Predictors of Suicide Attempts in Male UK Gamblers Seeking Residential Treatment.

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ABSTRACT

Background: Disordered gambling can have serious negative consequences for the individual and those around them. Previous research has indicated that disordered gamblers are at an increased risk of suicidal thoughts, ideation and attempts. The current study sought to utilise data from a clinical sample to identify factors that are associated with prior suicide attempts. **Methods:** The sample included 621 patients entering a gambling-specific residential facility in the UK. A series of Chi-Square analyses and binary logistic regressions were run to identify clinical and sociodemographic variables associated with suicide attempts. **Results:** Of the 20 variables analysed using Chi-square statistics, five were significantly associated with the outcome variable (lifetime attempted suicide): loss of family relationships, loss of home, prior depression, prior suicidal thoughts, and medication use. Regression analysis showed that individuals were more likely to have reported suicide attempts if they had experienced loss of family relationships (1.65 times), loss of a home (1.87 times), prior depression (3.2 times), prior suicidal thoughts (6.14 times), or were taking medication (1.95 times) compared to those not reporting such individual events. **Conclusions:** Disordered gamblers are vulnerable to suicide; a number of factors have been identified in the current study that predict an increased likelihood of attempted suicide. The factors mainly revolve around loss: not financial loss, but rather disintegration of an individual's support network and deterioration in the individual's mental health. Findings indicate that isolation and negative affect associated with gambling are most influential in attempted suicide and should therefore be more strongly considered when creating and providing the legislative, educational and treatment environments for those experiencing gambling related harm.

Keywords: Gambling; Disordered gambling; Suicide; Behavioral Addiction; Treatment.

1. INTRODUCTION

The accessibility of gambling, and the diversity of products available has substantially increased in recent years (McGee, 2020). Evidence indicates that 54% of individuals aged 16+ in the UK report gambling annually (Fuller, Mindell, & Prior, 2018). In some instances, gambling can reach problematic levels of maladaptive behavior that leads to significant harms at individual, community, and societal levels (Hilbrecht et al., 2020). The terminology used with reference to gambling is variable; terms such as 'problem', 'pathological', and 'probable pathological' gambling are often used interchangeably. Gambling was re-classified from an impulse control disorder to an addiction in the most recent version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), and renamed 'gambling disorder' (American Psychiatric Association, 2013). The term 'disordered gambling' will be used hereafter to describe people who experience any clinically significantly gambling-related condition.

Conservative estimates consistently report that less than 1% of the UK population report severe gambling behaviors that warrant a diagnosis of gambling disorder. Using the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001), data from the Health Survey for England (HSE) 2018 indicate that 0.4% of adults are problem gamblers (HSE, 2018). Furthermore, there are larger numbers reporting sub-clinical harm risk; a further 3.6% of gamblers reported some level of gambling harm-risk, defined by a score of ≥1 and ≤7 on the PGSI (HSE, 2018). Disordered gambling is linked to adverse consequences for individuals, including psychiatric comorbidity and poor mental and physical health (Lorains, Cowlishaw, & Thomas, 2011). Adverse consequences can also include harms such as relationship breakdown (Shaw et al., 2007), domestic violence (Roberts et al., 2018), criminal activity (May-Chahal, Humphreys, Clifton, Francis, & Reith, 2017), and homelessness (Sharman et al., 2015).

For some individuals, the most serious consequence of disordered gambling is attempted or completed suicide. Previous studies have suggested that suicidality may be elevated in those who experience problems relating to gambling (Battersby, Tolchard, Scurrah, & Thomas, 2006; Carr et al., 2018; Cook et al., 2015; Jang & Hong, 2018; Karlsson & Hakansson, 2018; Ledgerwood & Petry, 2004; Penfold, Hatcher, Sullivan, & Collins, 2006; Sundqvist & Rosendahl, 2019). In a recent study in 122 treatment seeking gamblers in the UK, it was reported that 6.6% (n=8) of individuals had made suicide plans, and 28.7% (n=35) reported current suicidal thoughts (Roberts, Smith, Bowden-Jones, & Cheeta, 2017). Results indicated that depressive symptomology and a history of familial psychiatric disorder were significant risk factors for such plans; indubitably factors associated with poorer mental health alongside gambling severity meant a greater risk for suicidality. Along similar lines, many studies have sought to identify socio-demographic and clinical factors that may increase the risk of suicide (Ronzitti et al., 2017). Gamblers attempting suicide are more likely to report co-morbid mental health/mood disorders including depression (Battersby et al., 2006; Bischof et al., 2015) and anxiety (Guillou

Landreat et al., 2016; Karlsson & Hakkanson, 2018). Likewise, gamblers with a history of substance misuse (Hodgins, Mansley, & Thygesen, 2006) and personality disorder (Bischof et al., 2015) are also more likely to attempt suicide. Moreover, suicide attempts have also been reported to be associated with a family history of addiction (Ledgerwood, Steinberg, Wu, & Potenza, 2005), family problems on admission (Kausch, 2003), debt (Battersby et al., 2006; Rodway et al., 2017), and unemployment (Komoto, 2014).

Utilising data from the early part of the millennium, a recent study used data from the Adult Psychiatric Morbidity Survey 2007 (APMS) to investigate the relationship between gambling and suicidality in the UK (Wardle, Dymond, John, & McManus, 2019). Although only identifying a small number of disordered gamblers (n=41), analysis revealed that 19.2% of disordered gamblers thought about suicide, and 4.7% had attempted suicide in the preceding 12 months. These figures were significantly elevated compared to the figures for those without disordered gambling (4.1% and 0.6% respectively), indicating that disordered gamblers are over 7.5 times more likely to have attempted suicide than those with no signs of disorder. Furthermore, the study revealed that disordered gamblers were more likely to be male, younger, live in rented accommodation, have higher rates of poor mental health, substance dependence, debt, and homelessness. However, even when accounting for these factors, disordered gamblers were more likely to have experienced suicidal ideation or attempted suicide than those without gambling problems (Wardle et al., 2019). Although previous research has indicated a robust link between gambling and suicide, there are a number of significant, underexplored areas; factors that increase or decrease risk of suicide remain largely unexplored (John, Wardle, McManus, & Dymond, 2019). Furthermore, previous research in a treatment seeking sample found that a higher proportion of individuals entering treatment reported at least one suicide attempt in more recent intake years (Sharman, Murphy, Turner, & Roberts, 2019), indicating a deeper understanding of gambling and suicide is urgently required.

The present study is the first of its kind to investigate suicidality in individuals attending a residential inpatient treatment programme at the Gordon Moody Association (GMA); the UK's most well-established gambling specific inpatient residential facility. Individuals in residential care are often at the most acute stage of addiction (Ledgerwood & Arfken, 2017). Developing a better understanding of the specific psychosocial and clinical risk factors that are associated with suicide in such cohorts will help gambling support services identify and support those experiencing acute gambling related harm, before the crisis point of suicide is reached.

More specifically, the study aimed to identify significant predictors of suicidality in individuals seeking residential treatment for gambling disorder.

2. METHODS

2.1 Participants

Data were drawn from records of residents who have sought treatment at the Gordon Moody Association (GMA), between January 2000 and November 2015. GMA residents are male, due to the additional complexities associated with mixed-gender residential facilities; therefore, only data from male gamblers who provided data on previous suicide attempts (yes or no) are reported (*n* = 621). In the period during which data was collected, the UK gambling landscape underwent significant change, primarily due to implementation of the Gambling Act of 2005, and the advent of online gambling; leading to the emergence of newer forms of gambling, including Fixed Odds Betting Terminals and in-play sports betting. Trends and patterns in gambling behavior of GMA residents over the stated time frame are discussed elsewhere (Sharman et al., 2019). GMA is a registered UK charity that has been helping rehabilitate compulsive gamblers through its residential treatment programme since 1971. It is the only specifically gambling-focussed residential clinic in the UK and is primarily funded by GambleAware. GMA currently run a 12-week programme based on a cognitive behavioral therapy (CBT) approach. Participants in the current study underwent treatment for 3, 6 or 9 months, depending on date of entry into the programme. GMA has two dedicated facilities in the UK, in London and the West Midlands. To be eligible for residential treatment, individuals must satisfy selection criteria, which include being male and ≥18 years of age. Individuals must have made previous unsuccessful committed attempts to quit, have a manageable perceived risk of harm to self or others, have no co-occurring addictions that will inhibit the individual's ability to undertake the treatment programme, and be self-sufficient in a community rehabilitation setting.

2.2. Measures and Procedure

Socio-demographic measures collected included age and ethnicity. The PGSI (Problem Gambling Severity Index, Ferris & Wynne, 2001) and the SOGS (South Oaks Gambling Screen, Lesieur & Blume, 1987) were used to measure past year disordered gambling. Scores show whether gambling should be considered a problem; higher scores are indicative of more serious problems. The PGSI is a widely used nine item scale for measuring the severity of gambling problems in the general population developed from a subset of items from the Canadian Problem Gambling Inventory (CPGI) (Ferris & Wynne, 2001). The scale is made up of four questions which assess problematic gambling behavior and five which assess adverse consequences of gambling. Each item is answered and scored as either Never (0), Sometimes (1), Most of the time (2) or Almost always (3) allowing a maximum score of 27; cumulative scores are categorised as Non-problem gamblers (Score of 0), low-risk gamblers (1-2), moderate-risk gamblers (3-7) or problem gamblers (≥8). The SOGS is a widely used 20-item measure

based on the Diagnostic and Statistical Manual of Mental Disorder (3rd Edition) criteria for pathological gambling (American Psychiatric Association, 1980). A respondent's total score on the SOGS can range from 0 to 20. Each endorsed item is worth 1 point; a score of five or more is indicative of probable pathological gambling (Lesieur & Blume, 1987). The SOGS has been found to have satisfactory reliability, with coefficient alphas of 0.69 and 0.86 in the general population and gambling treatment samples, respectively (Stinchfield, 2002).

2.3 Service-specific questionnaires. Individuals completed initial screening prior to treatment, and then as part of a larger clinical assessment on intake. Individuals completed service specific 'audit' measures including:

Health and Needs Audits: Self-reported questions about specific illness and disability, current and previous mental health including depression and anxiety, and physical health. Individuals were specifically asked if they were or had ever suffered from mental ill health (other than disordered gambling), alcohol or drug addiction, and if they had ever smoked. They were also asked to self-report if they had ever received treatment for a mental health disorder, have or have had any physical health issues, and if they were currently taking any medication. If responding 'yes', participants were asked to specify further details.

Life Audit: Questions were asked about significant lifetime events such as parental divorce or separation, assault during childhood, homelessness, crime resulting in legal punishment, unreported crime, relationship harm, whether the individual has children, family history of gambling, loss of a partner or other family relationships, loss of a job or home, and if they had ever previously attempted suicide or had prior suicidal thoughts.

Audits were completed in a one-to-one session with a member of GMA staff, and all answers were recorded in paper form. Data from each paper case was electronically scanned, redacted to ensure anonymity, before being input into a custom-built SPSS database. The SPSS file was created roughly in accordance with interview protocol: demographic data and data on gambling forms was input first, followed by Health, Safety and Life Audits. Lastly, questionnaire data (e.g. SOGS, PGSI) was coded. Data from the audits took different forms; some data lent itself to binary (yes/no) coding (i.e. 'Do you smoke?'), whereas some data was discrete (i.e. 'How many cigarettes do you smoke per week'?). For some variables, the scope of all possible outcomes was not known (e.g. medication type); in such instances, data were coded in string variables and then post-extraction re-coded into categorical variables (e.g. anti-depressants etc.). For all variables included in the chi-squared and binary logistic regression models, the applicable question from the audits were either simply answered yes or no by the participant therefore required no further coding, or were derived into binary variables. For

example, ‘how many children do you have?’ would be coded as a raw number, and then derived into a binary variable confirming if the participant had children (i.e. ‘Does the participant have children: raw data ≥1 coded as yes, raw data = 0 coded as no). For questionnaire data, raw scores were recorded and were then coded into the appropriate category. Preliminary analysis indicated that there was no difference in likelihood in attempting suicide between medication types (e.g. those taking anti-depressants, and those taking other types of medication), but there was a difference in likelihood of attempted suicide between those taking medication and those not-taking medication. Therefore, subsequent analyses considered ‘taking medication’ only as a binary yes / no variable.

For further details of the clinical assessment and the service specific measures, see Sharman et al., (2019, supplementary material).

2.4 Statistical Analysis

Participants were grouped according to whether they reported a lifetime suicide attempt (n=138) or not (n=483). Gambling severity scores were compared between the suicide attempt groups using independent samples *t* tests. Twenty clinical and sociodemographic predictor variables associated with suicide were identified (table 1). A series of twenty χ^2 tests were run on each of the predictor and outcome variables. Models assessed the statistical association between the binary outcome variable ‘ever attempted suicide’ (yes/no) as the outcome variable and the independent variables identified. Adjusted p values were used and were based on the number of analyses conducted. Predictor variables which were statistically associated with the outcome variable as evidenced from the χ^2tests were then regressed in five follow-up binary logistic regression analyses for which adjusted p values were used which were based on the number of analyses conducted. Five separate logistic regressions were run to express the relationship in terms of odds ratios associated with each predictor variable and the outcome variable ‘ever attempted suicide’. Each of the five binary logistic regressions consisted of one binary predictor variable and the outcome variable and no hierarchical procedure was used. Multiple variables were not entered simultaneously into a model. Participants were referred to one of two treatment centres. As such, there are only two ‘classes’ or for this variable. If the data consisted of several classes of variables, running a nested (multilevel) logistic regression would allow for the estimation of odds which will be a function of these classes (treatment centre in this case). However, as all our variables were binary in nature and because there were only two classes to group, this procedure was not conducted. The Hosmer and Lemeshow goodness-of-fit statistic only works with continuous predictor variables. Both our predictor and outcome variables were binary and this test of model fit breaks down thus these fit statistics are not reported. All statistical analyses were conducted using SPSS 26.

Missing values were not analysed and were treated as 'non-responses'. Participants were asked a comprehensive battery of questions, including complete scales, for example, the SOGS scale and PGSI scale among others mentioned in the methods section. Due to clerical input errors, a few questions had very small amounts (<10) of missing data. Some derived variables included responses to scales, the results of which reached a threshold score below which responses were recorded as 'missing'. Such items do not reflect missing data, rather they reflect 'not applicable' data. Lastly, our analyses rely on crosstabulations and not all participants necessarily answered all items in each crosstabulation. As such, analyses will necessarily result in varying totals.

Many items on the scale had binary 'yes' and 'no' response options. These items' response options were not collapsed for subsequent binary logistic regression analyses. We provide effect sizes for the χ^2 tests because despite the statistical significance of the analyses, all the effect sizes are considered small (none are larger than 0.25). The accepted maximum alpha value used in all analyses is 0.05 upon which adjusted values were based. To control for multiple comparisons and inflated Type 1 error, we adjusted the p value based on the number of analyses (Bonferroni correction) which resulted in a more stringent p value of 0.0025 being used for the chi-square analyses (based on twenty initial analyses) and an adjusted p value of 0.01 for the binary logistic regressions (based on five analyses). The Exp(*B*) values represent the odds ratios for the predictors, and they are the exponentiation of the *B* coefficients. We interpret the Exp(*B*) values as the change in odds of the event occurring.

Ethical approval for the current study was granted by the University of Lincoln Psychology Research Ethics Committee. When entering treatment, all individuals give consent for data to be used for service development and research purposes.

Insert table 1 here

3. RESULTS

Participant Characteristics

Mean age at point of entry was 34.63, (*s.d.* 9.96; M^{in} 17, M^{ax} 70). 88% identified as being British, White Irish, or White Other, 1.9% as Asian Indian, 1.2% as Black African and 1.1% as Black Caribbean. All other reported ethnicities accounted for less than 1% of the sample. Overall, 21% (n=138) of the sample reported attempting suicide prior to treatment start. Prevalence of attempted suicide varies by intake year (χ^2 (15) = 29.72, p = 0.13), with increased prevalence of attempted suicide in more recent intake years. This finding is discussed in more detail in Sharman, Murphy, Turner, & Roberts, 2019). Participants from the Dudley and Beckenham sites did not differ significantly on age at treatment start (*t* (616) = .08, p = .94), ethnicity (χ^2 (14) = 10.35, p = .74), or on two of the measures

used to assess gambling problems (SOGS (t (350) = .45, p = .65); DSM-IV (t (187) = .60, p = .55)). Participants assessed at Beckenham scored more highly on the PGSI (M = 24.68, s.d. = 4.19 compared to Dudley (M = 22.04, s.d. = .72), (t (49.2) = 3.32, p = .002), however this difference is not explored further due to the small number of participants from Dudley who completed the PGSI (n=34). Participants who reported a lifetime suicide attempt and those who did not, did not differ on any measures of gambling severity: PGSI: No n=97, M 22.42, *s.d.* 4.08, Yes n=38, M= 23.42, *s.d.* = 3.02 (t(91) =1.56 p = .12); SOGS: No n=265, M= 15.74 *s.d.* 2.59, Yes n=87 M= 16.07 *s.d.* = 2.39 (t(350) = 1.04, p = .30), indicating that all participants were categorised as problem or pathological gamblers.

Of the 20 predictor variables analysed using χ^2 analyses, five were significantly associated with the outcome variable. Table 2 below shows the significantly associated variables. All five variables related to relationship, loss, physical and mental health variables. None of the co-morbid substance use or crime variables were significantly associated with prior suicide attempts.

Insert table 2 here

Based on the significant associations with a prior suicide attempt, five separate follow-up binary logistic regressions were run. Results are shown in Table 3.

Individuals were more likely to have reported suicide attempts if they had experienced loss of family relationships (1.65 times), loss of a home (1.87 times), prior depression (3.2 times), prior suicidal thoughts (6.14 times), or were taking medication (1.95 times) compared to those not reporting such individual events.

Insert table 3 here

4. DISCUSSION

The current study used data from a sample of residential treatment seeking gamblers and sought to identify variables that were statistically associated with an increased likelihood of lifetime suicide attempts. Six variables were identified: those who had attempted suicide were more likely to have experienced loss of family relationships, loss of a home, experienced previous suicidal thoughts, suffered from depression, and be currently using medication. Gambling severity did not differ by group.

Analysis indicated that gamblers who had previously attempted suicide were more likely to have experienced loss of their home. Previous research has reported that disordered gamblers are more

likely to have experienced homelessness (Wardle et al., 2019), and that prevalence of disordered gambling is higher in homeless populations than the general population (Sharman et al., 2015). The loss of a home as a consequence of disordered gambling can result from the non-payment of mortgage or rent, or due to being asked to leave the family home either by a partner or family (Sharman, Dreyer, Clark, & Bowden-Jones, 2016). The heterogenous immediate causes of the loss of home notwithstanding, the resulting sense of isolation and instability can have negative implications for, and impact on the gambler. Services providing support for those who have lost their home should consider gambling as a potential causal factor, and be aware of the increased risk of harm in the individual. The loss of a home and debt have been previously explored with regards to suicide (Coope et al, 2014), however the relationship between loss of a home and suicide in disordered gamblers is an area that requires further investigation.

Similarly, previous research indicates that breakdown of family relationships can be a consequence of disordered gambling (Cowlishaw, Suomi, & Rodgers, 2016; Kalischuk, 2010). Although the exact nature of the lost relationship will vary from gambler to gambler, the sense of loss generated, and guilt associated with the relationship breakdown is likely to have significant negative implications. Whilst the loss of a family relationship, a home, may or may not be sufficient in isolation to provoke a suicide attempt, the cumulative experience of loss can remove a sense of routine, stability and identity from the individual's life and can contribute to the erosion of a gambler's support network. As such, relationship breakdown is something that gambling support and treatment services should remain vigilant for when assessing risk and when tailoring treatment for an individual.

Results also indicate that gamblers who had attempted suicide were more likely to report experiencing depression, previous suicidal thoughts, and were more likely to be taking medication, than those who did not report a previous suicide attempt, consistent with previous research (Ledgerwood, et al., 2005; Thon et al., 2015). In the current study, there was no difference between groups on any measure of gambling severity thus supporting the notion proposed by Roberts et al (2017) that poorer mental health is perhaps a stronger predictor of suicide attempts than merely measuring gambling severity. Data in the current study show that those that have attempted suicide are more likely to be taking medication at the start of the residential treatment programme. It is interesting to note that the mere presence of medication was associated with increased likelihood of attempted suicide, and that those taking anti-depressants were not more likely to have attempted suicide than those taking any other forms of medication. However the symptoms being treated were unknown, therefore is not known if the prescribed medication was for symptoms related to gambling (i.e. anti-depressants for gambling-related depression), or for an unrelated disorder (i.e. pain management or other chronic conditions).

Further investigation to better understand the relationship between gambling, medication and suicide is required.

Limitations

Although this is the first study identifying predictors of suicide attempts in treatment seeking gamblers in the UK, the current study was not without some procedural and statistical limitations. Data was collected across an extended timeframe at different sites, resulting in some procedural differences that influenced what data was collected. Moreover, this study used a single-item measure of lifetime suicidal attempts which has been shown to be associated with a fair degree of misclassification (Millner, Lee, & Nock, 2015). Although there was a measurement of previous suicidal thinking, current suicidal ideation was not included. Further research is required to understand suicidal ideation and self-harmful behaviors. The associations identified here do not prove causality; longitudinal analyses could provide more in depth information. The study also relied on self-reporting from the individuals seeking treatment, and the study population was limited to a treatment seeking sample. Furthermore, variables previously considered of theoretical importance to the development and maintenance of disordered gambling were either not recorded (e.g. economic status), or not recorded in a way as to allow analysis (e.g. age). For example, it is well established that suicide is more prevalent in younger males. Although we knew when the individual started gambling, and at what age they entered treatment, we did not know at what age the suicide attempt(s) was/were made relative to age the individual started gambling, or the age they entered treatment. This restricted the scope of variables that could be included in the analyses. Additionally, due to the nature of residential treatment, data analysed in the current study is for male gamblers only; it is unknown if the variables significantly related to attempted suicide are generalisable to female gamblers, or whether an equivalent analysis for females would generate different results. More research is urgently needed in this area to address this imbalance.

Conclusion

This paper is the first UK study to investigate predictors of suicide attempts in a large sample of 621 residential treatment-seeking disordered gamblers spanning 15 years. Previous research has shown that compared to non-gamblers, disordered gamblers are at an increased risk of suicide. Although this paper focuses on clinical and sociodemographic variable, there are myriad factors that influence the development and maintenance of disordered gambling, such as social, legislative, environmental and commercial factors that reach beyond the scope of individual vulnerability. The environment in which gambling is promoted, marketed, and engaged with in the UK provides the gambler with little respite. With increased gambling engagement comes withdrawal from regular life and increased deception of

those close to the gambler. This paper has shown how subsequent isolation through diminishing social support networks and lack of stability are fundamental to increased risk of suicide attempts and should be considered when identifying and supporting those experiencing gambling related harm before the crisis point of suicide is reached.

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