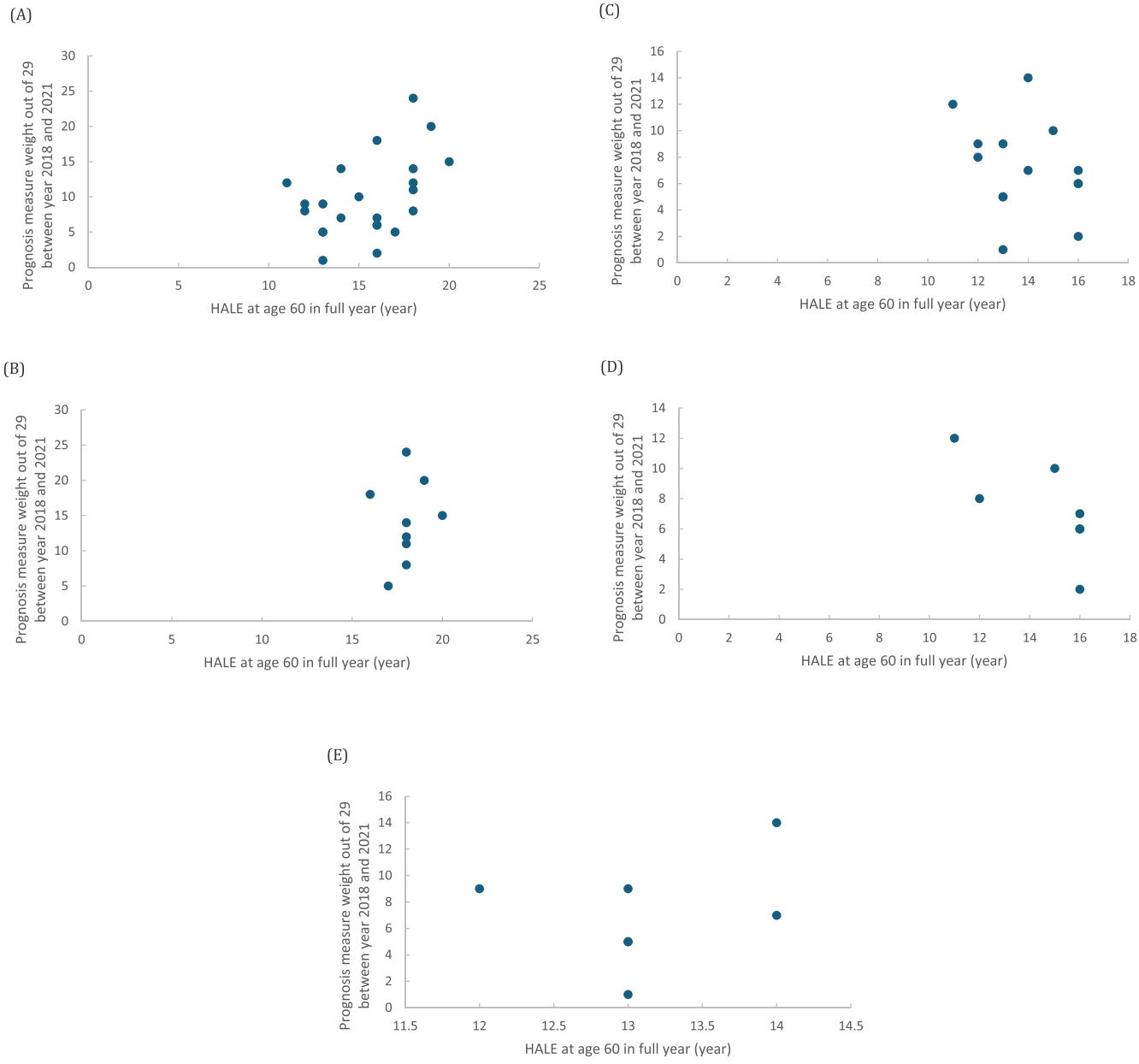

Fig. 2. Scattered plots for the Prognosis Measure Aggregated Scores and the HALE at Age 60. (A) All countries; (B) High-income countries; (C) Middle-income countries; (D) Upper middle-income countries; (E) Lower middle-income countries.
HALE: healthy adjusted life expectancy.

Basically, the patterns among high-income and middle-income countries can be easily visualized. The means of the HALE at age 60 and the aggregated prognosis scores from Table 4 indicate that high-income countries are likely to have longer life expectancies (in terms of HALE) and higher scores on legal provision measures than middle-income countries. Political efforts and scholarly insights into health policy systems surrounding gambling are not evenly distributed among high-income and low-income countries. Gambling research and policies have only recently considered public health approaches and have tended to rely on a rather insular intervention paradigm,[10,25] which is arguably replicated in legislative texts. Ukhova et al. noted that many jurisdictions currently reforming their gambling policies rely on weak solutions (applying many individual-frame measures to replace preventive system-frame actions) for gambling-related harm.[14] Individual-frame measures are often predominant in legislation. This restricts future possibilities for public health action on gambling-related harms. When gambling is legal, the responsibility for preventing harm should always be bound by government-private-public means. It lies not only with providers and gamblers, but also with legislators and regulators who permit gambling within their jurisdiction and govern all the characteristics associated with its provision.[14]

6. Conclusion

There are many studies on risky gambling or problem gambling from the perspective of behavioural science, while there are very few studies on responsible gambling as a pastime, culture or wellbeing from the perspective of social science. Again, research results can be completely different depending on whether they pinpoint micro analysis of designated cohorts concerning how to intervene in the prevalence of gambling problems,[26] or whether they focus on striking the balance of quality of life from gambling habits.[27,28]

From the perspective of public health, policy and health systems, different settings for individual-frame and system-frame measures should be carefully configured so that the sustainability of public health actions related to gambling harm can be maintained. Additionally, efforts to implement continual assessments of the effectiveness of these interventions and their health equity are important. Institutional attention or research efforts should contribute to lower-income countries and ageing populations so that their health systems or public health policy can be resilient to growing challenges and, in the long run, achieve global health equity among all countries with different income levels.

The study here is marked as a good practical start, and there is room for further research with innovative model construction or big data analysis on additional gambling variables against other life expectancy variables, quality of life variables or public health system variables. Additionally, using a broader dataset or considering data from different years or a series of continual years are always recommended. The use of datasets for different years can strengthen the ability of data analysis to determine the trend of movement severity.[27] It is essential to allow the model results from ongoing measurements to be translatable and user-friendly when applied to intervention or monitoring systems for existing gambling policies in a country or countries with different income levels so that they can be adjusted or improved within short timeframes. This is another challenge from collaboration among researchers and policy makers, and it is a new topic for further research. In brief, these approaches are important for policy makers because of the help of big data insights into the holistic integration of the gambling economy within a public health and social paradigm through resource availability and policy priorities to maintain sustainability in their cities or to pave the path towards health equity in their communities.

Competing interests

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Price A, Hilbrecht M, Billi R. Charting a path towards a public health approach for gambling harm prevention. *J Public Health (Berl)*. 2021;29:37-53. doi:10.1007/s10389-020-01437-2.
2. Francis L, Livingstone C. Discourses of responsible gambling and gambling harm: observations from Victoria, Australia. *Addict Res Theory*. 2021;29:212-222. doi:10.1080/16066359.2020.1867111.
3. de Lacy-Vawdon C, Vandenberg B, Livingstone C. Power and other commercial determinants of health: an empirical study of the Australian food, alcohol, and gambling industries. *Int J Health Policy Manag*. 2023;12:7723. doi:10.34172/ijhpm.2023.7723.
4. Nikkinen J, Marionneau V. Gambling and the common good. *Gambl Res*. 2014;26(1):3-19. doi:10.3316/informit.820177312012393.
5. Sulkunen P, Babor TF, Cisneros Ornberg J, et al. *Setting Limits*. Oxford: Oxford University Press; 2019.
6. Livingstone C, Rintoul A. Moving on from responsible gambling: a new discourse is needed to prevent and minimise harm from gambling. *Public Health*. 2020;184:107-112. doi:10.1016/j.puhe.2020.03.018.
7. Karlsson A, Håkansson A. Gambling disorder, increased mortality, suicidality, and associated comorbidity: a longitudinal nationwide register study. *J Behav Addict*. 2018;7(4):1091-1099. doi:10.1556/2006.7.2018.112.
8. Chater N, Loewenstein G. The i-frame and the s-frame: how focusing on individual-level solutions has led behavioral public policy astray. *Behav Brain Sci*. 2023;46:e147. doi:10.1017/S0140525X22002023.
9. United Nations. UN report calls for re-thinking social protection as world ages. https://www.un.org/en/delegate/un-report-calls-re-thinking-social-protection-world-ages. Accessed January 17, 2023.
10. Hancock L, Smith G. Critiquing the Reno model I–IV international influence on regulators and governments (2004–2015)—the distorted reality of "responsible gambling". *Int J Ment Health Addict*. 2017;15:1151-1176. doi:10.1007/s11469-017-9746-y.
11. Miller HE, Thomas SL. The problem with "responsible gambling": impact of government and industry discourses on feelings of felt and enacted stigma in people who experience problems with gambling. *Addict Res Theory*. 2018;26(2):85-94. doi:10.1080/16066359.2017.1332182.
12. Livingstone C., Rintoul A., de Lacy-Vawdon C., et al. Identifying effective policy interventions to prevent gambling-related harm. https://responsiblegambling.vic.gov.au/documents/640/Livingstone-identifying-effective-policy-interventions-June-2019.pdf. Accessed June 30, 2019.
13. Reynolds J, Kairouz S, Ilacqua S, et al. Responsible gambling: a scoping review. *Crit Gambl Stud*. 2020;1:23-39. doi:10.29173/cgs42.
14. Ukhova D, Marionneau V, Nikkinen J, et al. Public health approaches to gambling: a global review of legislative trends. *Lancet Public Health*. 2024;9(1):e57-e67. doi:10.1016/S2468-2667(23)00221-9.
15. Kavanagh MM, Meier BM, Pillinger M, et al. Global policy surveillance: creating and using comparative national data on health law and policy. *Am J Public Health*. 2020;110(12):1805-1810.
16. Goyal N, Howlett M. Making sense of the babble of policy-making: a general framework of the policy process. In: Capano G, Howlett M, eds. Modern Guide to Public Policy. New York: Elgar; 2020:78-92.
17. Lee CB. An analysis of gambling expenditure across countries. *UNLV Gam Res Rev J*. 2009;13(1):21-27. doi:https://digitalscholarship.unlv.edu/grrj/vol13/iss1/2.
18. Global Betting & Gaming Consultants. *The Global Gambling Report: Global Gaming Comes of Age*. West Bromwich, England: Global Betting and Gaming, Consultants; 2002.
19. World Health Organization (WHO). The global health observatory: healthy life expectancy. https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/healthy-life-expectancy-(hale). Accessed December 31, 2023.
20. World Bank. The World by Income and Region. https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html. Accessed December 31, 2023.
21. Parke A, Griffiths M, Pattinson J, et al. Age-related physical and psychological vulnerability as pathways to problem gambling in older adults. *J Behav Addict*. 2018;7(1):137-145. doi:10.1556/2006.7.2018.18.
22. Zaranek RR, Lichtenberg PA. Urban elders and casino gambling: are they at risk of a gambling problem? *J Aging Stud*. 2008;22(1):13-23. doi:10.1016/j.jaging.2007.11.001.
23. Guillou LM, Cholet J, Grall BM, et al. Determinants of gambling disorders in elderly people: a systematic review. *Front Psychiatry*. 2019;10:837. doi:10.3389/fpsyt.2019.00837.
24. Martins S, Ghandour L, Storr C. Gambling behavior subtypes among respondents with gambling related problems in a population based sample. *J Addict Dis*. 2021;30:169-180. doi:10.1080/10550887.2011.554781.
25. Orford J. *The Gambling Establishment: Challenging the Power of the Modern Gambling Industry and its Allies*. New York: Routledge; 2020.
26. Browne M, Rawat V, Newall P, et al. A framework for indirect elicitation of the public health impact of gambling problems. *BMC Public Health*. 2020;20:1717. doi:10.1186/s12889-020-09813-z.
27. Moore E, Pryce R, Squires H, et al. The association between health-related quality of life and problem gambling severity: a cross-sectional analysis of the Health Survey for England. *BMC Public Health*. 2024;24:434. doi:10.1186/s12889-024-17816-3.
28. Kohler D. A monetary valuation of the quality of life loss associated with pathological gambling: an application using a health utility index. *J Gam Iss*. 2024;29:1-23. doi:10.4309/jgi.2014.29.9.