

The Interest in Betting, Smoking, Alcohol, and Drugs in Malawi: Changing Trends between 2012-2022

Gülcan Demir¹, Chiwoza Bandawe²

1. Sinop University, Vocational School of Health Services, Department of Medical Services and Techniques, Turkey

2. Kamuzu University of Health Sciences, Department of Mental Health, Malawi

*Corresponding Author: Gülcan DEMİR; E-mail: gozdenk@sinop.edu.tr

Abstract

Background

In recent years, the online gambling market has rapidly developed, and betting has become one of the most popular forms of gambling. The aim of this study was to analyse the interest of the Malawian population in terms related to betting, sports betting, alcohol, cigarettes, and some psychoactive drugs through the relative search volumes of Google Trends.

Methods

Internet search query data related to betting, sports betting, alcohol, cigarettes, and psychoactive drugs were obtained monthly from Google Trends for the period 2010-2022. Comparisons of interest levels in these topics were conducted in Malawi, and correlation coefficients were calculated.

Results

In Malawi, relative search volumes for betting and sports betting terms were the highest (average RSVs: 66% and 30%). It was found that from 2019 onwards, the interest in betting and sports-related search topics and keywords increased significantly ($p < 0.001$). Strong positive correlations were found between betting-related keywords and alcohol and gross domestic product ($r = 0.831$ and $r = 0.901$, $p < 0.001$). A positive correlation was found between betting and psychoactive drug-related terms (minimum $r = 0.417$, $p < 0.01$).

Conclusions

This study concludes that the interest of the Malawian population in betting has increased in recent years, while interest in psychoactive drugs and alcohol remains high. Gross domestic product is highly correlated with society's interest in betting. It was additionally found that Google Trends can be used as a tool to predict and monitor future risky behaviours, such as gambling disorder.

Keywords: gambling, health risk behaviours, public health, addictive behavior, alcoholism, smoking, risk-taking

Introduction

The World Health Organization (WHO) states that many people worldwide struggle with addictive behaviours¹. Video games, betting, and gambling can potentially lead to dysfunction and distress when engaged in without control^{1,2}. Betting games can now be played online due to the increased availability of internet access and online platforms. In recent years, there has been a growing interest in virtual gambling among people worldwide, and WHO warns that this trend could lead to problems with transitioning from gaming to gambling¹.

In many countries, gambling is considered a form of social entertainment. However, repetitive gambling behaviour can lead to gambling disorder or addiction, even if it is subject to regulations in some countries³. The ease of accessing betting sites within a person's comfort zone⁴, free incentives and promotions offered by these sites to attract customers^{5,6}, and the ability of individuals to conceal their identity⁷, can increase the risk of developing addiction by encouraging frequent gambling. Gambling disorder and addiction are increasingly becoming a major public health problem. Such behavioural addictions include many risks that may harm individuals' physical, mental, and social health, none

of which are positive for public health. Some people may become addicted to gambling, leading to financial losses, debts, impaired family and social relationships, job loss, deteriorating mental health, and a decline in well-being⁸⁻¹¹. Therefore, gambling and similar games are considered a public health issue and monitoring them is crucial. It is possible to track the interest of people living in a specific area in these types of games using Google Trends (GT). GT is a tool that shows the search volumes and changes over time for a specific search term. By identifying the topics related to gambling and using various terms, you can search for a specific country worldwide in GT and observe changes in the popularity of these terms over time. However, as GT only reflects searches made by people with internet access, the data obtained inevitably excludes a certain group.

In Malawi, companies operating in the gambling industry are regulated and licensed by the Malawi Gaming and Lotteries Authority, a national gambling commission. The gambling games include betting, lottery, and casino games¹². Additionally, the betting industry in the country has gained significant momentum in recent years¹¹. There are many betting companies in Malawi, and they provide their services through both online and physical betting shops¹³. Malawi is

one of the countries in Sub-Saharan Africa with a high poverty rate. According to the World Bank Poverty Assessment Report, an estimated 50.7% of Malawi's population is poor¹⁴. To our knowledge, it has not been explored to what extent the Malawian population has been interested in betting sites over the years. This study was chosen to focus on Malawi due to its relatively developed freedom to gamble compared to other African countries¹⁵, the increasing access to high-speed internet over the years^{15,16}, the popularity of sports betting^{11,13,17}, the ability to continue accessing offshore operators online, and the absence of any law preventing local people from accessing foreign gambling sites and playing games with real Money^{15,16}. The aim of this study is to analyse web search trends related to gambling, smoking, alcohol, and some psychoactive drugs in Malawi during the period 2012-2022, and to determine the relationship between interest in gambling and Gross Domestic Product (GDP).

Methods

Googling commonly refers to searching for information on the World Wide Web, and the term suggests the act of looking up some new information through an internet search engine. Fast growing internet use by patients in order to acquire more health information and changes in the health care system towards a patient-centered approach is an example of googling which clinical researchers would be interested in^{18,19}. Google has become a very important way for improving patients' knowledge. Health care professionals should be conscious of these fast changes, in order to help individuals in understanding and evaluating information. Infodemiology has been accepted as a new science able to evaluate distribution and determinants of information through an electronic medium, specifically the internet, or in a population, with the ultimate aim to inform public health and public policy^{20,21}. Therefore, infodemiology would be useful in medical research in order to describe different diseases' impact in the general population. GT is a popular means for searching data and could be used for studying public interest in different medical topics²²⁻²⁴.

GT has been widely used in health research in recent years to analyse the search trends of people worldwide or in a specific location on various topics and to understand how these trends are affected by various events or factors^{25,26}. GT data can help determine which topics are more popular in which geographic regions or countries, measure how a particular event or factor affects people's search trends, and predict how interests change over time, thereby assisting in the development of health policies based on the findings.

GT, an accessible online tool, enables users to gauge global or local interest in specific search terms. It employs a metric known as relative search volume (RSV) to measure the search frequency of particular keywords or topics and showcases how these frequencies change over a designated time frame. Represented on a scale of 0 to 100, RSV allows for comparisons between different subjects. This measurement serves as an indicator of how popular a specific keyword or topic is relative to all search queries. An RSV value of 0 signifies minimal search interest in the designated term, while an RSV value of 50 indicates that search volume is half of the peak volume represented by an RSV value of 100. The search duration can range from weeks to months or years, facilitating comparisons of diverse search terms using obtained RSVs. Furthermore, GT facilitates evaluating RSV temporal patterns across different

regions and adjusts data for population size, allowing for meaningful comparisons between more densely or sparsely populated areas. To standardise data between countries, each data point is divided by the total searches within a specific geographic region and its corresponding time interval. GT can be explored in different languages, incorporate selected search terms, and apply filters to specific categories such as "Health" to eliminate irrelevant queries and prevent potential confounding results. Moreover, it is possible to conduct GT analyses within specific time intervals and across multiple geographic regions. Data analysis primarily centers on examining RSV variations throughout the study period, conducting comparisons between various global regions, and assessing correlations between RSVs associated with different search terms^{27,28}.

We used GT data to identify terms related to gambling and games of chance that may be prominent in Malawi between 01 January 2012 and 31 December 2022²⁹. In this time period, the most prominent search term in Malawi was identified as "betting," (ranked 1st) ranking first in popularity. Similarly, the term "sports betting," which experienced a significant surge, ranked fourth, indicating its noteworthy relevance within the Malawi community. Search queries were examined to identify key terms that are easily understood by the general population. To identify smoking and alcohol keywords, expressions were generated using a recent study³⁰ as there were no significant keywords. The search terms related to psychoactive drugs were determined based on the literature^{31,32} and researcher decisions. The key terms identified, other than "betting" and "sports betting," are presented in Table 1.

Due to the maximum of 14 terms allowed in searches using key terms, abbreviations were used for the "bet" and "sports betting" key terms. RSVs were determined by activating the "Malawi," "All categories," and "Google web search" filters and limiting the data to the period between 01 January 2012 and 31 December 2022, with monthly data collected (Additional Table 1). RSVs obtained from GT for Malawi²⁹ were compared on an annual basis with GDP data obtained from the World Bank (WB)³³. This comparison was conducted to assess the correlations between risky behaviors associated with interest in gambling games in Malawi and the country's GDP.

In the normalisation of the data obtained from GT, first, the mean value (μ) and standard deviation (σ) of the data were calculated for each search term. Then, to compare trends obtained from different topics, the RSV data was normalised using the normalisation formula (normalised value = (original value - μ) / σ). Pearson or Spearman's rank correlation coefficients were calculated for the analysis of correlation coefficients, taking into account the linearity of the data. Excel 16.0 (2016) and SPSS 20.0 (version 20.0, 2011) were used for visualisation and analysis of the data. As publicly available data was used, informed consent was not necessary, but scientific rigour was maintained throughout all stages.

Results

Over the examined years, the normalised average RSV values and corresponding standard deviations were determined for 'bet' (topic), 'sports betting' (topic), bet keywords, sports betting keywords, cigarette, alcohol, and some psychoactive drug keyword combinations, as 8.91 ± 15.70 , 8.32 ± 12.68 , 17.06 ± 20.97 , 8.13 ± 12.43 , 54.77 ± 17.06 , 52.44 ± 18.52 , and

Table 1. Determination of keywords

Categories	Keywords
Bet	bet+premier bet+premier+premier bet malawi+bet malawi+malawi bet+aviator+aviator bet
Sports betting	sports betting+betting+star betting+world star betting+world betting+worldstar betting+premier betting
Smoking	smoking+cigarette+tobacco+vaping+hookah+water pipe+nargile+cigaret
Alcohol	alcohol+beer+drinking+bringe drinking+alcoholic drinks+alcoholic beverage+wine+spirits
Drugs	drugs+marijuana+cannabis+bonzai+spice+ecstasy+methamphetamine

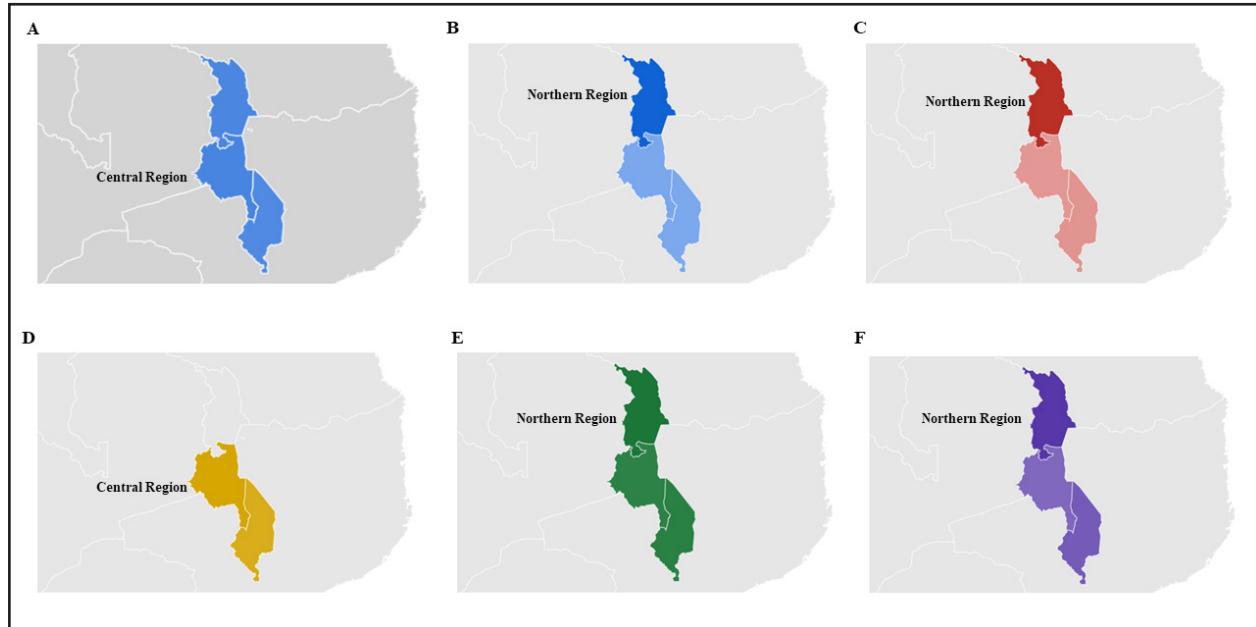


Figure 1. Distribution of relative search volumes in Malawi from 2012-2022: (A) all terms, (B) bet keywords (blue), (C) sports betting keywords (red), (D) smoking keywords (yellow); (E) alcohol keywords (green), (F) drugs keywords (purple). Darker shades have more relative search volume (Taken from Google Trends; Data source: Google Trends (<https://www.google.com/trends>, accessed 27 April 2023))

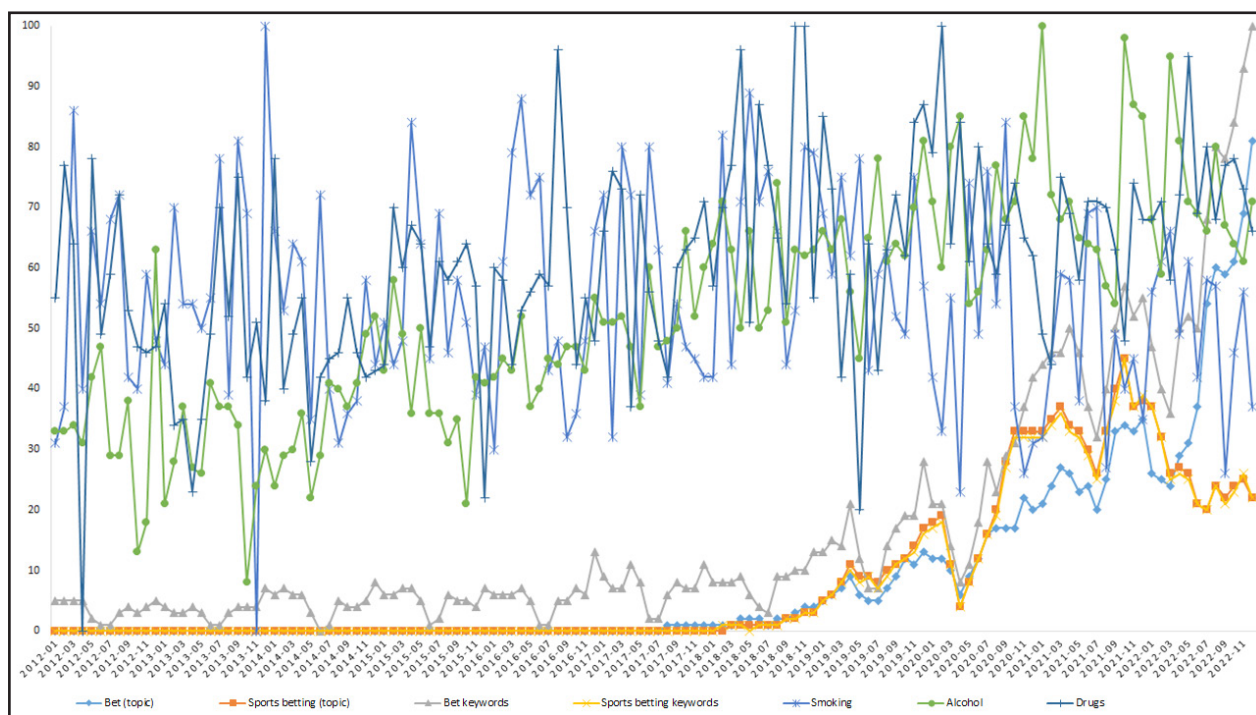


Figure 2. Time series of Google search queries. Each marker in different colors on the chart represents a different topic. The data presented has not been normalized for the comparison of search topics; crude values have been utilized. Data source: Google Trends (<https://www.google.com/trends>, accessed 27 April 2023)

Each marker in different colors on the chart represents a different topic.

Table 2. Correlation coefficients between bet, sports betting topics, and search terms and relative search volumes (RSVs) recorded during the last 10 years

Categories	RSVs for			
	Bet	Sports betting	Bet keywords	Sports betting keywords
RSVs for bet (topic)	1	0.956**	0.881**	0.955**
RSVs for sports betting (topic)	0.956**	1	0.847**	0.990**
RSVs for bet keywords	0.881**	0.847**	1	0.852**
RSVs for sports betting keywords	0.955**	0.990**	0.852**	1

* $p < 0.05$; ** $p < 0.01$

Table 3. Correlation coefficients between search volumes based on betting terms and search terms related to smoking, alcohol, and drugs, as well as GDP data from the World Bank

Categories	RSVs for			WB
	Smoking	Alcohol	Drugs	GDP
RSVs for bet (topic)	-0.085	0.831**	0.463**	0.803**
RSVs for sports betting (topic)	-0.078	0.795**	0.425**	0.829**
RSVs for bet keywords	-0.097	0.789**	0.417**	0.681**
RSVs for sports betting keywords	-0.079	0.796**	0.440**	0.830**

* $p < 0.05$; ** $p < 0.01$

60.72±16.90, respectively. The comparison of RSV values for topics of interest in the north, central, and south regions of Malawi is presented in Figure 1. Taking all years and categories into consideration, the highest search rate, at 68%, was observed for 'bet' keywords. The regions with the highest search rates were presented in Figure 1 for each category separately.

Psychoactive drug keywords are the most commonly searched terms in Malawi, and the temporal changes in RSVs of bet, sports betting, smoking, alcohol, and psychoactive drug keywords over a decade are presented in Figure 2. Significant differences were found among RSVs over the years, except for smoking. It was found that interest in betting and sports search topics and keywords has increased since 2019 ($p < 0.001$), and this interest has significantly peaked in 2022 and 2021, respectively. While no significant variation was found in the interest in searching for smoking keywords over time, interest in alcohol and psychoactive drug topics was found to be higher in 2021 and 2022 ($p < 0.001$) (Figure 2). The correlation coefficient between the RSVs of sport topic and sports betting keywords was strong and positive. Similarly, the correlation coefficients between the RSVs of bet topic and betting keywords were also significant and positively correlated (Table 2). Betting search terms' correlations with smoking, alcohol, and psychoactive drug search volumes obtained from the WB's official data are reported in Table 3. The correlations between betting search terms and alcohol and GDP were strongly positive, while there was a moderately positive relationship with psychoactive drug-related searches. No relationship was found between search terms and smoking RSVs (Table 3).

Discussion

In this study, we have identified the importance of examining

the temporal trend related to gambling, as well as tobacco, alcohol, and psychoactive drug use, which have the potential to lead to behavioural addiction and increase in Malawi. GT search volume indices reveal the public's interest in topics such as gambling, sports betting, tobacco, alcohol, and psychoactive drugs. Recent years have seen a growing interest in gambling and sports betting in the northern region of Malawi, with a subsequent increase in search volumes for related keywords over time. This increased interest in gambling, sports betting, and online gambling in Malawi mirrors the global trend³⁴⁻³⁶. However, the prevalence of risky behaviours in Malawi demonstrates a more positive trend^{31,32,37}. According to the WHO data, among individuals aged 15 and above of both sexes in Malawi, the usage rate of tobacco and tobacco products has shown a declining trend over the years. For instance, the usage rate that was 13.1% in 2015 has decreased to 10.8% in 2020. Furthermore, there hasn't been any increase in the total alcohol consumption per individuals aged 15 and above throughout a calendar year, as indicated by the data from 2015 and 2019 (3.4 liters)³⁸.

Technological advancements, increased internet access^{36,39}, the use of mobile devices for internet browsing, the implementation of new forms of gambling¹¹, easy access to online platforms, and the desire for quick financial gains are among the factors shaping this trend^{36,39}. These situations, which have the potential to create behavioural addictions such as games of chance, betting, and gambling, can have negative effects on an individual's mental well-being, leading to deteriorated social relationships, the adoption of risky habits, and significant financial losses. Investigating the reasons behind the growing interest in this issue in Malawi demonstrates that it is imperative that we identify public health risks, implement regulations to protect all segments

of society, particularly vulnerable groups such as youth and individuals with mental health issues. In addition, there is need to provide necessary mental health support to individuals with behavioural addictions as well as conduct awareness campaigns that prioritise potential consequences among young people³⁵. Evidence-based interventions based on research findings are therefore of great importance. Furthermore, although there is no definitive explanation for the increased prevalence of gambling in the northern region of Malawi, it can be speculated that the local population, often facing poverty, may turn to quick money-making opportunities such as gambling. GT data can be used to monitor the interest of individuals residing in a specific location in gambling games. Recently, concerns have been raised regarding the adverse health outcomes associated with gambling, and studies have linked gambling to gambling disorder and gambling addiction^{10, 40-43}. These findings indicate a close relationship between the interest in gambling and sports betting, as these concepts are often addressed together in research and discussions, and the terminology related to these topics is similarly interconnected. The increasing interest in gambling and sports betting may have directed individuals towards more detailed research. There could be several underlying reasons for the high interest in sports betting, especially in Malawi. Football is one of the most popular sports in Malawi, and betting on football matches is widespread. Additionally, a significant portion of the young population in Malawi is unemployed, and gambling can be seen as a source of income. Furthermore, some betting companies in Malawi may attract people by offering high odds. Nevertheless, regardless of the type of gambling, excessive interest in such games is believed to increase susceptibility to uncontrollable and unhealthy behaviours over time. The global trend of increased interest in online gambling and sports betting can have serious implications for public health in Malawi, particularly in terms of mental health issues. As stated by the WHO, gambling disorder has the potential to lead to severe mental health problems^{1,3}. Studies have indicated that gambling disorder is associated with repetitive movement disorders, sexual dysfunction, gastrointestinal issues, cardiovascular problems, and other physical ailments³. From a mental health perspective, the most common impact is a high comorbidity with mental disorders, including addictions, and a significant correlation with perceived stress, irritability, mood fluctuations, self-harm, suicide, anxiety, and depression^{7,44,45}. On the other hand, individuals with gambling addiction may face stigma from society, which can hinder their help seeking⁴⁶. In the case of Malawi, comprehensive data on gambling, games of chance, and online gambling are lacking. However, addressing the potential risks associated with behavioural disorders and monitoring young individuals is of great importance in terms of public health. Due to its potential to create a serious public health problem, monitoring the interest in gambling games nationwide in Malawi and taking appropriate measures when necessary is crucial. Comorbidity is a commonly observed condition between gambling addiction and substance use disorders and other behavioural addictions^{10,47,48}. Gambling can increase the propensity for risky behaviours. Therefore, in this study, RSVs calculated from GT data were examined in relation to gambling, sports betting, smoking, alcohol, and psychoactive drugs. The data demonstrate a positive correlation between searches for gambling, sports betting, and alcohol and psychoactive drug-related terms.

Specifically, searches for alcohol-related terms increase as interest in gambling and sports betting terms rises. A study also suggests that gambling disorder tends to cluster with high-risk behaviours such as smoking and psychoactive drug use⁴⁴. Alcohol is the most commonly used substance in Malawi, and a significant proportion is attributed to informal alcohol consumption⁴⁹. While gambling is generally considered a social activity, the simultaneous increase in interest in risky behaviours like alcohol consumption can lead to gambling addiction. These behavioural addictions are strongly associated with social anxiety disorder, depressive and anxiety disorders, attention-deficit/hyperactivity disorder, and substance use disorders⁵⁰. Another study highlights the need for more rigorous clinical trials despite short-term effectiveness of treatments for gambling disorder⁵¹. Particularly in the young population of Malawi, public health measures should be implemented to identify strategies that support mental health before the onset of such behavioral addictions. There is no definitive answer as to whether psychoactive drug use increases or decreases gambling, as this issue is dependent on numerous variables and individuals may exhibit different behavioural patterns⁵². However, it is known that psychoactive drug use generally increases the propensity for risky behaviours and raises the likelihood of engaging in uncontrolled behaviors. Therefore, it can be speculated that psychoactive drug use may increase gambling. Additionally, the association between these searches and drug-related terms is moderate. While these analyses do not indicate a cause-effect relationship, they demonstrate the presence and strength of an associative connection. The public health significance of these findings is that alcohol and psychoactive drug use may enhance individuals' desire to engage in gambling and sports betting. Despite notable advancements in public health in Malawi, challenges persist in certain areas. A study conducted by Kuyokwa et al. indicated that psychoactive drug use among university students in Malawi negatively impacts academic performance⁵³. Furthermore, substance addiction has been found to be more prevalent among individuals living with HIV/AIDS⁵⁴. Bullying among students in a school in Malawi has been associated with substance use⁵⁵. Additionally, further research and data are needed on gambling addiction and its impact on public health in Malawi. Ultimately, this situation can lead to risky behaviours that harm individuals' health and economic well-being. Therefore, public health officials should conduct awareness campaigns and educational programs to raise awareness among the population on these issues. Moreover, these notable findings highlight the need for further epidemiological research. There are studies in the literature indicating a relationship between unemployment and interest in gambling^{15,56,57}. To confirm the accuracy of interest in betting and sports betting, we compared the current RSV results with Malawi's GDP from the WB and found a very strong correlation, demonstrating that GT can somehow capture official epidemiological data. To identify the reasons for the increasing interest in betting in Malawi, a more comprehensive study would provide more detailed results. As far as we know, betting games in Malawi are legally regulated and supervised, which can help minimise negative effects. However, the proliferation and normalisation of betting games can lead to their being seen as a normal activity among the younger generation, attract society's interest, lead to further searches, and this can lead to an increase in behavioural addiction

problems in the future. Therefore, the increasing interest in betting games should be considered a threat to public health. With the increase in internet access in Malawi over the years, it is believed that monitoring society's interest regularly and providing guidance in the early detection of potential negative situations would be beneficial. GT is a tool that allows you to track the search volume of a specific word or phrase over time. Therefore, GT enables you to see how frequently people search for a particular betting game and its search trend over time. However, it is not possible to say that GT data alone is a complete measure of interest in gambling games, considering the possible impact of different factors such as internet access and media literacy.

Limitations

In studies like this one, it is necessary to take into account several limitations. First, GT tests public global interest for search terms expressed in a specific language, and merely reported RSVs; therefore, it is not possible to understand any cause-effect relationship. Second, different studies^{58,59} underline that GT could be subject to unpredictable fluctuations and anomalies; this aspect was not examined. Third, GT could be influenced by the mass media. Many publications⁶⁰⁻⁶² show that web searches are strongly influenced by mass media coverage, which often misreport scientific evidence. Therefore, caution is required in interpreting the GT results. Fourth, although the study's investigation is across an entire decade, any interpretation of the population of interest could not be based on definitive profiles of the different people performing the searches. GT does not record information about the identity, internet protocol address, or specific physical location of any user. Fifth, searches are limited to a specific language, and only a few terms could be included in the global search, making it difficult to generalise the results. It is necessary to be conscious that other terms may be considered common. Besides, search terms are arbitrarily selected by authors as scientific words defining an unhealthy condition, but also considered popular, i.e., easily understood by the general population. On the other hand, searching of non-specific keywords and those mostly attributable to informative purposes, could lead to non-specific results and methodological problems. Finally, the technology used in this study is Web 1.0, and analysis of Web 2.0 technology, such as Twitter or other social media, could result in different findings.

Conclusion

The findings indicate a high level of interest in gambling, sports betting, alcohol, and psychoactive drugs among the Malawian population, which is a serious concern for public health. Therefore, awareness campaigns on the harms of gambling, smoking, alcohol, and psychoactive drugs, education programs on behavioural addiction, legal regulations, enforcement, deterrent and effective penalties (imprisonment, fines, community service penalties, and similar education and rehabilitation programs) are necessary in Malawi. Informing the public about early diagnosis and treatment programs for behavioural addiction are integral to such interventions. These efforts are important for protecting public health and can have a positive impact on Malawi's future.

Competing Interest

The authors has no relevant financial or non-financial interests to disclose.

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Author Contributions

GD was responsible for study conception and design, data curation and analysis. GD and CB were responsible writing, reviewing, and editing the manuscript.

Data availability

The data presented in this study are available on request from the corresponding author.

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