Social and economic costs of gambling problems and related harm among UK military veterans

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► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjmilitary-2021-001892).

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Received 17 May 2021
Accepted 12 September 2021
Published Online First 18 October 2021

Check for updates

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To cite: Harris S, Pockett RD, Dighton G, *et al*. *BMJ Mil Health* 2023;**169**:413–418.

ABSTRACT

Introduction Military veterans are at heightened risk of problem gambling. Little is known about the costs of problem gambling and related harm among United Kingdom (UK) Armed Forces (AF) veterans. We investigated the social and economic costs of gambling among a large sample of veterans through differences in healthcare and social service resource use compared with age-matched and gender-matched non-veterans from the UK AF Veterans' Health and Gambling Study.

Methods An online survey measured sociodemographic characteristics, gambling experience and problem severity, mental health and healthcare resource utilisation. Healthcare provider, personal social service and societal costs were estimated as total adjusted mean costs and utility, with cost-consequence analysis of a single timepoint.

Results Veterans in our sample had higher healthcare, social service and societal costs and lower utility. Veterans had greater contacts with the criminal justice system, received more social service benefits, had more lost work hours and greater accrued debt. A cost difference of £590 (95% CI −£1016 to −£163) was evident between veterans with scores indicating problem gambling and those reporting no problems. Costs varied by problem gambling status.

Conclusions Our sample of UK AF veterans has higher healthcare, social service and societal costs than non-veterans. Veterans experiencing problem gambling are more costly but have no reduction in quality of life.

Key messages

⇒ Gambling is a growing public health issue, with military veterans at heightened risk of harm.
⇒ Little is known about the costs of problem gambling and related harm among UK military veterans.
⇒ We investigated the social and economic costs of gambling among a large sample of UK veterans through differences in healthcare and social service resource use.
⇒ Veterans had higher healthcare, social service and societal costs and lower utility.
⇒ Veterans had greater contacts with criminal justice services, received more benefits and had more lost work hours. Costs increased by gambling status.
⇒ Overall, veterans experiencing problem gambling are more costly but experience no reduction in quality of life.

Gambling is a growing public health concern with adverse impacts on the health and well-being of individuals, families and society.[1] These adverse consequences include financial management problems and debt, loss of employment, relationship breakdown, poor health, contact with the criminal justice system, disrupted educational attainment and reduced social opportunities.

The social and economic costs of gambling harms are wide-ranging and difficult to estimate precisely.[2 3] To date, only one analysis has been conducted on the costs of gambling harms (specifically, on the costs of problem gambling) in the UK. Thorley *et al*[4] estimated the excess fiscal costs of problem gambling in four domains: health services (primary care and associated services such as mental health) costs, welfare and employment costs, housing costs and criminal justice costs. It was estimated that problem gambling costs the UK between £260 million and £1.6 billion. This is, however, likely to be a conservative estimate; in Australia, for instance, where a broader public health approach has long been adopted to calculating costs, the cost of gambling harms is estimated at AUSD$4.7 billion a year.[5]

Gambling harms and associated social-economic costs disproportionately impact vulnerable populations. Military veterans are at heightened risk of problematic gambling, with rates of lifetime problem gambling considerably higher than the general population.[6] Indeed, the military population is over-represented by groups with typically lower rates of treatment seeking including younger men and those from lower sociodemographic groups.[7] Gambling problems among the general population also tend to co-occur with mental health conditions such as anxiety and depression and are associated with prior traumatic experience which can lead to post-traumatic stress disorder (PTSD).[8] Veterans are at greater risk of being exposed to traumatic events compared with the general population,[9] with exposure known to increase vulnerability to problem gambling,[10] which may require health and social care support long after discharge from the armed forces (AF). Veterans are also less likely to be employed and more likely to be unemployed than the general population, with 10% of UK veterans experiencing financial difficulties including household arrears and debt after leaving the forces.[11]

Taken together, these risk factors and comorbid mental health difficulties may contribute to the social and economic burden of gambling-related harm among veterans. The costs of postdeployment screening for mental illness in UK veterans

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are considerably higher for those reporting psychiatric comorbidity.[12] However, mental health assessments do not currently include gambling. As a result, little is known about the costs of gambling-related harm in veterans.

The present study sought to assess, for the first time, the social and economic costs of problem gambling among veterans through differences in healthcare usage and social service provision between a sample of UK AF veterans and age-matched and gender-matched non-veterans. Using survey data collected as part of the UK AF Veterans' Health and Gambling Study,[13] we first measured resource use using groups of social costs before conducting cost-consequence analysis (CCA) of problem gambling-related harm.

METHODS

Study design and participants

The UK AF Veterans' Health and Gambling Study is an age-matched and gender-matched cross-sectional online survey of UK citizens no longer serving (veterans) or those who have never served in the military (non-veterans). Participants were recruited primarily online through social media (eg, targeted adverts on Facebook), via recruitment calls circulated by NHS veterans' services, charities and Prolific (an online research participation platform). Veterans and non-veterans were a minimum of 18 years old and not currently serving in the UK AF. Non-veterans were domiciled within the UK, while veterans with a valid service number but had emigrated since leaving the AF were included. Primary outcome measures of relevance to the present study included gambling severity, mental health (eg, anxiety, depression, PTSD) and healthcare utilisation. A total of 5147 responses were received (2535 veterans and 2612 non-veterans); after quality control measures were applied, a final sample of 2185 resulted (n=1037 veterans and n=1148 non-veterans, respectively). Participants provided prior informed consent.

Outcome measures

Sociodemographic characteristics

Respondents were asked their gender, age, ethnicity, marital status, highest qualification, accommodation type and who they lived with. Veterans provided further details about their military service including length of service in years and branch.

Gambling participation and severity

Respondents were asked whether they had participated in one or more of 19 gambling activities within the past year (online supplemental table 1). If participants had gambled, they completed the *Problem Gambling Severity Index* (PGSI).[14] The PGSI comprises nine items measuring potentially problematic gambling. Respondents rated how often in the past year they had experienced a particular behaviour (eg, '*Have you bet more than you could really afford to lose*?'), ranging from '*Never*' (0) to '*Almost Always*' (3). PGSI scores are summed, with 0 indicative of *non-problem gambling*, scores of 1–2 are classified as *low-risk gambling*, scores of 3–7 indicate *moderate-risk gambling* and scores of 8 or above indicate *problem gambling*.

Mental health

For the present study, only three of the relevant mental health variables are described. First, the *Patient Health Questionnaire* (PHQ-9)[15] was used to screen for depression. Second, the *Generalised Anxiety Disorder assessment* (GAD-7)[16] screened for generalised anxiety disorder. Finally, the *International Trauma Questionnaire*,[17] which assessed PTSD and complex PTSD, was also administered. Scores on these three questionnaires were included as covariates in the economic analysis (see below).

Healthcare utilisation and costs analysis

Health and social care utilisation

A version of the *Client Service Receipt Inventory* (CSRI)[18] measured NHS and social service utilisation (eg, whether the participant has accessed their general practice (GP in the last 3 months). Dichotomous yes/no response options were given, along with the number of contacts, and free-text boxes for further clarifying information.

Employment, benefits and debt

Primary components of the CSRI were used to assess employment status, hours worked, length of time in current job, days off sick in the past 12 months, monthly net income, any state benefits (and, if so, the type of benefits) and the number, type and amount of priority and non-priority debts, if any.

Criminal justice contact

Respondents were asked if they had contact with the criminal justice system (eg, with the police) in the past 3 months and whether they had ever been convicted of a criminal offence and, if so, the nature of the offence.

Health-related quality of life

The *European Quality of Life in 5 Dimensions, 5 Level* (EQ-5D-5L)[19] scale assessed perceived quality of life across five domains: mobility, self-care, activities of daily living, pain/discomfort and anxiety/depression. Respondents selected whether they had '*no problems*', '*slight problems*', '*moderate problems*', '*severe problems*', were *unable* to walk/wash or dress oneself/perform usual activities or experienced *extreme pain/discomfort* or were *extremely anxious or depressed*. Utility values were generated from the EQ-5D-5L, using the validated mapping function[20] to existing EQ-5D-3L UK tariffs.

Respondents also indicated their perceived current health on a visual analogue scale ranging from 0 (*the worst health you can imagine*) to 100 (*the best health you can imagine*).

Economic analysis

The analysis compared costs and outcomes for veterans by gambling status (PGSI score). Resource use for the 3-month horizon was grouped by service type and group with mean number of contacts alongside 95% CIs. Unit costs were obtained from published sources (online supplemental table 2).[21–28] For each item, the total cost was calculated by multiplying resource use by the unit costs and summed for each participant. Total costs were calculated from two perspectives: healthcare provider (HCP) and personal social service (PSS) and societal. Total adjusted mean costs and utility, and differences between groups of veterans differing by gambling status, were estimated using seemingly unrelated regressions accounting for the correlation between costs and outcomes. Costs and utilities were adjusted for age group, ethnicity, country of residence, qualifications, relationship status and PHQ-9 and GAD-7 total scores as covariates. Analyses were verified by an independent statistician and conducted using Stata 16.

As the study considered a single timepoint, a CCA was conducted which presents costs alongside a range of outcomes allowing decision makers to form their own opinion on their comparative relevance and importance.[29] Cost-consequence analyses are recommended where an intervention has a range of health and non-health benefits which may be difficult to measure or quantify.[30 31] Although mean EQ-5D-5L utility values were

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Table 1 Sociodemographic characteristics of the veterans' and non-veterans' samples

	Veterans (n=1037)		Non-veterans (n=1148)			
	n	%	n	%	P value	
Gender						
Male	970	93.5	1054	91.8	0.123	0.278
Female	64	6.2	91	7.9	0.111	
Other	3	0.3	3	0.3	0.901	
Age						
18–29	63	6.1	73	6.4	0.788	1.00
30–39	346	33.4	383	33.4	0.986	
40–49	201	19.4	221	19.3	0.929	
50–59	222	21.4	246	21.4	1.00	
60–69	155	15.0	171	14.9	0.966	
70–79	40	3.9	45	3.9	0.943	
80+	9	0.9	9	0.8	0.827	
Country						
England	805	77.6	965	84.1	<0.001‡	<0.001‡
Wales	127	12.2	76	6.6	<0.001‡	
Scotland	67	6.5	84	7.3	0.431	
Northern Ireland	28	2.7	23	2.0	0.282	
Other	10	1.0	0	0.0	0.001‡	
Ethnicity						
White British	960	92.6	1020	88.9	0.003‡	
Other	77	7.4	128	11.1		
Marital status						
Single	103	9.9	243	21.2	<0.001‡	<0.001‡
In a relationship	95	9.2	160	13.9	0.001‡	
Cohabiting	47	4.5	138	12.0	<0.001‡	
Married	510	49.2	440	38.3	<0.001‡	
Married 2nd+	166	16.0	87	7.6	<0.001‡	
Separated	25	2.4	22	1.9	0.426	
Divorced	70	6.8	45	3.9	0.003‡	
Widowed	21	2.0	13	1.1	0.092	
Highest qualification*						
No formal qualification	63	6.1	24	2.1	<0.001‡	<0.001‡
Entry certificate	34	3.3	16	1.4	0.003‡	
GCSE D–G	153	14.8	83	7.2	<0.001‡	
GCSE A*–C	311	30.0	156	13.6	<0.001‡	
AS/A level	153	14.8	199	17.3	0.101	
Certificate of HE	125	12.1	87	7.6	<0.001‡	
Bachelor's degree	116	11.2	355	30.9	<0.001‡	
Master's degree	78	7.5	189	16.5	<0.001‡	
Doctorate	4	0.4	39	3.4	<0.001‡	

p=significance of Pearson's χ^2 test.
*Qualification categories describe qualifications of equivalent level of attainment and may not be the qualification the respondent holds.
†Indicates significance where p<0.05.
‡Indicates significance where p<0.01.

calculated for each arm, data were only available for a single timepoint; therefore, it was not possible to calculate quality-adjusted life years (QALYs).

RESULTS

Sociodemographic characteristics

Table 1 shows the sociodemographic profile for the veterans (n=1037) and non-veterans (n=1148) from the UK AF Veterans' Health and Gambling Study. Most veterans in the sample were male (93.5%), aged 30–29 (33.4%), from England (77.6%), married (49.2%), in paid employment (67.9%) and had achieved at least General Certificate of Secondary Education (GCSE) A*–C qualification (30.0%). Most non-veterans were male (91.8%), aged 30–39 (33.4%), from England (84.1%), married (38.3%), in paid employment (70.6%) and had a Bachelor's degree as their highest earned qualification (30.9%).

Gambling

Table 2 describes the gambling status of the veterans and non-veterans' samples. Most veterans experienced problem gambling (43.1%), whereas most non-veterans had experienced non-problem gambling (67.0%). Veterans were 10.88 times more likely to experience problem gambling than non-veterans (6.5%).

Healthcare resource utilisation

For the primary analysis, complete societal data were available for n=1686 (77.2%) participants. Imputation of missing data was not conducted. Resources used over the 3 months varied between veterans and non-veterans, with veterans generally reporting higher levels of healthcare resource use (Tables 3 and 4). Veterans had a higher number of inpatient admissions (0.08 vs 0.02), outpatient visits (0.59 vs 0.29) and emergency department attendances (0.06 vs 0.03) compared with non-veterans. There was also a greater number of GP visits (0.46 vs 0.16) and other primary care contacts among veterans, along with more contacts with physiotherapists (0.24 vs 0.08), psychologists (0.29 vs 0.04) and counsellors (0.23 vs 0.17). Non-veterans had a higher number of prescribed medications (0.97 vs 0.90). Notably, veterans had more contacts with gambling support (0.09 vs 0.01), substance misuse (0.10 vs 0.01) and alcohol misuse services (0.17 vs 0.01). Contacts with criminal justice services were also higher for veterans (0.12 vs 0.03). Veterans lost a greater number of hours from work (32.7 vs 18.3), received a greater number of benefits (1.08 vs 0.48) and had a higher amount of debt owed (£1375 vs £806).

Cost-consequence analysis

Considering veterans' gambling status (PGSI score), adjusted mean costs were lower for veterans with scores indicating problem gambling (PGSI ≥8) compared with no problem gambling or low-moderate risk of problem gambling (Table 5). A cost difference of £590 (95% CI −£1016 to −£163) was observed between veterans with scores indicating problem gambling and those with no problems (£287 vs £877). Conversely, from a societal perspective, veterans with higher PGSI scores had higher costs; however, differences between veterans without gambling problems and the remaining gambling status groups were not statistically significant. A cost difference of £137 (95% CI: −£659 to £933) was observed between those veterans with scores indicating problem gambling and those with no problems (£2336 vs £2199). Veterans with higher PGSI scores had greater costs associated with benefits received and lost work costs. Utility was higher for veterans with problem gambling behaviours compared with those with no problems (0.84 vs 0.72), with similar differences observed for perceived current health (82.4 vs 72.2) and with an approximate linear relationship by gambling status (Table 5).

DISCUSSION

The present study reports the first investigation of the social and economic costs of gambling-related harm and the costs-consequences of problem gambling among UK AF veterans. We measured healthcare resource utilisation, criminal justice contact and the social costs incurred by veterans and conducted CCA of the costs of these harms in veterans differing by gambling status. Generally, veterans had higher utilisation of healthcare services

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Table 2 Comparison of gambling severity between veterans and non-veterans

	Veterans		Non-veterans				
	n	%	n	%	P value		OR (95% CI)
Gambling severity	949		815				
Non-problem gambling	357	37.7	546	67.0	<0.001*	<0.001†	0.30 (0.25 to 0.36)
Low-risk gambling	80	8.4	125	15.3	<0.001*		0.51 (0.38 to 0.69)
Moderate-risk gambling	102	10.8	91	11.2	0.791		0.96 (0.71 to 1.30)
Problem gambling	408	43.1	53	6.5	<0.001*		10.88 (8.01 to 14.79)

Sample respondent totals reported for each measure. p=significance of Pearson's χ^2 test.
*Indicates significance where p<0.01.
†Indicates significance where p<0.05.

such as inpatient stays, visits to GPs and contact with social workers than non-veterans. Veterans also had greater contact with the police, lost more work hours, were in receipt of more benefits and had amassed larger debts than non-veterans. The CCA revealed that veterans incurred substantially higher HCP/PSS and societal costs than non-veterans, while their adjusted mean costs decreased by gambling status and their utility scores rose as problem gambling severity scores increased.

Veterans are assumed to be reluctant to seek health and social care support,[7] yet these findings suggest our veteran sample was largely treatment-seeking.[32] The differences we found in healthcare resource utilisation and costs between veterans and non-veterans are likely to indicate an imbalance mediated by the impact of military service which is known to be associated with greater physical and mental needs and for which veterans are already likely to be in receipt of support. It is important

Table 3 Total unadjusted mean resource use by veterans and non-veterans

	Veterans		Non-veterans	
Resource use category (unit of measurement)	N	(95% CI)	N	(95% CI)
A&E attendances not resulting in admission (number of attendances)	1037	0.06 (0.04 to 0.07)	1148	0.03 (0.02 to 0.04)
A&E attendances resulting in admission (number of attendances)	1037	0.05 (0.04 to 0.07)	1148	0.02 (0.01 to 0.03)
Inpatient stays (number of stays)	961	0.08 (0.07, 0.10)	1136	0.02 (0.01 to 0.03)
Outpatient appointments (number of appointments)	905	0.59 (0.54 to 0.64)	1080	0.29 (0.26 to 0.32)
Day case attendance (number of attendances)	958	0.16 (0.14 to 0.19)	1135	0.07 (0.05 to 0.08)
GP practice visits (number of visits)	919	0.46 (0.42 to 0.50)	1131	0.16 (0.14 to 0.19)
GP phone calls (number of phone calls)	929	0.57 (0.53 to 0.63)	1129	0.52 (0.48 to 0.56)
GP home visits (number of visits)	938	0.05 (0.04 to 0.07)	1131	0.01 (0.01 to 0.02)
Nurse practice visits (number of visits)	931	0.19 (0.17 to 0.22)	1128	0.22 (0.20 to 0.25)
GP provided clinics (number of visits)	929	0.13 (0.11 to 0.16)	1130	0.05 (0.04 to 0.06)
GP out-of-hours service (number of contacts)	938	0.04 (0.02 to 0.05)	1132	0.02 (0.02 to 0.03)
NHS Direct/111 phone service (number of phone calls)	936	0.17 (0.15 to 0.20)	1131	0.10 (0.08 to 0.12)
Counsellor (number of contacts)	928	0.23 (0.20 to 0.26)	1132	0.17 (0.15 to 0.20)
Physiotherapist (number of contacts)	933	0.24 (0.21 to 0.27)	1132	0.08 (0.06 to 0.10)
Psychologist (number of contacts)	931	0.29 (0.26 to 0.33)	1133	0.04 (0.03 to 0.06)
Charity support (number of contacts)	930	0.26 (0.23 to 0.30)	1133	0.02 (0.01 to 0.03)
Home help/home care worker (number of contacts)	937	0.34 (0.31 to 0.38)	1133	0.56 (0.52 to 0.60)
Social worker (number of contacts)	936	0.17 (0.14 to 0.20)	1132	0.04 (0.03 to 0.05)
Mental health caseworker (number of contacts)	931	0.34 (0.31 to 0.38)	1133	0.01 (0.01 to 0.02)
Self-help group (number of contacts)	933	0.34 (0.30 to 0.38)	1131	0.16 (0.14 to 0.19)
Community day care (number of contacts)	936	0.02 to (0.01 to 0.03)	1133	0.00 (0.00 to 0.01)
Community mental health centre (number of contacts)	935	0.06 (0.04 to 0.08)	1133	0.02 (0.02 to 0.04)
Other community care† (number of contacts)	913	1.80 (1.72 to 1.89)	1128	0.52 (0.48 to 0.56)
Gambling support (number of contacts)	933	0.09 (0.08 to 0.12)	1133	0.01 (0.01 to 0.02)
Alcohol misuse service (number of contacts)	937	0.17 (0.15 to 0.20)	1133	0.01 (0.00 to 0.02)
Substance misuse service (number of contacts)	937	0.10 (0.08 to 0.13)	1133	0.01 (0.00 to 0.01)
Prescribed medications (number of medications)*	943	0.90 (0.84 to 0.96)	1133	0.97 (0.91 to 1.03)
Total cost of medications (£)	922	50.04 (20.32 to 79.76)	1128	53.78 (20.32 to 79.76)
Total cost of medications excluding high-cost patients (>£1000 medication costs)	914	17.14 (13.50 to 20.79)	1108	16.19 (13.02 to 19.35)

*Details of over-the-counter medications were not collected. Any over-the-counter medications reported by participants were excluded from analysis.
†Other community care includes walk-in health service/minor injury unit visits, district nurse home visits, community nurse contacts, health visitor home visits, occupational therapist visits, speech therapist visits, other therapist visits, complementary medicine visits and community support visits.
GP, general practice.

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Table 4 Criminal justice contacts and social costs (unadjusted mean resource use) for veterans and non-veterans

	Veterans		Non-veterans	
Resource use category (unit of measurement)	**N**	**95% CI**	**N**	**95% CI**
Criminal justice				
Any contact with police (number of contacts)	912	0.12 (0.09 to 0.14)	1126	0.03 (0.02 to 0.03)
Overnight stays in police cell or prison (number of stays)	912	0.02 (0.01 to 0.04)	1126	0 (0.00 to 0.00)
Psychiatric assessments in custody (number of assessments)	917	0.02 (0.01 to 0.03)	1125	0 (0.00 to 0.00)
Criminal court appearances (number of appearances)	914	0.02 (0.01 to 0.03)	1126	0.00 (0.00 to 0.01)
Civil court appearances (number of appearances)	917	0.05 (0.04 to 0.07)	1126	0.01 (0.00 to 0.02)
Any probation service contacts (number of contacts)	914	0.14 (0.11 to 0.16)	1126	0.01 (0.01 to 0.02)
Community sentences served (number of sentences served)	915	0.02 (0.01 to 0.04)	1126	0.01 (0.00 to 0.02)
Social costs				
Debt (amount owed (£))	658	11 574.17 (10 400.48 to 12 747.85)	630	8907.10 (7415.82 to 10 398.38)
Lost work hours (number of hours)	1010	32.69 (26.42 to 38.96)	1120	18.34 (14.82 to 21.87)
Benefits received (number of benefits)	1029	1.08 (0.97 to 1.19)	1153	0.48 (0.41 to 0.54)
Total cost of benefits received (£)	1029	1374.54 (1226.36 to 1522.72)	1153	805.66 (693.49 to 917.83)

therefore to better understand the needs of treatment-seeking UK veterans and our findings suggest that gambling and related health-harming behaviour warrant further investigation.

The present analysis has several strengths. First, it extends existing health-economic analysis to dimensional categories of gambling status (PGSI score) over just problem gambling with veterans known to be at heightened risk of gambling harm. By so doing, it provides a fuller picture of the range of health-harming behaviours caused by gambling in veterans and the costs incurred. Second, our analysis was drawn from a large online sample of possibly self-selected, and help-seeking, veterans and a comparison group of age-matched and gender-matched non-veterans from across the UK. As such, the results may be considered at least partially representative of the national veteran community and are consistent with international evidence from similar treatment-seeking samples in the USA, Canada and Australia. Further replication and extension with other samples is, however, needed. Third, the analysis provides a detailed demographic breakdown of this sample drawn from the UK AF veterans population. Finally, while noteworthy, the cost estimates are likely to be conservative as data were partially collected during the COVID-19 pandemic and could be higher as restrictions are eased and the demands for healthcare support increase.[33]

Our findings support an economic case for screening for gambling-related harm among UK AF veterans. The costs of routine postdeployment and end of service screening are relatively low.[12] However, while costs may increase for those identified with mental health conditions, there is an obvious trade-off in the costs saved from future healthcare resource use as well as criminal justice contact and accrued debt. Notwithstanding the absence of standardised screening tools for problem gambling

Table 5 Cost-consequences (costs, utility and perceived current health) for veterans by gambling status (95% CI)

					Costs	Utility	Health
	N	**Costs (£)**	**Utility**	**Health**	**Difference (£)**	**Difference**	**Difference**
Healthcare provider/personal social service costs*							
Non-problem gambling (PGSI 0)	215	876.62 (603.61 to 1149.64)	0.72 (0.69 to 0.74)	72.22 (70.03 to 74.41)			
Low-risk gambling (PGSI 1–2)	51	601.07 (100.72 to 1101.42)	0.75 (0.70 to 0.79)	76.60 (72.59 to 80.61)	−275.55 (−829.51 to 278.42)	0.03 (−0.02 to 0.08)	4.38 (−0.07 to 8.82)
Moderate-risk gambling (PGSI 3–7)	73	457.44 (40.80 to 874.07)	0.80 (0.76 to 0.84)	73.22 (69.88 to 76.56)	−419.19 (−916.94 to 78.57)	0.08 (0.03 to 0.12)	1.00 (−3.00 to 4.99)
Problem gambling (PGSI ≥8)	249	286.79 (26.85 to 546.74)	0.84 (0.82 to 0.87)	82.39 (80.30 to 84.47)	−589.83 (−1016.31 to −163.34)	0.12 (0.09 to 0.16)	10.17 (6.74 to 13.59)
Societal costs*							
Non-problem gambling (PGSI 0)	213	2199.04 (1692.04 to 2706.05)	0.72 (0.70 to 0.75)	72.39 (70.20 to 74.59)			
Low-risk gambling (PGSI 1–2)	48	2143.62 (1196.89 to 3090.36)	0.75 (0.70 to 0.79)	76.14 (72.04 to 80.24)	−55.42 (−1098.66 to 987.82)	0.02 (−0.03 to 0.08)	3.74 (−0.77 to 8.26)
Moderate-risk gambling (PGSI 3–7)	71	2328.76 (1548.97 to 3108.55)	0.80 (0.76 to 0.84)	72.58 (69.21 to 75.96)	129.72 (−800.04 to 1059.48)	0.08 (0.03 to 0.13)	0.19 (−3.84 to 4.22)
Problem gambling (PGSI ≥8)	243	2335.72 (1849.15 to 2822.29)	0.85 (0.82 to 0.87)	82.91 (80.80 to 85.02)	136.68 (−659.41 to 932.76)	0.13 (0.09 to 0.16)	10.52 (7.07 to 13.96)

*Difference in adjusted means estimated using a seemingly unrelated regression model with age group, ethnicity, country of residence, qualifications, relationship status, PTSD status, armed forces branch and PHQ-9 and GAD-7 total scores as covariates.
GAD-7, Generalised Anxiety Disorder assessment; PGSI, Problem Gambling Severity Index; PHQ, Patient Health Questionnaire; PTSD, post-traumatic stress disorder.

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risk in the military, our findings indicate that engaging all healthcare professionals working with veterans as part of support for other, comorbid difficulties such as mental health problems and alcohol and substance use is needed to better understand the trajectory of gambling-related harms.[6 34]

The economic analysis is subject to limitations. First, data were collected at a single timepoint making it impossible to calculate QALYs. Second, the analysis is predominantly descriptive due to limitations on the available data. An incremental cost-utility analysis would provide further insight regarding the benefit of interventions targeted at veterans. Third, greater healthcare costs for veterans are likely to indicate exposure to greater physical and mental problems for this group. Future economic studies within these populations (eg, in non-help-seeking veterans) should seek to collect baseline costs to control for these differences. Fourth, further research should seek to incorporate standardised health and well-being measures such as the Short-Form Health Survey[35] in addition to gambling-specific outcomes and social costing. Finally, our findings cannot infer causality (ie, whether the outcomes measured were the result of gambling or the other way around) and, to that extent, are merely statements of association or predictability.

In conclusion, cost-consequences analysis showed that UK AF veterans have higher healthcare, social service and societal costs and have lower utility. Veterans have greater contacts with criminal justice services, receive more social service benefits and have more lost work hours. From a societal perspective, veterans with problems gambling are more costly but experience no reduction in quality of life.

Acknowledgements We thank the UK Armed Forces charities and veterans' networks for their keen support of this research.

Contributors SH, RP, CA, MF, LH, NK, JL, RR and SD designed the study. SH, RP, GD and KW collected the data and conducted the statistical analysis. SH, GD and SD completed the first draft of the manuscript and all authors contributed to and approved the final manuscript.

Funding This work was supported by a grant from Forces in Mind Trust (FiMT17/0510S).

Competing interests None declared.

Patient consent for publication Consent obtained directly from patient(s).

Ethics approval The study was approved by Wales NHS Research Ethics Committee 6 (REC reference 19/WA/0134).

Provenance and peer review Not commissioned; externally peer reviewed.

No data are available.

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