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Gambling habits, gambling norms, and problem gambling in foreign born and native populations in Denmark — A general population survey

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A B S T R A C T

Background: Being foreign born, i.e. not born in the reception country or belonging to an ethnic minority, has been described as a risk factor of problem gambling, although research so far has been inconclusive. Also, there is limited knowledge about whether this association is caused by differing gambling norms. The present study aimed to study whether foreign origin is associated with problem gambling, when controlling for several potential risk factors, gambling frequency and beliefs about peer gambling, i.e. gambling norms.

Methods: Cross-sectional web survey including 1970 adult individuals from the general population in Denmark (50% female), in April 2018. Binary analyses and hierarchical logistic regression with respect to associations between foreign origin, relevant co-factors and problem gambling.

Results: Problem gambling was more common in individuals with foreign origin (15 vs 10%, $p = 0.01$). In logistic regression, problem gambling was associated with male sex, gambling frequency, foreign origin, psychological distress, smoking, and number of gambling types used. Beliefs about peer gambling did not differ with respect to foreign origin, but were associated with problem gambling until one's own gambling frequency was entered into the model.

Conclusions: When controlling for a number of relevant risk factors, foreign origin still appears to predict problem gambling. Gambling patterns or gambling norms are unlikely to be the sole explanation of the increased prevalence. The findings have implications for preventive work in the foreign born population, and gambling norms may be targeted in screening for at-risk gamblers.

1. Introduction

Gambling disorder (GD) is a condition with an increasing attention in recent research, and recently added to the chapter of addictive disorders in the Diagnostics and Statistical Manual of Mental Disorders (DSM-5) (*American Psychiatric Association. Diagnostic and statistical manual of psychiatric disorders*, 2013; Ashley & Boehlke, 2012; Petry, 2006; Petry, Blanco, Stinchfield, & Volberg, 2013). When including both the less severe concept of problem gambling, as well as patients with a manifest diagnosis, the prevalence of a problematic gambling pattern ranges from 0.12% (in Norway) and 5.8% (Hong Kong) (Calado & Griffiths, 2016). Problem gambling is known to be associated with physical, psychological, financial and social consequences which are not only isolated to the individual, but also extend to their families and to the community (Barnes, Welte, Hoffman, & Dintcheff, 1999; Shaffer & Korn, 2002). Several risk factors of GD have been described, including younger age, male sex, low socioeconomic status, gambling preference, number of gambling activities, gambling frequency, psychiatric illness including alcohol or drug use disorders, minority status and gambling norms (Chou & Afifi, 2011; Dowling et al., 2015; Foster,

Neighbors, Rodriguez, Lazorwitz, & Gonzales, 2014; Raylu & Oei, 2002; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2004).

Studies have shown that being foreign born and belonging to an ethnic minority may constitute a risk factor for problem gambling (Alegria et al., 2009; Caler, Vargas Garcia, & Nower, 2017; Canale et al., 2017; Giralt et al., 2018; James, O'Malley, & Tunney, 2016; Lyk-Jensen, 2010; Okuda et al., 2016; Welte et al., 2004; Wilson, Salas-Wright, Vaughn, & Maynard, 2015). However, authors have suggested that ethnicity may not be a risk factor in itself, but associated risk factors are likely to mediate the increased risk (Kastirke, Rumpf, John, Bischof, & Meyer, 2015; Okuda et al., 2016), and this includes the finding that immigrants may present a more severe gambling pattern, compared to natives (Eva et al., 2012).

Given the suggested association between minority status and problem gambling, and the existence of potential mediators of this association, it can be discussed whether this is associated with different gambling norms in different ethnic groups. Previous research has shown that when looking at injunctive norms most people rate their beliefs about peers' gambling habits higher compared to their own gambling, that these beliefs are correlated to one's actual gambling

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frequency, and that injunctive norms influence gambling behavior (Larimer & Neighbors, 2003; Foster et al., 2014; Neighbors, Lostutter, Larimer, & Takushi, 2002). However, there is a paucity of research addressing whether immigrants have other gambling norms than natives, and whether this may contribute to the larger prevalence of problem gambling. It has been hypothesized that cultural values and beliefs, stress from acculturation, resistance to search for professional help, or religious beliefs, might contribute to the heightened prevalence of GD among minorities (Zitzow, 1996; Okuda et al., 2016; Raylu & Oei, 2004). For example, poor acculturation has been described to predict gambling habits (Oei & Raylu, 2009), and in some Asian cultures, gambling may be more integrated into common lifestyle and tradition, with higher public acceptance of gambling (Raylu & Oei, 2004). Also, there is evidence showing that sex distribution in problem gambling may differ in minorities, with several studies indicating that the risk of developing GD may be equal between minority men and women, in contrast to the sex distribution seen in majority populations (Zitzow, 1996; Alegría et al., 2009; Okuda et al., 2016). In addition, it has been shown that overall health is lower in minorities (Bhugra, 2004), potentially contributing to a higher prevalence of problem gambling.

As previous studies on the link between migration and problem gambling have not addressed whether the increase in risk may be associated with different norms related to gambling, the present study aimed to study whether immigrant status remains a correlate of problem gambling, when controlling for beliefs about peer gambling and for several known risk factors.

2. Materials and methods

2.1. Participants

The data was collected through a quantitative web-survey, distributed to participants in a pre-existing online web panel of survey respondents, and the study recruited individuals until representative distributions of sex and age were obtained, and with the plan to halt the data collection when around 2000 respondents were reached. The survey was designed for online use by two collaborating companies, Patent Information Broker Ltd. (PIB) and I-Mind Consulting Ltd. (I-mind), and distributed to the web panel owned by the company Userneeds (<http://userneeds.se/marknadsanalys>). Userneeds operates in six countries (Denmark, Norway, Sweden, Finland, Ireland, and Switzerland), and reports a total of 300,000 panel participants in these countries altogether. The participants of the web panel had previously signed up with their personal information to the system, agreeing to receive regular surveys by e-mails which they choose either to enter or not enter. For the present study, participants living in Denmark were addressed. The Danish Userneeds web panel consists of individuals living in Denmark and above 16 years of age, who have agreed to receive questionnaires for different types of inquiries. The current data collection was carried out during 13 days in April 2018, with a median response time of 4:23 min to fill out the questionnaire. From a total of 2130 respondents accepting participation, 100 subjects with incomplete data were excluded. Participants who were minors (in the age category 16–18 years, $n = 56$) were excluded from the research study. Among the remaining 1974 respondents, 50% were male ($n = 992$), 50% were female ($n = 978$), and four individuals identified as transgender, and due to the low number, transgender individuals were excluded, such that the final sample comprised 1970 individuals. For the six questions measuring psychological distress (see below), respondents were able to choose not to answer ('do not wish to answer this question'), and therefore, in the final logistic regression analyses including the present variable, another 59 individuals were excluded due to incomplete and insufficient data (individuals with incomplete data were still included if their provided data qualified them for at least a certain level in the categorical subdivision of the variable, regardless of the data for the non-reported items). Thus, in the logistic regression analyses (and in the

univariate analysis of psychological distress), the final sample comprised 1911 individuals.

2.2. Procedures

Members of the Userneeds web panel received the question about participating, along with information about the study, including the message that the study was anonymous and that answers would be handled with confidentiality. In this information, with the headline 'survey dealing with gambling for money', each panel member was informed in written that the present study addressed gambling and addiction to gambling. The survey opened only after an informed consent was provided electronically by the participant. For participation in the present study, individuals obtained credits in the company's bonus system, corresponding to around one euro for the completion of the present study.

Questionnaires were distributed by Userneeds who are aware of the identity of individuals who are part of their web panel, but data were collected by PIB, who cannot obtain the identity of any participant, and data was analyzed by the research group. The study did not address any variables which could theoretically identify study participants directly or indirectly (e.g., information about age was grouped in wide age intervals), and no personal information or information about geographical area or other potentially identifiable data was provided. As the study did not collect any biological data, the study did not require ethical permission according to Danish law ([Information about the law on research ethics in health-related research, 2017](#)).

2.3. Instruments

The web-based questionnaire consisted of four parts, as described below.

2.3.1. Sociodemographic data

These variables included age, sex, primary occupation, birth country, mother's birth country, father's birth country, living conditions, occupation, having Danish as the native language, number of children and number of children living at home. Foreign origin was defined as not being born in Denmark or having at least one parent not born in Denmark.

2.3.2. Gambling pattern and types of gambling

Participants filled out part of Addiction Severity Index – Gambling (ASI-G); three questions from this form were included to assess gambling frequency and perceived negative effects from gambling (ASI Spel Grund, 2017; Petry, 2003). The three questions included whether or not an individual has gambled on each specific type of gambling during the past 30 days (online casino, landbased casino, online horse games, landbased horse games, live sports betting, non-live sports betting, online poker, landbased poker, landbased electronic gambling machines [EMGs], online bingo, and forms of gambling for money within the setting of videogames), how many of the past 30 days the individual has experienced gambling problems (0 to 30 days), and how worried or bothered the individual was about gambling during the past 30 days (rated from 1 to 5) (ASI Spel Grund, 2017).

2.3.3. Problem gambling

The NORC DSM-IV Screen for Gambling Problems (NODS-CLiP) was used in order to define the outcome variable, problem gambling. The NODS-CLiP has a sensitivity of 0.94–0.99 and specificity 0.88–0.95 for identifying problem gamblers. This questionnaire was used to identify problem gambling, with a cut-off point of answering 'yes' to one or more of the questions. The three items include preoccupation ('P'), loss of control ('C'), and having lied about gambling ('L') (Toce-Gerstein, Gerstein, & Volberg, 2009).

2.3.4. Perceived gambling norms

The Gambling Quantity and Perceived Norms (GQPN) questionnaire has been reported to have a reliability of 0.89 (Larimer & Neighbors, 2003; Neighbors et al., 2002); here, parts of this form were used in order to assess the respondents' past-month gambling losses, gambling wins, and beliefs about gambling frequency and amount of gambling-related losses of an individual of the same sex and age during a typical month. Options regarding gambling frequency ranged from 'never' to 'every day'. Amounts lost or won were transformed into Euros, and ranged from less than around 6.5 Euros to around 650 Euros.

2.3.5. Psychological distress

This was measured using the Kessler 6 ('K-6'), an instrument with a sensitivity of 0.76 and specificity of 0.75 for identifying psychological distress at a moderate level when a cut-off point of 5 points is used, and a sensitivity of 0.36, specificity of 0.96, and total classification accuracy of 0.92 when a cut-off point of 13 or higher is used to identify severe psychological distress (Prochaska, Sung, Max, Shi, & Ong, 2012). The respondents were given six options for each question, given a value of 0–5, asking to what extent an individual has experienced (in last 6 months) feelings of nervousness, hopelessness, restlessness or fidgety, depressive thoughts and feelings that everything is an effort (Kessler et al., 2002). The total score was categorized as describing no psychological distress (0 to 4), moderate (Barnes, Welte, Hoffman, & Dintcheff, 1999; Calado & Griffiths, 2016; Chou & Afifi, 2011; Dowling et al., 2015; Foster et al., 2014; Raylu & Oei, 2002; Shaffer & Korn, 2002; Welte et al., 2004), or severe psychological distress (13 or above) (Prochaska et al., 2012).

Additional questions about psychological distress asked about whether the respondent had ever felt the need to seek professional mental health treatment, ever felt the need to seek professional help for alcohol or drug problems, or ever felt the need to seek treatment for problem gambling, as well as a question about whether the respondent is a daily smoker or not.

The survey was translated from Swedish into Danish by a professional translator, and structured questionnaires were back-translated by a consultant physician in psychiatry fluent in Danish and Swedish, and checked for satisfactory adequacy by the first author.

2.4. Statistical analysis

All statistical analyses were performed using IBM SPSS Statistic version 24.0. Chi-squared tests were used to identify correlates of problem gambling for categorical variables with Pearson's and linear-by-linear *p*-values, and chi-squared values for dichotomous variables were also reported using a continuity correction measure. A correlation matrix examining bivariate Spearman rho's correlations was performed to examine whether significant correlations existed between variables which were demonstrated to be associated with problem gambling. Hierarchical logistic regression was used, in the first model entering simultaneously the variables which in binary comparisons were associated with problem gambling, and using problem gambling as the dependent variable. In the second model, the findings were controlled for the frequency of gambling.

3. Results

3.1. Comparison of foreign born and native participants

The comparison between respondents with foreign and native origin is displayed in Table 1. Of all the respondents, 15% reported having participated in at least one type of gambling activity in the last 30 days. A total of 10% (*n* = 202) of all respondents were identified as problem gamblers. Neither gambling frequency or gambling losses, nor beliefs about peer gambling frequency and peer gambling losses, were

Table 1

Comparison of gambling frequency, beliefs about peer gambling frequency, gambling losses and beliefs about peer gambling losses, in foreign born individuals compared to natives.^a

	Foreign born, % (<i>n</i> = 221)	Native, % (<i>n</i> = 1749)	Chi-square	<i>p</i> value
Gambling frequency			12.07	0.15
- Never	55 (121)	52 (902)		
- Once/year	12 (27)	10 (168)		
- 2–3 times/year	12 (26)	13 (224)		
- Every second month	6 (14)	5 (88)		
- Once/month	5 (11)	7 (129)		
- Every week	7 (16)	11 (185)		
- More than every week	1 (2)	2 (33)		
- Every second day	0 (0)	1 (9)		
- Daily	2 (4)	1 (11)		
Beliefs about peer gambling frequency			10.79	0.21
- Never	19 (43)	14 (245)		
- Once/year	12 (26)	11 (198)		
- 2–3 times/year	26 (58)	24 (412)		
- Every second month	11 (25)	13 (223)		
- Once/month	15 (33)	20 (342)		
- Every week	13 (28)	16 (279)		
- More than every week	2 (5)	2 (40)		
- Every second day	0 (1)	0 (5)		
- Daily	1 (2)	0 (5)		
Monthly loss from gambling (Euros)^b			10.06	0.35
- < 6.5	79 (174)	75 (1317)		
- 6.5–13	7 (15)	9 (151)		
- 13–26	7 (16)	8 (132)		
- 26–52	2 (4)	4 (73)		
- 52–78	2 (4)	2 (40)		
- 78–130	2 (4)	1 (21)		
- 130–260	1 (3)	1 (10)		
- 250–650	0 (0)	0 (3)		
- 650–1300	0 (0)	0 (1)		
- > 1300	0 (1)	0 (1)		
Beliefs about peer monthly loss from gambling^b			14.67	0.10
- < 6.5	35 (78)	34 (586)		
- 6.5–13	21 (47)	21 (372)		
- 13–26	15 (33)	20 (357)		
- 26–52	15 (33)	13 (222)		
- 52–78	8 (18)	6 (106)		
- 78–130	4 (9)	4 (70)		
- 130–260	0 (1)	1 (24)		
- 250–650	0 (1)	1 (10)		
- 650–1300	0 (0)	0 (1)		
- > 1300	0 (1)	0 (0)		

^a Chi-square analyses. *N* = 1970.

^b Expressed in the survey in discrete values in the currency Danish Krona (DKK), corresponding to approximately 0.13 Euros.

significantly associated with foreign origin. Among respondents with foreign origin, 14.9% were problem gamblers, compared to 9.7% among natives (*p* = 0.01, Table 1).

3.2. Correlates of problem gambling

Problem gamblers scored significantly higher on gambling frequency and gambling losses, as well as beliefs about frequency of gambling or monthly gambling losses of peers (Table 2), and problem gambling was significantly associated with being foreign born. Also, problem gambling and non-problem gambling differed with respect to age group (*p* = 0.03), male sex (*p* < 0.001), a higher number of gambling types (*p* < 0.001), higher gambling frequency (*p* < 0.001), tobacco smoking (*p* < 0.001), problematic alcohol and/or substance use (*p* < 0.001), and psychological distress (*p* < 0.001) (Table 2).

Table 2

Comparison of problem gamblers and non-problems gamblers, regarding gambling measures, sociodemographic data, psychological distress and substance use, % (n).^a

	Problem gambling (n = 202)	Non-problem gambling (n = 1768)	Chi-square value	P value	Continuity correction	P value
Foreign born	16 (33)	11 (188)	5.92	0.02	5.36	0.02
Male sex	71 (143)	48 (849)	37.61	< 0.001	36.70	< 0.001
Age groups (yrs)			12.64	0.03	–	–
- 19–24	11 (23)	12 (219)				
- 25–29	9 (19)	9 (156)				
- 30–39	24 (48)	16 (277)				
- 40–49	24 (49)	22 (385)				
- 50–59	16 (32)	20 (357)				
- 60+	15 (31)	2 (374)				
Need for alcohol or drug use treatment	13 (27)	4 (72)	32.81	< 0.001	30.89	< 0.001
Tobacco smoker	29 (58)	12 (218)	40.39	< 0.001	39.04	< 0.001
Psychological distress ^b			45.24	< 0.001	–	–
- None	48 (93)	68 (1166)				
- Moderate	39 (75)	28 (483)				
- Severe	13 (25)	4 (69)				
Monthly loss from gambling (Euros) ^c			302.18	< 0.001		
- < 6.5	39 (79)	80 (1412)				
- 6.5–13	13 (26)	8 (140)				
- 13–26	16 (32)	7 (116)				
- 26–52	11 (22)	3 (55)				
- 52–78	5 (11)	2 (33)				
- 78–130	7 (15)	1 (10)				
- 130–260	5 (11)	0 (2)				
- 250–650	1 (3)	0 (0)				
- 650–1300	0 (1)	0 (0)				
- > 1300	1 (2)	0 (0)				
Beliefs about peer monthly loss from gambling (Euros) ^b			80.96	< 0.001		
- < 6.5	17 (34)	36 (630)				
- 6.5–13	18 (37)	22 (382)				
- 13–26	17 (35)	20 (355)				
- 26–52	21 (42)	12 (213)				
- 52–78	16 (32)	5 (92)				
- 78–130	7 (15)	4 (64)				
- 130–260	2 (4)	1 (21)				
- 250–650	1 (2)	1 (9)				
- 650–1300	0 (0)	0 (1)				
- > 1300	0 (1)	0 (0)				
Number of gambling types past month			313.13	< 0.001		
- 0	50 (101)	89 (1573)				
- 1	17 (35)	8 (134)				
- 2	16 (33)	3 (45)				
- 3+	16 (33)	1 (16)				
Beliefs about peer gambling frequency			93.65	< 0.001	–	–
- Never	5 (10)	16 (278)				
- Once/year	5 (10)	12 (214)				
- 2–3 times/year	16 (33)	25 (437)				
- Every second month	14 (28)	12 (220)				
- Once/month	22 (44)	19 (331)				
- Every week	31 (62)	14 (245)				
- More than every week	4 (8)	2 (37)				
- Every second day	2 (4)	0 (2)				
- Daily	1 (3)	0 (4)				
Gambling frequency			298.97	< 0.001	–	–
- Never	12 (24)	57 (999)				
- Once/year	10 (20)	10 (175)				
- 2–3 times/year	15 (30)	12 (220)				
- Every second month	10 (20)	5 (82)				
- Once/month	14 (28)	6 (112)				
- Every week	22 (44)	9 (157)				
- More than every week	9 (18)	1 (17)				
- Every second day	3 (6)	0 (3)				
- Daily	6 (12)	0 (3)				

^a Chi-squared analyses. N = 1970. Problem gambling defined by endorsing one or more items of the NODS-CLiP (Toce-Gerstein et al., 2009).

^b Categories based on Kessler-6 for screening of psychological distress (Kessler et al., 2002; Prochaska et al., 2012). Missing data = 59 (total n = 1911).

^c Expressed in the survey in discrete values in the currency Danish Krona (DKK), corresponding to approximately 0.13 Euros.

Factors associated with problem gambling were entered into a hierarchical binary logistic regression, with problem gambling status as the binary outcome (Table 3). As the correlation matrix analysis revealed high collinearity between gambling losses, beliefs about peers'

gambling losses, gambling frequency and beliefs about gambling frequency, respectively, only the variables describing peers' gambling frequency was kept in the analysis as a measure of gambling norms.

In the first logistic regression (model 1), male sex, foreign origin,

Table 3
Identified risk factors for problem gambling (NODS-CLiP, one or more items endorsed, (Toce-Gerstein et al., 2009)) in hierarchical logistic regression.^a

	Model 1 ^b				Model 2 ^c			
	p	OR	CI 95% for OR		p	OR	CI 95% for OR	
			Lower	Upper			Lower	Upper
Age	0.51	0.96	0.84	1.09	0.31	0.93	0.81	1.07
Male sex	0.01	1.66	1.11	2.50	0.03	1.58	1.03	2.40
Foreign origin	< 0.01	1.87	1.17	2.99	< 0.01	1.99	1.22	3.23
Psychological distress (Kessler-6, (Kessler et al., 2002; Prochaska et al., 2012))	< 0.001	1.94	1.47	2.58	< 0.001	1.94	1.46	2.59
Alcohol/drug problem	0.12	1.62	0.89	2.94	0.12	1.62	0.88	2.99
Tobacco smoking	< 0.01	1.85	1.21	2.81	< 0.01	1.97	1.28	3.02
Number of gambling types	< 0.001	2.62	2.16	3.17	< 0.001	1.87	1.51	2.31
Beliefs about peer gambling frequency	< 0.001	1.29	1.15	1.44	0.50	1.05	0.92	1.19
Gambling frequency	–	–	–	–	< 0.001	1.44	1.29	1.60

^a Hierarchical logistic regression analysis, with problem gambling as the dependent variables. Age, sex, origin, problematic alcohol and/or substance use, psychological distress, smoking, gambling activities and gambling frequency norms entered in the first model, gambling frequency added in the second model. Cases without sufficient data on Kessler-6 excluded. $N = 1911$.

^b Nagelkerke 0.24.

^c Nagelkerke 0.32.

psychological distress, smoking, number of gambling types and beliefs about peer gambling frequency were positively associated with problem gambling. In the second model, when adding the individual's own gambling frequency, the association with beliefs about peer gambling disappeared, whereas other variables remained significant, including foreign origin. Also, the individual's own gambling frequency was significantly associated with problem gambling (Table 3).

4. Discussion

The primary aim of this study was to examine whether problem gambling was more common among people with foreign origin, and whether this association remained when controlling for norms about peer gambling and for a number of potential risk factors. The study demonstrated that foreign origin was indeed associated with problem gambling, when controlling for other variables, and even though gambling norms were not clearly different in individuals with foreign origin. A secondary finding with great relevance to the field is that norms about peer gambling in the present study were associated with an individual's own problem gambling.

The present findings of an overrepresentation of problem gambling in foreign born individuals are in line with the findings in previous studies (Alegria et al., 2009; Caler et al., 2017; Lyk-Jensen, 2010; Okuda et al., 2016; Welte et al., 2004). The link between foreign origin and problem gambling may have several explanations. It has been hypothesized that the 'emotionally vulnerable gambler' is one sub-type predicting the development of a gambling problem, according to the well-established so-called 'pathways model' (Blaszczynski & Nower, 2002; Allami et al., 2017; Milosevic & Ledgerwood, 2010), but although it was hypothesized that psychological distress could potentially contribute to problem gambling, the association with foreign origin remained when controlling for psychological distress. Despite the lack of a clear moderating role of psychological distress in this study, a vulnerability aside from actual poor mental health may contribute, including a vulnerability related to the immigrant status itself. Hitherto, research has not clearly addressed whether foreign born status specifically constitutes one type of pathway to problem gambling in this model, and more in-depth research in foreign born groups is likely needed.

A second major finding was that although beliefs about peer gambling were associated with one's own problem gambling, this factor did not explain the risk increase in immigrants. This is, to the best of our knowledge, the first study comparing gambling problems between people with foreign origin and native individuals when taking gambling

norms – here expressed as the beliefs about peer gambling – into account. Higher gambling frequency norms are correlated to higher actual gambling frequency (Foster et al., 2014), but interestingly, respondents with foreign origin did not differ from native respondents with respect to gambling norms. In addition, although these groups also did not differ with respect to gambling frequency or money lost from gambling, being foreign born was still significantly associated with having a gambling problem. Thus, beliefs about peer gambling are unlikely to explain the increased prevalence of problem gambling in immigrant. This may raise hypotheses about other explanations to the risk increase in foreign born individuals, but also, interestingly, foreign origin appears to be a factor contributing to gambling problems, even though the actual measures of gambling or gambling-related beliefs did not differ. This implies that groups with foreign origin, at a given level of gambling behavior, may be at higher risk of developing a problem related to gambling. This is likely to require future larger studies, and based on previous literature describing a certain complexity in the association of migration and gambling, more studies will need to include sufficiently large study samples, where power allows for sub-group comparisons (Wilson et al., 2015).

Another important finding was that beliefs about peer gambling were associated with one's own problem gambling, controlling for a number of other variables, and this association disappeared only when controlling for the individual's own gambling frequency. We hypothesize that this is due to the high correlation between high-frequency norms and actual gambling frequency, which is a well-established risk factor (Foster et al., 2014). Thus, it can be argued that in screening and prevention of high-risk gambling in the general population, questions about individuals' beliefs about how others gamble, compared to themselves, may be a fruitful way of detecting and addressing risky gambling behaviors. Thus, peer gambling norms may potentially constitute a factor to screen for and address in treatment.

Other variables associated with problem gambling in the present study were smoking, number of gambling types, psychological distress, and gambling frequency. All these associations have previously been described in the literature (Barnes et al., 1999; Dowling et al., 2015; Raylu & Oei, 2002; Shaffer & Korn, 2002; Welte et al., 2004). Unlike most other studies, our study did not find a correlation between problematic alcohol and/or drug use and problem gambling. In order to keep this online questionnaire brief, the alcohol/drug item was brief and focused on the need to seek treatment, rather than measures of actual alcohol or drug consumption. Thus, the lack of an association with problem gambling in the present study should be interpreted with caution, as previous studies have documented an association between

problem gambling and substance use disorders (Chou & Afifi, 2011; Dowling et al., 2015; Raylu & Oei, 2002; Welte et al., 2004).

Male sex was also a statistically associated with problem gambling in the first statistical model, and this association remained when controlling for gambling frequency. Thus, while male sex is typically an overall risk factor of problem gambling in the population, it also has been shown that males gamble more frequently than women, i.e. a finding likely to explain part of the risk increase in men (Hing & Breen, 2001).

The present study has potential implications to the research field of problem gambling. In prevention efforts in the society, the association between problem gambling and being foreign born should be borne in mind. Thus, interventions in the general population of in problem gamblers should be ready to address ethnic minorities who may be at larger risk. Also, as an individual's beliefs about peer gambling frequency were shown to be associated with one's own risk of problem gambling, screening and prevention work could potentially address individuals who demonstrate high beliefs about peer gambling. The present study cannot conclude whether an intervention targeting gambling norms could potentially lower the risk of problem gambling, but suggests that gambling norms may be a target for assessment and screening for potential risky gambling behaviors.

As a potential limitation in the present study, but due to the data collection procedure, the present study cannot aim to describe a true prevalence measure of problem gambling in the general population, but rather addresses specific correlates within the population assessed. The prevalence of problem gambling in this sample was significantly higher than what has previously been reported in Denmark (Ekholm et al., 2014). One explanation of the difference may be that the study that reported lower problem gambling frequency utilized a more extensive diagnostic questionnaire with 11 questions, rather than the present shorter screening tool. Another contributing factor may be a selection bias since the questionnaire was sent to respondents who had signed up to receive regular web surveys, and who potentially may have other internet habits than the general population. Problematic internet use has previously been linked to increased problem gambling (Yau, Potenza, & White, 2013), and potentially, being prone to engage in web surveys may be related to increase gambling habits. A third factor previously addressed in the literature is that the actual gambling behavior is positively correlated with participation gambling surveys; people with higher interest in gambling may also be more attracted by a web survey addressing that area of research (Harrison, Jessen, Lau, & Ross, 2018). In the present sample, younger age was – as expected – associated with problem gambling in the non-adjusted analysis, whereas in the logistic regression, age did not demonstrate an independent association with problem gambling, as would have been expected from previous literature (Welte et al., 2004). It could also be due to the same selection bias that is potentially affecting the problem gambling rates. In addition, particular limitations are related to the use of self-report survey data. In order to decrease the risk of results being biased by respondents who may skip through questions too rapidly, for the psychological distress scale, we conducted a sensitivity analysis excluding all individuals who endorsed the lowest option for all six items (total score 0), or the highest option for all six items (total score 24), and analyzed psychological distress only for the remaining subjects ($n = 1461$). This sensitivity did not alter the main findings of the study, such that the same set of variables remained significantly associated with problem gambling.

Another limitation is that the sample size included a relatively limited number of respondents with foreign origin, and data would be impossible to analyze for separate sub-groups of ethnicity. Therefore, foreign origin was categorized homogeneously, although large variations may exist between cultural and ethnic groups. Another limitation may be related to the instrument used to define problem gambling, the NODS-CLiP. Some research suggests that NODS-CLiP might have a lower chance of capturing problem gambling across demographic

groups. One study showed that the NODS-CLiP captured 96% of male gamblers but only 91% of female gamblers. The same study had a capture rate of 100% of the Hispanic problem gamblers, 94% of Caucasian problem gamblers and 87% of the African American problem gamblers, suggesting that sensitivity may be lower among demographic, cultural and ethnic groups (Petry, 2003). It is unclear to what extent this may have affected the results here, and this calls for more extensive research in larger study samples, with the possibility to address smaller sub-groups of immigrants with respect to problem gambling.

5. Conclusions

The present study confirmed the heightened prevalence of problem gambling in individuals with foreign origin, compared to the rest of the population, also when controlling for a number of potential risk factors, and the link to foreign origin even remained after controlling for gambling frequency and beliefs about gambling, used to express gambling norms. The increased likelihood for problem gambling is unlikely to be explained by different beliefs about the extent of peer gambling. More research in larger study samples is needed to fully understand gambling norms in different groups of ethnic minorities, and factors mediating their increased risk of problem gambling. Gambling norms, expressed as beliefs about the frequency of the gambling of others, was associated with problem gambling.

Conflicts of interest

Håkansson holds a position as a researcher at Lund University, for which the funding is donated by the Swedish state-owned gambling monopoly, in collaboration with the university. The funding body does not have any influence on the present study. Ekblad and Kostevski report no potential conflicts of interest.

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