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**Addiction**

# Gambling and violence in a nationally representative sample of UK men.

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**Abstract**

**Background and aims:** The relationship between violence and problem gambling in general population samples is under-researched and requires further attention to inform treatment and prevention efforts. We investigated the relationship between gambling problems and violence among men and sought to determine if the link can be accounted for by mental disorders, alcohol and drug dependence and impulsivity.

**Design:** A cross-sectional survey.

**Setting:** A United Kingdom representative general population survey conducted in 2009.

**Participants:** 3025 UK men aged 18-64 years.

**Measurements:** Binary logistic regression was used to examine relationships. Outcome measures included gambling behaviour and self-reports of violence. Covariates included alcohol and drug dependence, mental illness, impulsivity and socio-demography.

**Findings:** Problem gambling and probable pathological gambling were associated with increased odds of the perpetration of violence (Adjusted Odd Ratios (AOR) 3.09 (CI =1.9-5.0) and 4.09 (CI =2.8-6.3) respectively), and a range of other behaviours such as using a weapon, (AORs 4.93 (CI =2.5-9.6) and 6.33 (CI =3.5-11.4)), and the perpetration of intimate partner violence (AOR 9.80 (CI =2.5-39.0)). The results were attenuated when adjusted for comorbid mental illness, and impulsivity but remained statistically significant. Alcohol and drug dependence had the most impact; relationships were most attenuated when they added into the models, with the latter having the largest effect.

**Conclusions:** Among men in the United Kingdom, self-reports of problem/pathological gambling remain predictive of a range of measures of violent behaviour after adjusting for alcohol and drug dependence, comorbid mental disorder and impulsivity; of the covariates, alcohol and drug dependence have the greatest effect in attenuating the gambling-violence association.

**KEY WORDS**

Gambling, problem gambling, violence, substance use, intimate partner violence, men.

**INTRODUCTION**

The gambling environment has changed substantially in recent decades, with increased accessibility and a proliferation of land-based venues as well as the addition of internet gambling in all its manifestations. Whilst gambling does not result in problematic behaviour in the majority of individuals, a significant and appreciable number go on to experience serious social, financial, legal and emotional problems [1]. It has been estimated that approximately 2.3% of the world's population experience problems with gambling [2]. In

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Great Britain, 7.3% of adults fall into the 'at risk' group, with an additional 0.7% becoming problem gamblers [1], with men (1.2%) more likely to be problem gamblers than women (0.2%) [1].

Difficult and sometimes discordant interpersonal and family relationships are often amongst the significant negative impacts of problem gambling [4-7]. Some dysfunctional relationships evolve into violence, and there is growing evidence to show that problem gambling is a specific risk factor for family and intimate partner violence (IPV) [8-14]. Moreover, studies of male perpetrators of IPV show consistently high rates of pathological gambling [14,15]. It has been speculated that the stress and financial problems that go hand-in-hand with gambling problems are a catalyst for violent behaviour in the home which is then directed towards partners, significant others and/or children [9, 13, 17].

There is a well-established association between IPV and alcohol/substance use [18-20]. Furthermore, alcohol and substance use disorders have also been shown to be highly comorbid with problem gambling [21-24]. However, few studies have investigated the relationship between IPV perpetration and problem gambling and whether alcohol and/or other substance misuse may be a covariate [9, 15, 25-26]. The majority indicate that the relationship between problem gambling and violence is aggravated by the addition of drug or alcohol use problems. Likewise, mental disorders and impulsivity have been shown to mediate the relationship between gambling and violence [15, 17]. Converging evidence suggests that multi-morbidities (multiple co-occurring conditions) have significant implications for future treatment interventions [9, 22].

Despite the global expansion of the gambling industry, few studies of nationally representative samples have investigated the relationship between family violence (specifically IPV and child abuse) and gambling in the general population. Most studies have used specific samples such as those attending problem gambling treatment services [9, 14, 27], mothers postpartum [28], IPV perpetrators [15], or emergency room attendees [26]. Only three studies to date have provided data regarding the relationship between IPV and problem gambling in representative community samples; two in Canada [17, 29] and one in small groups of Chinese gamblers in the United States [30]. In addition, most studies have focused exclusively on pathological gambling and its relationship with IPV rather than the broader continuum of gambling problems, and only a few have considered the role that mental disorders may play [9, 17].

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Understanding the relationship between gambling, problem gambling, and violence will help problem gambling treatment services tailor intervention and treatment programmes for their clients. Moreover, understanding the factors that play a role in IPV is crucial in developing effective intervention programmes [15]. The aim of this study was to examine the relationship between gambling problems and violence, including IPV. The present study addressed some gaps in the literature by using a nationally representative sample of men to examine the relationship between a range of gambling problems and perpetration of violence and abuse, and considering the roles of mental illness, impulsivity, and drug and alcohol misuse. As the latter have been shown to be associated with problem gambling, it is important to consider their effect. More specifically, the study aimed to: 1) examine the relationship between a spectrum of gambling problems and the perpetration of violence, including using a weapon, fighting while intoxicated, injuries sustained, IPV (spouse and child violence) and number of victims. It was predicted that gambling problems would be associated with increased levels of violence and related activities. The study also sought to 2) determine if mental disorders and impulsivity account for some of the variance between gambling problems and violence; and 3) determine if alcohol and drug dependence account for some of the variance across a spectrum of gambling problems. It was predicted that the relationships between problem gambling and violence would be attenuated when adjustments were made in 2) and 3).

## METHOD

### Sample

The study is based on data from the 'Men's Health and Modern Lifestyles Survey' collected in 2009 at Queen Mary, University of London. The sample comprised 3025 men aged 18-64 living in England, Wales and Scotland. The ages and demographic details of participants can be seen in Table 1.

A one-stage survey sought to interview a geo-demographically representative sample of the male population of the UK through a random location methodological approach. Random location techniques utilise a full selection of geographic areas to be visited by interviewers, allied to quota sheets showing exactly whom they must approach and interview within their target geography. This procedure necessitated the use of profiling statistics from the then most up-to-date Census (2001). Within each Government Office Region, all Output Areas (OA) (averaging 150 households, and about which all demographic profiling information is known) were selected and listed in descending order of ACORN [31] type to place the most affluent OAs at the top of the list and the least affluent at the bottom. This applies a purely

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random variable into the selection of sampling locations. The total number of eligible male adults in each OA were then cumulated down the list. Using a random start and fixed sampling interval the required number of OAs were selected. This process produces a sample of OAs with a probability of selection proportionate to size and was designed to produce a representative sample by ACORN type.

A total of 250 OAs were selected, with interviewers required to achieve 12 interviews with eligible targets at each. All addresses that lay within selected OAs were potentially available for interview. With OA information cross-referenced against full address lists, interviewers were supplied with every single address that was eligible within each OA. A quota sheet was provided for each selected OA, which reflected the actual composition of eligible residents according to standard demographic criteria. These would include socio-demographic characteristics such as gender, ethnicity and working status (in addition to age). Interviewers were required to interview a sample profile that exactly matched that of the eligible OA population profile using the then up-to-date ONS population estimates information. This ensured that the sample was demographically representative at the micro-level, as well as geographically representative of males in the general population. If a participant refused to fill out the questionnaire (approximately 23% of all participants approached), or was absent, another was located in the area with exactly the same demographic profile (age and social class) until the quota was filled.

The statistical reliability of this approach depended both on strictly defining the selection of the sampling points, as well as in setting representative quotas at each point, and then meticulously meeting these quotas. Compliance with this procedure produced a fully representative dataset. Self-report questionnaires were administered at home, with the respondent left to complete the questionnaire in their own time. The researcher either returned later that day, or the next. Each questionnaire took approximately 45 minutes to complete. Participants were given £5 on completion of the questionnaire. A total of 3025 male adults completed the questionnaire.

Study design and procedures were approved by the Queen Mary, University of London Human Research Ethics Committee.

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**Survey Measures**

**Dependent Measures:**

**Problem/pathological gambling**

Gambling behaviour/classifications were determined by using The South Oaks Gambling Screen (SOGS) [32]. The SOGS is a widely used 20-item measure based on the Diagnostic and Statistical Manual of Mental Disorder criteria for pathological gambling [33]. A respondent's total score on the SOGS ranges from 0-20. Originally the authors designated a score of 0 to indicate that an individual had "no problem" with gambling, a score of 1-4 indicated that the person had "some problem" and scores of 5 or more indicated "probable pathological gambling" [32]. Later, researchers proposed that scores of 3 and 4 should indicate "problem gambling" instead [34, 35]. In the current study, in line with later suggestions: those with SOGS scores of 0-2 were given the designation "non problem gambler", those with scores of 3 and 4 "problem gamblers" and those with scores of 5 or more "probable pathological gamblers". Non-Gamblers included respondents who indicated that they had never engaged in any gambling activity in their lifetime. This focus on problem as well as probable pathological gambling is consistent with other studies [36]. The SOGS has been found to have satisfactory reliability with coefficient alphas of .69 and .86 in the general population and gambling treatment samples, respectively [37].

**Violence**

The survey included questions about violent behaviour including whether or not participants "had been in a physical fight, assaulted or deliberately hit anyone in the past 5 years". Similar questions have been used in previous large-scale national surveys [38-40]. In addition, questions asked about type and number of victims, location, weapon use, intoxication and frequency of violent incidents. A question was also included that asked if they had "ever hit a child, yours or someone else's, so hard that they had bruises or had to stay in bed or see a doctor".

**Covariates**

**Sociodemographic Covariates**

Age, marital status, education, annual income, area, employment status and ethnicity were included as covariates in analyses. Coding groupings are shown in Table 1.

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**Lifetime mental illness and impulsivity**

Two aspects of mental health were used: lifetime mental illness and impulsivity. Two items were used for a category of lifetime mental illness: (1) “Do you have any longstanding mental illness or illnesses” and (2) “Are you being prescribed medication for a longstanding mental illness”. If individual answered yes to either item they were classified under this category. Antisocial Personality Disorder (ASPD) was identified using the Structured Clinical Interview for DSM-IV Personality Disorders Screening Questionnaire (SCID-II) [41]. Questions from the SCID-II identified the presence of impulsivity (e.g. “Now thinking of the time, SINCE YOU WERE 15, do you often do things on the spur of them moment without thinking about how it will affect you or other people”).

**Alcohol use disorders**

The principal instrument to assess alcohol misuse was the Alcohol Use Disorders Identification Test (AUDIT), which defines hazardous alcohol use as an established pattern of drinking which brings risk of physical and psychological harm over the previous year and includes questions to measure alcohol dependence [42]. The AUDIT consists of 10 questions, each scored from 0-4 with an overall score ranging from 0 to 40. Scores of 20 or more indicate alcohol dependence. The scale has a good median reliability coefficient of 0.83 [43].

**Drug use**

The Drug Use Disorders Identification Test (DUDIT) was used to identify drug use [44]. The DUDIT consists of an 11-item self-report questionnaire, which looks at frequency of drug use. A cut-off score of ≥ 25 indicates drug-related addiction. The DUDIT has been found to have good reliability with a coefficient alpha of 0.80 [44].

**Data analysis**

The data were analysed using the Statistical Package for the Social Sciences (SPSS) 22.0. The analysis firstly described demographic, socioeconomic and psychiatric characteristics of the sample such as age, marital status, area, employment, income, education, lifetime mental illness, alcohol dependence, drug related problems and impulsivity among the four gambling groups. A chi-square test of independence was performed to examine the relationship between demographic variables, psychiatric characteristics and gambling status. In the next stage of the analysis (Tables 2 and 3) binary logistic regression was used to examine relationships and estimate differences in violence and injuries sustained according to gambling group. There were 7 stages to the regression analyses. Different combinations of covariates were

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entered into the analysis to estimate the independent impact of these characteristics on the gambling-violence relationship. In the first model, all associations were adjusted by age, marital status, education, income, area and ethnicity (AOR-1). In the second model, associations were adjusted by age, marital status, education, income, area, ethnicity and lifetime mental illness (AOR-2). In the third model, adjustments were made with the demographic covariates, lifetime mental illness and impulsivity (AOR-3). In the fourth model, associations were made with the demographic covariates and impulsivity (AOR-4). In the final stage of the analysis (Tables 4 and 5) regression was used to examine relationships and estimate differences in violence and injuries sustained according to gambling group with alcohol and drugs as covariates. In the fifth model, associations were adjusted with the demographic covariates and alcohol addiction (AOR-5). In the sixth model, associations were adjusted with the demographic covariates and drug addiction (AOR-6). In the seventh model, associations were adjusted with the demographic covariates, alcohol and drug addiction (AOR-7). A significance level of 5% was adopted for all analyses.

**RESULTS**

**Table 1**

In the sample of 3025 men, 2418 (79.9%) had taken part in some sort of lifetime gambling activity. Of the men who gambled, 85.9% were non-problem gamblers, 6.0% problem gamblers and 8.1% possible pathological gamblers. This is consistent with the most recent British Gambling Prevalence Survey (2010) in which 7.3% of adults fell into the 'at risk' group. However, the male gambling rate at about 80% is slightly higher than the national figure of about 75% [1]. Table 1 compares demographic characteristics and psychiatric characteristics of our sample of men. According to chi square tests, gambling activity and risk decreases with age. Marriage, living in the countryside and higher education are protective factors against problem gambling and pathological gambling. Likewise, unemployment, low earnings, mental illness, alcohol dependence, drug problems and impulsivity are all risk factors for problem and probable pathological gambling.

**Table 2**

Table 2 shows independent associations between gambling and the use of violence. Overall, 53.3% probable pathological gamblers and 45.8% problem gamblers reported some sort of physical fight in the past 5 years (cf. 28.0% non-problem gamblers and 19.1% non-gamblers). After adjusting for demographics, analyses showed that relative to non-gamblers, for all forms of gambler (non-problem, problem, and probable pathological gamblers) there were significantly increased odds perpetration of violence and being in a

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fight in the last 5 years. Additionally, problem and probable pathological gambling were associated with significantly increased odds of using a weapon. Over a quarter (27.9%) of probable pathological gamblers and 18.1% problem gamblers reported using a weapon (c.f. 6.7% non-problem gamblers and 5.8% non-gamblers). Moreover, problem and probable pathological gambling were associated with increased odds of fighting while intoxicated. Almost a third (43.7%) of probable pathological gamblers and 25.7% problem gamblers reported fighting while intoxicated (c.f. 15.7% non-problem gamblers and 8.2% non-gamblers). Table 2 shows the relationships between gambling and violence perpetration were generally attenuated when adjustments were made for lifetime mental illness and impulsivity (the latter more so). However, fighting in the past 5 years, in all categories of gamblers, using a weapon in problem and probable pathological gamblers, and fighting while intoxicated in probable pathological gamblers all retained statistical significance in each adjusted model.

**Table 3**

Table 3 shows independent associations between gambling and injuries sustained by the male, or a victim and the individual involved. Problem gambling was associated with significantly increased odds of being injured and the victim being injured ($p < 0.05$), whilst probable pathological gambling was associated with significantly increased odds of victim injury. Considering specific forms of violence, problem gambling and probable gambling were associated with significantly increased odds of hitting a child; 9.6% probable pathological gamblers and 6.3% problem gamblers reported hitting a child (cf. 2.6% non-problem gamblers and 1.6% non-gamblers). Probable pathological gambling was associated with significantly increased odds of perpetration of IPV; 9.1% probable pathological gamblers and 4.1% problem gamblers reported IPV perpetration (cf. 1.6% non-problem gamblers and 0.8% non-gamblers).

Table 3 shows the relationships between gambling and injuries/victims were generally attenuated when adjustments were made for lifetime mental illness and impulsivity. However, injury sustained, victim injury, and hitting a child retained statistical significance in each adjusted model in problem gamblers, and victim injury, IPV and hitting a child retained statistical significance in each adjusted model in probable pathological gamblers.

**Tables 4 and 5**

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Tables 4 and 5 show independent associations between gambling and the use of violence with alcohol dependence and drug addiction as covariates. Associations were attenuated with the addition of the covariates, with drug addiction having the most effect overall, especially among the more personal form of violence such as IPV, victim injury and hitting a child.

## DISCUSSION

From both public health and clinical perspectives the associations between gambling, violence, and comorbidities are of theoretical and practical importance. Most research to date has used treatment-seeking samples or convenience samples with an explicit focus on problem gamblers [21] and alcohol and drug research seldom has a gambling focus [45]. Thus, these problem and/or pathological gamblers are not representative of problem gamblers in the community, and a broader range of gamblers is seldom considered [21]. The present study addressed these issues in a nationally representative sample of males and confirmed strong links between problematic gambling and violent behaviours [17], and also showed links with non-problem gambling. Amongst problem and probable pathological gamblers these relationships were attenuated somewhat but remained significant when adjusted for demographic characteristics, impulsivity, mental illness, and drug and alcohol dependency (with the exception of fighting while intoxicated for problem gamblers [see Tables 2 & 4]). With respect to causing or suffering an injury and violence towards a partner or child, problem and probable pathological gamblers had significantly elevated odd ratios which retained significance when demographics, mental illness and impulsivity were adjusted for, but were more strongly attenuated by comorbid drug and/or alcohol dependence.

The links between violence, notably IPV, and problem gambling are not well understood, but it is possible that the strain and tension associated with the harms of problem gambling (exacerbated by drug and alcohol dependence in some cases) can lead to stress and antagonism that is directed towards others. The present results suggest this might be reflected in a general tendency for gamblers to become involved in violent situations even when factors such as impulsivity and lifetime mental illness are accounted for. Among problem and pathological gamblers, the risks are further elevated, and seem to generalise to those in close relationships with the perpetrator [9], although they are attenuated by comorbid alcohol and/or drug dependence to a certain extent.

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Negative relationship dynamics can lead to greater gambling severity [5], and it is possible that gambling and violence are reciprocally related, such that perpetrating violence might increase gambling perhaps as a coping or escape strategy, and gambling in turn further increases violence (due to stress); much in the same way as alcohol use and gambling have been shown to be co-related [15, 23, 24]. The present results suggest that alcohol and drug dependence could be part of the same general cycle. This is consistent with Suomi and colleagues who postulate that reciprocal violence may occur alongside problem gambling [13]. However, although Suomi et al. suggest that problem gambling may precede such violence [13], whether the association has a causal component remains to be determined, but the present results show a general link between non-problem gambling and violence. Moreover, even when alcohol or drug dependence were adjusted for there were still significantly inflated odds-ratios for partner directed violence among probable pathological gamblers. The present results are not equivocal, however they do suggest that violence associated with problem and pathological gambling is more severe and more personalised even when drug and alcohol use are accounted for. Different methodologies would be required to explore the nature of these relationships in more detail, and it would be useful to establish whether there are pre-existing tendencies towards violence among male gamblers, and/or gambling related events or resultant financial, relationship difficulties or drug and alcohol use serve as triggers.

In line with our findings above, previous research, generally in clinical samples, has shown problem or pathological gambling is highly comorbid with drug or alcohol problems [46] and that these comorbidities exacerbate the links between harmful gambling and violence [15, 17, 25, 26]. Afifi and colleagues reported related results in a nationally representative sample of US males and females [17]. The present study shows very strong relationships in a nationally representative sample of males who are generally the perpetrators of violence, notably IPV [47-49]. Establishing temporality is difficult, nonetheless violence, problem gambling and substance abuse may be interceded and exacerbated by the same factors. That is, the same causal factors and mechanisms (e.g. genetic [50], neurological [51], past psychological trauma [17, 29], or similarities in social backgrounds [52]) -and a possible interaction between the mechanisms may make individuals vulnerable to both addiction and violence. Such an idea is consistent with the “pathways model” [53], which notes that there is a diverse array of psychological, biological and environmental factors involved in the development of problem gambling.

One factor of interest is impaired impulse control, as pathological gambling has been shown to be associated with elevated impulsivity [54-57]; and elevated impulsivity is also

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associated with IPV [58, 59]. Several impulsivity traits have been identified as relevant to aggression, including self-control and anger. Korman et al. found that problem gamblers with recognised anger problems were more likely to be perpetrators of IPV [9]. They also suggested that anger problems were more likely to be associated with IPV when gamblers also have additional substance use issues. One other study to date has found that impulsivity was associated with both IPV and problem gambling in male perpetrators [15]. In the present study impulsivity (and mental health problems) attenuated the relationships between gambling behaviour and violence, but these relationships remained significant, most notably amongst probable pathological gamblers. However, comorbid alcohol or drug problems, and more particularly the two combined attenuated these relationships to a greater extent [9]. Hence, although impulse control problems and mental health problems can go some way in explaining the relationship between violence and gambling (the roles of factors such as impulsivity and mental health issues in problem gambling have been speculated on elsewhere [9, 14, 15, 17], along with more persistent violence [20-22]), it is the latter (comorbid substance abuse) that seems even more important in explaining links that are more personalised, persistent and deleterious [15, 17, 25, 26]. A coherent more holistic approach to understanding the interactions between these various issues is required. A model such as the 'pathways model' [53] is perhaps useful, but likely to be too gambling centric. However, as more population surveys are reported that assess the broader range of related conditions, supplemented by research in range of help seeking populations (again with a broader focus) the development of a broader contextual model might be possible.

The present results reiterate that public health efforts at problem gambling prevention and harm minimisation should include education around violence, and that there is value in integration with efforts at addressing alcohol and drug abuse programmes. Gambling problems are seldom discussed in the same context as alcohol and drug issues, perhaps due to a perception it is a less serious issue. Similarly, while there is a growing understanding of the links between harmful gambling and violence, most public health approaches focus on financial and work or study-related impacts. Due to the nature of commercial gambling, in many jurisdictions funding for problem gambling research and prevention is independent of other public and mental health services resulting in a somewhat isolated approach. The present results and a growing body of evidence [21, 46] suggest a greater integration would be beneficial.

While only a small proportion of problem gamblers seek help for their gambling [60], the present results suggest again that other services (e.g., alcohol, drug, domestic violence,

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general practitioners) should be aware of the potential linkages with gambling. Gambling could be an issue affecting their service users, either directly or via another person's gambling. While gains have been made, outside of specialist services problem gambling is still perceived as a less serious issue [61]. Public health approaches will continue to raise awareness among the general public and professionals. However, specific educational materials for a broader range of health and mental health professionals outlining the impacts of harmful gambling and the links to violence, and alcohol and/or drug use are needed. With respect to gambling specific services, screening for IPV should be enhanced.

The present research was not without limitations and these should be considered when interpreting the findings. The data were collected in 2009 and are now 7 years old. Violence was assessed by self-report and did not include corroborative data on specific arrests and/or convictions. The inevitable reliance on self-report measures does present some common issues. Self-report data concerning personal matters and socially unacceptable behaviour may be subject to distortions related to memory and retrospective reporting and demand characteristics [62, 63], although some recent studies have shown that self-report drug use can be quite reliable [64]. Thus, it is possible that people who use drugs and possibly engage in other compulsive behaviours are less likely to misreport. In addition, The SOGS [32] was designed as a clinical scale, and despite being widely used in population surveys [35, 65], there are other scales such as the Problem Gambling Severity Index [3] that were specifically designed for population level work. Researchers have used a variety of scales, and caution is required when directly comparing prevalence rates.

Notwithstanding these limitations, the findings add strong support to previous literature that shows a link between IPV, other forms of violence and problem/pathological gambling. A link between non-problem gambling and violence in men was also evident. The research addresses gaps in the literature by using a nationally representative sample of men who are more often the perpetrators of violence, and more likely to gamble harmfully. The community sample allows avoidance of a selection-bias often associated with specific clinical samples. Moreover, the large general UK population sample provided large enough statistical power to control for colinearity and confounding variables in the analyses. Understanding the relationship between gambling problems and various types of violence including IPV would be a substantial step towards informing treatment, intervention and prevention strategies. The current findings highlight the need for problem gambling treatment services to undertake routine screening for alcohol, violence and IPV, to tailor treatment for clients who present with such a cluster of issues. Given the strong associations identified, there is some justification for establishing a standard battery of

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screens for gambling, alcohol, drug and violence issues in a range of mental health and addictions settings. The findings also highlight the importance of prevention (problem gambling and violence) interventions being targeted at a broad range of male gamblers.

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**Table 1: Demographic, socioeconomic and psychiatric characteristics of our sample of men (n=3025)**

| | Respondents | | Non Gambler (N=607) | | Non-Problem Gambler (N=2077) (SOGS 1-2) | | Problem Gambler (N=144) (SOGS 3-4) | | Probable Pathological Gambler (N=197) (SOGS 5+) | | Chi-Square likelihood ratio (df) and trend |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) | |
| **Age group** | | | | | | | | | | | 42.31**(12) |
| Age 18-24 | 1073 | (35.5) | 233 | (38.4) | 698 | (33.6) | 61 | (42.4) | 81 | (41.1) | Gambling decreases with age |
| Age 25-34 | 989 | (32.7) | 187 | (30.8) | 674 | (32.5) | 55 | (38.2) | 73 | (37.1) | |
| Age 35-44 | 394 | (13.0) | 71 | (11.7) | 289 | (13.9) | 15 | (10.4) | 19 | (9.6) | |
| Age 45-54 | 318 | (10.5) | 50 | (8.2) | 244 | (11.7) | 10 | (6.9) | 14 | (7.1) | |
| Age 55-64 | 251 | (8.3) | 66 | (10.9) | 172 | (8.3) | 3 | (2.1) | 10 | (5.1) | |
| **Marital Status** | | | | | | | | | | | 38.23**(9) |
| Single | 1453 | (48.3) | 304 | (50.3) | 950 | (46.0) | 86 | (60.1) | 113 | (57.4) | Marriage is a protective factor |
| Married | 906 | (30.1) | 178 | (29.5) | 667 | (32.3) | 26 | (18.2) | 35 | (17.8) | |
| Separated / divorced/ widowed | 257 | (8.5) | 57 | (9.4) | 168 | (8.1) | 14 | (9.8) | 18 | (9.1) | |
| Couple | 395 | (13.1) | 65 | (10.8) | 282 | (13.6) | 17 | (11.9) | 31 | (15.7) | |
| **Area** | | | | | | | | | | | 28.20**(3) |
| Rural (Countryside/ village) | 505 | (16.9) | 121 | (20.1) | 337 | (16.4) | 26 | (18.6) | 21 | (10.9) | Living in the countryside is a protective factor |
| Semi-urban (town) | 1336 | (44.8) | 261 | (43.4) | 918 | (44.8) | 54 | (38.6) | 103 | (53.6) | |
| Other urban (suburbs) | 789 | (26.4) | 142 | (23.6) | 573 | (27.9) | 37 | (26.4) | 37 | (19.3) | |
| Inner city | 355 | (11.9) | 78 | (13.0) | 223 | (10.9) | 23 | (16.4) | 31 | (16.1) | |
| **Employment** | | | | | | | | | | | 55.04**(3) |
| Employed | 2733 | (90.3) | 536 | (88.3) | 1925 | (92.7) | 122 | (84.7) | 150 | (76.1) | Unemployment is a risk factor |
| Unemployed | 292 | (9.7) | 71 | (11.7) | 152 | (7.3) | 22 | (15.3) | 47 | (23.9) | |
| **Income** | | | | | | | | | | | 71.47**(12) |
| Less than £10,000 | 556 | (24.5) | 136 | (31.9) | 329 | (20.8) | 33 | (30.0) | 58 | (38.9) | Earning less is a risk factor |
| £10,000-£19,999 | 664 | (29.2) | 129 | (30.2) | 446 | (28.1) | 37 | (33.6) | 52 | (34.9) | |
| £20,000-£29,999 | 512 | (22.5) | 78 | (18.3) | 393 | (24.8) | 21 | (19.1) | 20 | (13.4) | |
| £30,000-£39,999 | 291 | (12.8) | 42 | (9.8) | 231 | (14.6) | 12 | (10.9) | 6 | (4.0) | |
| £40,000+ | 248 | (10.9) | 42 | (9.8) | 186 | (11.7) | 7 | (6.4) | 13 | (8.7) | |
| **Education** | | | | | | | | | | | 50.21**(9) |
| Degree Level or above | 221 | (7.6) | 68 | (11.6) | 140 | (6.9) | 9 | (6.7) | 4 | (2.1) | Higher education is a protective factor |
| 'A-Level' or equivalent | 180 | (6.2) | 39 | (6.7) | 126 | (6.3) | 8 | (6.0) | 7 | (3.7) | |
| 'GCSE' or other | 2072 | (70.9) | 394 | (67.5) | 1463 | (72.6) | 90 | (67.2) | 125 | (65.4) | |
| None | 451 | (15.4) | 83 | (14.2) | 286 | (14.2) | 27 | (20.1) | 55 | (28.8) | |
| **Lifetime Mental Illness** | | | | | | | | | | | 26.19**(3) |
| No | 2892 | (96.4) | 567 | (93.9) | 2006 | (97.5) | 138 | (96.5) | 181 | (91.9) | Poor mental health is a risk factor |
| Yes | 109 | (3.6) | 37 | (6.1) | 51 | (2.5) | 5 | (3.5) | 16 | (8.1) | |
| **Alcohol Dependence** | | | | | | | | | | | 179.44**(3) |
| No | 2160 | (89.9) | 390 | (91.8) | 1591 | (93.6) | 89 | (77.4) | 90 | (54.9) | Alcohol dependence is a risk factor |
| Yes | 243 | (10.1) | 35 | (8.2) | 108 | (6.4) | 26 | (22.6) | 74 | (45.1) | |

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| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Drug related Problems** | | | | | | | | | | | 39.17**(3) |
| No | 2974 | (98.3) | 598 | (98.5) | 2057 | (99) | 139 | (96.5) | 180 | (91.4) | Drug problems are a risk factor |
| Yes | 51 | (1.7) | 9 | (1.5) | 20 | (1) | 5 | (3.5) | 17 | (8.6) | |
| **Impulsivity** | | | | | | | | | | | 84.78**(3) |
| No | 1976 | (65.3) | 452 | (74.5) | 1371 | (66) | 70 | (48.6) | 83 | (42.1) | Impulsivity is a risk factor |
| Yes | 1049 | (34.7) | 155 | (25.5) | 706 | (34) | 74 | (51.4) | 114 | (57.9) | |

***P≤ 0.05; ** P≤ 0.01; *** P≤ 0.00**

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**Table 2: Independent Associations between Gambling and Use of Violence**

| | Non Gambler (N=607) | | Non-Problem Gambler (N=2077) (SOGS 1-2) | | | | | Problem Gambler (N=144) (SOGS 3-4) | | | | | Probable Pathological Gambler (N=197) (SOGS 5+) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % (n) | AOR | % (n) | AOR-1 (CI) | AOR-2 (CI) | AOR-3 (CI) | AOR-4 (CI) | % (n) | AOR-1 (CI) | AOR-2 (CI) | AOR-3 (CI) | AOR-4 (CI) | % (n) | AOR-1 (CI) | AOR-2 (CI) | AOR-3 (CI) | AOR-4 (CI) |
| **Physical Fight in last 5 years** | 19.1 (116) | 1 | 28.0 (582) | 1.74*** (1.30-2.30) | 1.79*** (1.34-2.37) | 1.63*** (1.21-2.17) | 1.58** (1.18-2.11) | 45.8 (66) | 3.09*** (1.90-5.00) | 3.22*** (1.97-5.25) | 2.49*** (1.50-4.11) | 2.36*** (1.42-3.89) | 53.3 (105) | 4.09*** (2.76-6.30) | 4.06*** (2.63-6.26) | 3.19*** (2.04-4.97) | 3.15*** (2.02-4.91) |
| **Used a weapon** | 5.8 (35) | 1 | 6.7 (140) | 1.62* (0.99-2.64) | 1.65 (1.00-2.68) | 1.40 (0.84-2.31) | 1.37 (0.83-2.26) | 18.1 (26) | 4.93*** (2.52-9.63) | 4.94*** (2.51-9.69) | 3.38*** (1.68-6.77) | 3.24*** (1.61-6.5) | 27.9 (55) | 6.33*** (3.52-11.38) | 6.06*** (3.36-10.92) | 4.41*** (2.39-8.13) | 4.48*** (2.42-8.19) |
| **Fighting while intoxicated** | 8.2 (50) | 1 | 15.7 (327) | 2.00** (1.20-3.30) | 1.94** (1.16-3.22) | 2.03** (1.20-3.39) | 2.09* (1.25-3.49) | 25.7 (37) | 2.11* (0.98-4.57) | 2.09* (0.96-4.53) | 1.90 (0.87-4.15) | 1.92 (0.88-4.18) | 43.7 (86) | 7.29*** (3.35-15.85) | 7.17*** (3.29-15.62) | 6.80*** (3.09-14.93) | 6.85*** (3.12-15.03) |

Adjusted Odds Ratio (AOR-1): adjusted for age, marital status, education, income, area, and ethnicity.
Adjusted Odds Ratio (AOR-2): adjusted for age, marital status, education, income, area, ethnicity, and lifetime mental illness.
Adjusted Odds Ratio (AOR-3): adjusted for age, marital status, education, income, area, ethnicity, lifetime mental illness and impulsivity.
Adjusted Odds Ratio (AOR-4): adjusted for age, marital status, education, income, area, ethnicity and impulsivity.
***P≤ 0.05; ** P≤ 0.01; *** P≤ 0.001**

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**Table 3: Independent Associations between Gambling and Injuries/Victims**

| | | Non Gambler (N=607) | | Non-Problem Gambler (N=2077) (SOGS 1-2) | | | | | Problem Gambler (N=144) (SOGS 3-4) | | | | | Probable Pathological Gambler (N=197) (SOGS 5+) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | % (n) | AOR | % (n) | AOR-1 (CI) | AOR-2 (CI) | AOR-3 (CI) | AOR-4 (CI) | % (n) | AOR-1 (CI) | AOR-2 (CI) | AOR-3 (CI) | AOR-4 (CI) | % (n) | AOR-1 (CI) | AOR-2 (CI) | AOR-3 (CI) | AOR-4 (CI) |
| **Injury sustained** | | 7.6 (46) | 1 | 10.5 (219) | 1.21 (0.72-2.01) | 1.26 (0.75-2.10) | 1.26 (0.75-2.1) | 1.21 (0.72-2.02) | 22.9 (33) | 2.37* (1.10-5.08) | 2.47* (1.14-5.32) | 2.44* (1.13-5.25) | 2.33* (1.08-5.01) | 22.3 (44) | 1.07 (0.55-2.08) | 1.09 (0.56-2.13) | 1.08 (0.55-2.11) | 1.06 (0.54-2.06) |
| **Victim injured** | | 7.7 (47) | 1 | 13.8 (286) | 1.50 (0.91-2.46) | 1.50 (0.91-2.48) | 1.52 (0.91-2.5) | 1.51 (0.92-2.48) | 21.5 (31) | 2.26* (1.06-4.81) | 2.32* (1.08-4.96) | 2.22* (1.03-4.76) | 2.16* (1.01-4.62) | 28.9 (57) | 2.01* (1.05-3.83) | 2.14* (1.11-4.10) | 2.08* (1.08-3.98) | 1.94* (1.02-3.71) |
| **Individual involved** | **Partner** | 0.8 (5) | 1 | 1.6 (33) | 2.37 (0.65-8.63) | 2.12 (0.58-7.62) | 2.21 (0.60-8.00) | 2.44 (0.66-8.97) | 4.1 (6) | 1.86 (0.32-10.80) | 1.86 (0.32-10.60) | 1.79 (0.31-10.28) | 1.73 (0.29-10.18) | 9.1 (18) | 9.80*** (2.45-39.04) | 8.58** (2.16-33.95) | 8.48** (2.12-33.18) | 9.46* (2.35-38.06) |
| | **Child** | 1.6 (10) | 1 | 2.6 (53) | 1.67 (0.73-3.81) | 1.67 (0.73-3.82) | 1.34 (0.58-3.07) | 1.36 (0.59-3.13) | 6.3 (9) | 4.71** (1.57-14.07 | 4.73** (1.58-14.10) | 2.98* (0.97-9.05) | 3.06* (1.01-9.29) | 9.6 (19) | 5.65*** (2.19-14.52) | 5.74*** (2.22-14.78) | 3.83** (1.46-9.98) | 3.71** (1.42-9.67) |

Adjusted Odds Ratio (AOR-1): adjusted for age, marital status, education, income, area, and ethnicity.
Adjusted Odds Ratio (AOR-2): adjusted for age, marital status, education, income, area, ethnicity, and lifetime mental illness.
Adjusted Odds Ratio (AOR-3): adjusted for age, marital status, education, income, area, ethnicity, lifetime mental illness and impulsivity.
Adjusted Odds Ratio (AOR-4): adjusted for age, marital status, education, income, area, ethnicity and impulsivity.
***P≤ 0.05; ** P≤ 0.01; *** P≤ 0.001**

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**Table 4: Independent Associations between Gambling and use of Violence with alcohol and drug addiction as covariates**

| | Non Gambler (N=607) | | Non-Problem Gambler (N=2077) (SOGS 1-2) | | | | Problem Gambler (N=144) (SOGS 3-4) | | | | Probable Pathological Gambler (N=197) (SOGS 5+) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % (n) | AOR | % (n) | AOR-5 (CI) | AOR-6 (CI) | AOR-7 (CI) | % (n) | AOR-5 (CI) | AOR-6 (CI) | AOR-7 (CI) | % (n) | AOR-5 (CI) | AOR-6 (CI) | AOR-7 (CI) |
| **Physical Fight in last 5 years** | 19.1 (116) | 1 | 28.0 (582) | 1.54** (1.11-2.14) | 1.52* (1.09-2.10) | 1.44* (1.00-2.07) | 45.8 (66) | 1.9* (1.04-3.30) | 1.96* (1.10-3.45) | 1.6 (0.84-3.02) | 53.3 (105) | 2.3* (1.37-3.84) | 3.04*** (1.79-5.15) | 2.4** (1.34-4.38) |
| **Used a weapon** | 5.8 (35) | 1 | 6.7 (140) | 1.6 (0.86-2.92) | 1.38 (0.76-2.49) | 1.64 (0.80-3.33) | 18.1 (26) | 3.72** (1.63-8.51) | 2.72* (1.19-6.22) | 3.9** (1.50-9.94) | 27.9 (55) | 3.76*** (1.80-7.81) | 2.8** (1.31-5.93) | 2.8* (1.17-6.79) |
| **Fighting while intoxicated** | 8.2 (50) | 1 | 15.7 (327) | 2.51** (1.39-4.51) | 1.78 (0.49-3.16) | 2.07* (1.07-3.96) | 25.7 (37) | 2 (0.79-4.88) | 1.5 (0.59-3.55) | 1.32 (0.48-3.62) | 43.7 (86) | 6.08*** (2.41-15.31) | 5.3*** (2.16-12.71) | 4.8* (1.74-13.26) |

Adjusted Odds Ratio (AOR-5): adjusted for age, marital status, education, income, area, ethnicity, impulsivity and alcohol dependence.
Adjusted Odds Ratio (AOR-6): adjusted for age, marital status, education, income, area, ethnicity, impulsivity and drug addiction.
Adjusted Odds Ratio (AOR-7): adjusted for age, marital status, education, income, area, ethnicity, impulsivity, drug and alcohol addiction.
***P≤ 0.05; ** P≤ 0.01; *** P≤ 0.001**

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**Table 5: Independent Associations between Gambling and Injuries/Victims with alcohol and drug addiction as covariates**

| | | Non Gambler (N=607) | | Non-Problem Gambler (N=2077) (SOGS 1-2) | | | | Problem Gambler (N=144) (SOGS 3-4) | | | | Probable Pathological Gambler (N=197) (SOGS 5+) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | % (n) | AOR | % (n) | AOR-5 (CI) | AOR-6 (CI) | AOR-7 (CI) | % (n) | AOR-5 (CI) | AOR-6 (CI) | AOR-7 (CI) | % (n) | AOR-5 (CI) | AOR-6 (CI) | AOR-7 (CI) |
| **Injury sustained** | | 7.6 (46) | 1 | 10.5 (219) | 1.17 (0.66-2.05) | 1.3 (0.72-2.31) | 1.26 (0.67-2.35) | 22.9 (33) | 2.55* (1.05-6.12) | 2.7* (1.14-6.47) | 2.6 (0.98-6.77) | 22.3 (44) | 0.95 (0.45-2.01) | 1.08 (0.5-2.31) | 1 (0.43-2.29) |
| **Victim injured** | | 7.7 (47) | 1 | 13.8 (286) | 1.33 (0.77-2.29) | 1.6 (0.90-2.77) | 1.24 (0.68-2.27) | 21.5 (31) | 1.71 (0.72-4.03) | 2.42* (1.01-5.75) | 1.65 (0.64-4.28) | 28.9 (57) | 1.8 (0.86-3.70) | 2.05 (0.97-4.29) | 1.7 (0.75-3.78) |
| **Individual involved** | **Partner** | 0.8 (5) | 1 | 1.6 (33) | 7.07 (0.62-79.64) | 2.7 (0.51-14.17) | 6.33 (0.45-87.82) | 4.1 (6) | 8.28 (0.54-124.99) | 2.08 (0.26-16.30) | 11.31 (0.58-217.24) | 9.1 (18) | 16.6* (1.35-201.55) | 8.8* (1.47-52.65) | 11.17 (0.7-176.07) |
| | **Child** | 1.6 (10) | 1 | 2.6 (53) | 1.07 (0.43-2.61) | 1.23 (0.48-3.15) | 1.03 (0.37-2.83) | 6.3 (9) | 2.43 (0.74-7.89) | 3.11 (0.93-10.36) | 3.1 (0.89-10.82) | 9.6 (19) | 1.4 (0.48-4.06) | 1.95 (0.62-6.10) | 0.73 (0.2-2.62) |

Adjusted Odds Ratio (AOR-5): adjusted for age, marital status, education, income, area, ethnicity, impulsivity and alcohol dependence.
Adjusted Odds Ratio (AOR-6): adjusted for age, marital status, education, income, area, ethnicity, impulsivity and drug addiction.
Adjusted Odds Ratio (AOR-7): adjusted for age, marital status, education, income, area, ethnicity, impulsivity, drug addiction and alcohol dependence.
***P≤ 0.05; ** P≤ 0.01; *** P≤ 0.001**

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