Hospital admissions for self harm after discharge from psychiatric inpatient care: cohort study

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ABSTRACT

Objective To determine the risk of non-fatal self harm in the 12 months after discharge from psychiatric inpatient care.

Design Cohort study based on national hospital episode statistics.

Setting England.

Population Patients aged 16-64 years discharged from psychiatric inpatient care between 1 April 2004 and 31 March 2005 and followed up for one year.

Results 75 401 people were discharged from psychiatric inpatient care over the study period, 4935 (6.5%) of whom were admitted at least once for self harm in the following 12 months. Risk of self harm was greatest in the four weeks after discharge; one third (32%, n=1578) of admissions for self harm occurred in this period. The strongest risk factor for self harm after discharge was admission for self harm in the previous 12 months (hazard ratio 4.9, 95% confidence interval 4.6 to 5.2). The risk of self harm was also higher in females, younger people, those with diagnoses of depression, personality disorders, and substance misuse, and those with short lengths of stay.

Conclusion More than 6% of patients discharged from psychiatric inpatient care are readmitted for an episode of self harm within 12 months, with one third of these episodes occurring in the month after discharge. Self harm after discharge from hospital shares many of the features of suicide after discharge. Interventions should be developed to reduce risk in this period.

INTRODUCTION

The risk of suicide in the four weeks after psychiatric inpatient care is around 100 times greater than that for the general population.¹⁻³ This risk declines rapidly over subsequent weeks.^{1,4} Data from the National Confidential Inquiry into Suicide and Homicide by Psychiatric Patients (1996-2000) in England and Wales indicate that people who die within three months of discharge from psychiatric inpatient care account for about 5% (1100/20 927) of all suicides. Although the high risk of suicide in the period shortly after discharge is well documented, less is known about the rates of

non-fatal self harm at this time. A study of 954 patients discharged from an adult psychiatric unit in the United States found that over 20% self harmed in the 12 months after discharge but that the risk remained constant throughout the follow-up period.⁵

In view of the overlap in the epidemiology of fatal and non-fatal self harm, a greater understanding of the incidence and characteristics of non-fatal self harm after discharge from psychiatric inpatient care may provide information relevant to the prevention of suicides after discharge. Furthermore, such information should provide an indication of the level of morbidity around the time of hospital discharge.

Using hospital episode statistics (HES) data for England we investigated the incidence and timing of self harm in the 12 months after discharge from psychiatric inpatient care.

METHODS

Hospital episode statistics data for England contain records for all National Health Service patients admitted to NHS hospitals in each financial year (1 April to 31 March). Admissions to private hospitals are not included in the dataset.

From the full set of records for the index year 2004-5 (n=14 546 126), we selected all patients (n=75 401) aged 16-64 years who had been discharged from hospital after an episode of care under a psychiatric specialist (hospital episode statistics main specialty code 710; mental illness) on at least one occasion. This code excludes the relatively small number of patients admitted under the following psychiatric specialties: learning disability (code 700; n=2633), child and adolescent psychiatry (711; n=494), forensic psychiatry (712; n=607), and psychotherapy (713; n=116). We excluded admissions under these specialty codes because the focus of our study was on patients admitted to general adult psychiatry inpatient beds, where processes of care, diagnostic profiles, and, possibly, risk factors for self harm, differ from those admitted to these specialties.

To identify previous and subsequent admissions for the same patient we created unique patient identifiers.

Timing of admissions for self harm in year after discharge from inpatient psychiatric care

These were derived from the patient's NHS number, postcode, date of birth, and sex, and enabled us to track individual patients within any year and in subsequent years. Using the patient identifier, and based on the first episode of admission to hospital for each patient, we searched the hospital episodes statistics databases for 2004-5 and 2005-6 to identify readmissions within one year of discharge, and for 2003-4 to identify previous admissions for self harm or admissions to a psychiatric hospital. To ensure that we excluded patient transfers we removed from the analysis any readmission occurring on the same day as the discharge date.

We used Office for National Statistics population estimates for 2004, extrapolated from the 2001 census, as the denominators in our rate estimates.

Diagnostic codes

We grouped the codes (international classification of diseases, 10th revision) for the main diagnosis underlying the psychiatric admission as follows: organic disorders (F00-F09), substance misuse (F10-F19), schizophrenia and related psychoses (F20-F29), mania (F30-F31), depression and anxiety (F32-F49), eating disorders (F50), and other (F51-F69, F99). The category for other comprised behavioural syndromes associated with physiological disturbances and physical factors (F50-F59), disorders of adult personality and behaviour (F60-F69), and unspecified diagnoses (F99).

We used the following ICD-10 diagnosis codes to identify readmissions for self harm: intentional self harm (X60-X84), event of undetermined intent (Y10-Y34), and accidental poisoning by exposure to noxious substances (X40-X49). We included episodes coded as X40-X49 because the sociodemographic characteristics of people with these diagnoses were similar to those for people admitted after intentional self harm and poisoning of undetermined intent in the 16-64 year age group. Although data coders in different hospitals are likely to vary in the proportion of cases of self harm coded as "intentional" and of "undetermined intent," in part because the level of intent is often difficult to determine, these two codes are usually combined in epidemiological studies of suicide to identify all cases of self inflicted injury.

Data management

Duplicate records were identified and removed from the data extracts by matching on several fields, including NHS number, date of birth, sex, post code, place of admission, admission data, and date of discharge.

Analysis

We used Cox proportional hazards regression models to investigate the associations of age (four categories 16-24, 25-34, 35-44, and 45-64), sex, diagnosis (eight categories), and psychiatric admission or admissions for self harm in the 12 months preceding the index admission to a psychiatric hospital with the risk of being readmitted with self harm in the year after discharge. If patients were readmitted to a psychiatric hospital during the follow-up period we censored their data at the date of readmission. Thus, if readmission for a psychiatric disorder preceded readmission for self harm during follow-up, we excluded this episode of self harm from the analysis as it was likely to be related to the subsequent episode of psychiatric care. All records were censored after 52 weeks' follow-up. We fitted appropriate interaction terms to investigate whether risk of self harm in relation to diagnosis differed between men and women. We also investigated whether the length of stay differed between those who did or did not self harm. The proportional hazards assumption was tested graphically.

As length of stay was highly positively skewed we compared median length of stay for each diagnostic group and used Wilcoxon's rank sum test to compare the lengths of stay of patients who were and were not admitted to hospital for self harm in the 12 months after discharge from psychiatric inpatient care. To assess whether any such associations were confounded by differences in age and sex between those who did and did not self harm we used log transformed length of stay as the outcome variable in a linear regression analysis to assess the effect of controlling for both these factors in models. All analyses were carried out using Stata version 10.

RESULTS

Between 1 April 2004 and 31 March 2005, 75 401 patients (40 751 (54%) males) were discharged from psychiatric inpatient care in England. Table 1 gives the sociodemographic and diagnostic categorisation of these patients. Overall, 11.7% (8837/75 401) of these patients had been admitted to hospital for self harm in the 12 months before their index psychiatric admission. The overall person based psychiatric discharge rate for England was 187 per 100 000 per year; rates were highest in males aged 25-34 years (336 per 100 000) and lowest in females aged 16-24 years (141 per 100 000).

Overall, 18 650 (24.7%) of those discharged from psychiatric care were readmitted to a psychiatric bed in the 12 months after discharge and 4935 (6.5%) people were readmitted to a general hospital or psychiatric bed for self harm. Sixteen (0.3%) of the patients who were

readmitted after self harm died. The risk of readmission for self harm among patients discharged from psychiatric inpatient care was higher in females than in males (8.0% (2765/34 650) *v* 5.3% (2170/40 751); χ^2 216 (df=1); $P<0.001$). More than one third of those who self harmed after discharge (38.5%, 1900/4935) had been admitted to hospital for self harm in the 12 months before their index admission to psychiatric care.

Admissions for self harm in the 12 months after discharge comprised about 7% (4935/72 251) of all admissions for self harm in England between April 2004 and March 2005.

Timing of self harm episodes

Risk of self harm diminished rapidly in the weeks after discharge. One third (32.0%; 1578/4935) of admissions for self harm occurred in the four weeks after discharge, with 585 (11.9%) occurring within seven days of discharge; 2826 (57.3%) occurred within 12 weeks (figure).

Risk factors for self harm after psychiatric inpatient care

Table 1 shows the characteristics of the people who were admitted for self harm after discharge from hospital. Although 1671 (33.9%) patients admitted for self harm had a primary diagnosis of depression or anxiety, such patients comprised only 23.7% (n=17 905) of those discharged from hospital. In contrast, only 483 (9.8%) patients admitted for self harm had a diagnosis of schizophrenia and related psychoses at discharge, whereas this was the commonest diagnosis at discharge from psychiatric care (n=18 513, 24.6% of discharges).

In total, 688 (85.9%) of the 801 patients coded as having an “other” diagnosis who self harmed had

personality disorder as their primary diagnosis—the most commonly occurring diagnosis among these patients was emotionally unstable personality disorder (code F60.3; n=481).

Table 2 shows the associations of sex, age, diagnosis, recent admission to hospital for psychiatric care (past 12 months), and recent admissions for self harm (past 12 months) with the risk of self harm in the 12 months after discharge from psychiatric care. In fully adjusted models, risks were 40% higher in females than in males and declined with increasing age—the risk of self harm after discharge was 32% (95% confidence interval 25% to 38%) lower in those aged 45–64 years than in those aged 16–24 years. The strongest risk factor for self harm after discharge was an admission for self harm in the previous 12 months (hazard ratio 4.85, 95% confidence interval 4.57 to 5.16). The greatest risks with specific diagnostic groups was for “other” diagnoses, mainly personality disorder (hazard ratio 3.71), depression and anxiety (2.69), and substance misuse (2.64). The apparent protective effect in univariable models of previous psychiatric admission (hazard ratio 0.71, 0.65 to 0.78) was because a disproportionate number of those with a psychiatric history had diagnoses of schizophrenia or psychosis (38%) and this group is at reduced risk of self harm. This effect was reversed (1.25, 1.14 to 1.37) in the multivariable models controlling for a history of self harm.

There was some evidence that the risk of self harm after discharge in relation to particular diagnoses was stronger in females than in males (P for interaction 0.038). For example, the hazard ratios for the risk of self harm among those with a discharge diagnosis of depression were 2.4 in males and 3.0 in females and

Table 1 Sociodemographic and diagnostic characteristics of 16–64 year olds discharged from inpatient psychiatric care in England and proportion readmitted for self harm within 12 months after discharge, 2004–5

Risk factor	Males		Females		Total No discharged (n=75 401)	No (%) of total readmitted for self harm (n=4935)
	No discharged (n=40 751)	No (%) readmitted for self harm (n=2170)	No discharged (n=34 650)	No (%) readmitted for self harm (n=2765)		
Age group (years):						
16-24	6148	366 (5.8)	4001	456 (11.4)	10 149	822 (8.1)
25-34	11 288	673 (6.0)	7897	749 (9.5)	19 185	1422 (7.4)
35-44	11 913	637 (5.3)	10 350	867 (8.4)	22 263	1504 (6.8)
45-64	11 402	494 (4.3)	12 402	693 (5.6)	23 804	1187 (5.0)
Psychiatric diagnosis:						
Organic disorders (F00-F09)	353	13 (3.7)	208	4 (1.9)	561	17 (3.0)
Substance misuse (F10-F19)	8949	593 (6.6)	3999	375 (9.4)	12 948	968 (7.5)
Schizophrenia and related psychoses (F20-F29)	11 554	288 (2.5)	6959	195 (2.8)	18 513	483 (2.6)
Mania (F30, F31)	3152	82 (2.6)	4503	160 (3.6)	7655	242 (3.2)
Depression and anxiety (F32-F49)	7842	623 (7.9)	10 063	1048 (10.4)	17 905	1671 (9.3)
Eating disorders (F50)	37	2 (5.4)	432	27 (6.3)	469	29 (6.2)
Other (F51-F69, F99)	2587	259 (10.0)	3501	542 (15.5)	6088	801 (13.1)
None of above codes	6277	310 (4.9)	4985	414 (8.3)	11 262	724 (6.4)
Psychiatric admission in year before index admission	6602	234 (3.5)	5225	304 (5.8)	11 827	538 (4.6)
Admission for self harm in year before index admission	3979	751 (18.9)	4858	1149 (23.7)	8837	1902 (21.5)

for “other” diagnoses were 3.3 in males and 4.2 in females.

Length of stay

Patients who self harmed tended to have shorter lengths of hospital stay than those who did not self harm across all diagnostic groups (table 3). In linear regression models with log length of stay as the outcome and controlling for age and sex, differences were little changed between those who did and those who did not self harm. Controlling for length of stay in the models investigating factors associated with risk of self harm after discharge did not greatly alter the associations reported in table 2. After controlling for length of stay, the hazard ratio for the risk associated with previous self harm was 4.79 (95% confidence interval 4.51 to 5.09), with other disorders was 3.35 (2.98 to 3.76), with depression and anxiety was 2.42 (2.17 to 2.68), and with substance misuse was 2.28 (2.04 to 2.56).

DISCUSSION

At least 6% of people discharged from psychiatric inpatient care in England self harm within 12 months. The actual figure is likely to be higher than this as less than half of all episodes of self harm in England result in admission to hospital.⁶ One third of these episodes occurred in the month after discharge. A higher proportion of females than males were readmitted with self harm (8.0% *v* 5.3%), and the risk was greatest among people with depression, anxiety, personality

disorder, or substance use disorder and lowest among those with schizophrenia and related psychoses. An admission for self harm in the 12 months before the index psychiatric admission was the strongest risk factor for self harm after discharge (hazard ratio 4.85); one third of people admitted for self harm after hospital discharge had been admitted with self harm in the preceding 12 months.

Strengths and limitations

This is a large study based on NHS hospital discharge data for the whole of England. The hospital episodes statistics database includes information on a patient's NHS number and date of birth, which enable re-admissions to be identified. Discharge diagnoses coded according to the international classification of diseases (10th revision) for all discharges from hospital allowed us to estimate the risks of self harm for the main psychiatric diagnoses.

Our study has four main limitations. Firstly, as we were only able to identify episodes of self harm leading to hospital admission we will have underestimated the magnitude of the problem. If the likelihood of admission after presentation to hospital with self harm differs by age, sex, and diagnosis then this will bias our risk estimates. However, our results are likely to reflect the more medically serious episodes of self harm that lead to admission. With changes in the hospital management of self harm—for example, the growth in the number of short stay non-admission units linked to accident and emergency departments—it is

Table 2 Associations of sex, age, and psychiatric diagnosis with risk of self harm after discharge from inpatient psychiatric care

Risk factor	No in sample	Hazard ratio (95% CI)	P value	Adjusted hazard ratio* (95% CI)	P value
Sex:					
Male	40 751	1.00		1.00	
Female	34 650	1.57 (1.49 to 1.66)	P<0.001	1.40 (1.33 to 1.49)	P<0.001
Age group (years):					
16-24	10 149	1.00		1.00	
25-34	19 185	0.91 (0.84 to 1.00)		0.96 (0.88 to 1.04)	
35-44	22 263	0.85 (0.78 to 0.92)		0.86 (0.79 to 0.93)	
45-64	23 804	0.63 (0.58 to 0.69)	P<0.001	0.68 (0.62 to 0.75)	P<0.001
Diagnosis:					
Organic disorders (F00-F09)	561	1.26 (0.78 to 2.04)		1.47 (0.90 to 2.38)	
Substance misuse (F10-F19)	12 948	3.00 (2.69 to 3.34)		2.64 (2.37 to 2.95)	
Schizophrenia and related psychoses (F20-29)	18 513	1.00		1.00	
Mania (F30, F31)	7655	1.23 (1.06 to 1.44)		1.17 (1.00 to 1.37)	
Depression and anxiety (F32-F49)	17 905	3.74 (3.38 to 4.14)		2.69 (2.42 to 2.98)	
Eating disorders (F50)	469	2.54 (1.74 to 3.69)		1.74 (1.19 to 2.53)	
Other (F51-F69, F99)	6088	5.75 (5.14 to 6.44)		3.71 (3.31 to 4.17)	
None of above codes	11 262	2.53 (2.26 to 2.84)	P<0.001	2.16 (1.92 to 2.43)	P<0.001
Psychiatric admission in year before index admission:					
No	63 574	1.00		1.00	
Yes	11 827	0.71 (0.65 to 0.78)	P<0.001	1.25 (1.14 to 1.37)	P<0.001
Admission for self harm in year before index admission:					
No	66 564	1.00		1.00	
Yes	8837	5.94 (5.61 to 6.29)	P<0.001	4.85 (4.57 to 5.16)	P<0.001

*Controlling for all variables in table.

likely that admission for self harm will be further underestimated by the hospital episodes statistics database in the future. Secondly, data in the database are collected for administrative reasons rather than for research purposes and it is likely that some patients admitted with self harm will have been miscoded; previous research indicates that the reliability of routine hospital admission data for studies such as ours is reasonable.⁷ Thirdly, for practical reasons the range of sociodemographic data recorded on the database is relatively sparse—for example, information on occupation or marital status is lacking. Furthermore, although information on ethnicity is recorded, a considerable number of data are missing for this field, limiting analyses using this variable. Lastly, we did not examine comorbidity, which is likely to be strongly associated with risk of self harm and repetition after discharge, nor were we able to investigate the effect of aftercare following discharge from psychiatric care on risk of self harm.

Findings in relation to other studies

To the best of our knowledge only one previous study has examined the risk of non-fatal self harm among adults discharged from psychiatric inpatient care,⁵ based on interviews with 954 patients in the United States. The researchers found that the risk of attempted suicide was higher in females than in males. The greater overall risk of self harm in that study⁵ compared with our finding (22.8% *v* 6.4%) was most likely because information on suicidal behaviour was collected by face to face interview; thus episodes not leading to hospital admission were identified. In keeping with our findings, the greatest risks of self harm after discharge in the US based study were in people with personality disorder—the hazard ratios greater than 3.0 in this group compared with people who had bipolar disorder; people with depression had the second highest risks and those with schizophrenia had the lowest risk.⁵ In contrast with our findings, however, no increase in risk was found in the first few weeks after discharge compared with later weeks. This may be because the authors relied on information from face to face interviews and because response rates at the first

follow-up interview were only 74%. People who had self harmed shortly after discharge may well have been under-represented.

Two studies have investigated the risk of self harm among adolescents discharged from psychiatric hospital.^{8,9} Both studies found that the risk was highest in the first few months after discharge, with risks of self reported self harm of 12-20% in the year after discharge. It is likely that these higher risks are due to both the increased incidence of self harm among young people and the use of self report data, rather than our reliance on identifying people admitted to hospital.

Our findings of the high incidence of self harm in the month after hospital discharge are in keeping with those for suicide from other UK studies.^{1,2,4} In the most recent analysis of data from the national confidential inquiry 32% of suicides in the three months after discharge occurred in the first two weeks⁴; in our study the equivalent figure for self harm was 35% (1028/2941). Similarly, in studies of suicide after discharge from a psychiatric hospital and our study of self harm after discharge, rates among people with psychoses were low compared with those for depression in studies carried out in England¹ and Scotland.² In contrast with our analysis, however, these two studies found a relatively low risk of suicide in people discharged after an admission for alcohol misuse.^{1,2}

Studies based on reviews of psychiatric case notes have identified several other predictors of suicide after discharge. These include a history of self harm, difficulties with relationships, living alone, being of non-white ethnicity, changing consultants, losing a job, hopelessness, unplanned discharge, and significant care professionals going on leave.¹⁰ Use of non-prescribed substances was a protective factor.¹⁰ Studies of adolescents discharged from psychiatric units confirm the importance of a previous episode of self harm as a risk factor for repeat self harm.⁹

Clinical implications

The prevention of suicide is a national priority in England¹¹ and internationally.¹² About 5% of deaths from suicide in England and Wales occur within three months of discharge. Our analysis shows that non-fatal

Table 3 | Length of hospital stay for patients readmitted for self harm after discharge from inpatient care for various psychiatric diagnoses compared with patients who did not self harm

Diagnosis	Median (interquartile range) length of stay (days)		P value for difference*
	Patients who self harmed	Patients who did not self harm	
Organic disorders (F00-F09)	18 (8 to 40)	22 (8 to 8)	0.44
Substance misuse (F10-F19)	9 (4 to 16)	10 (5 to 18)	0.0014
Schizophrenia and related psychoses (F20-29)	20 (7 to 50)	30 (12 to 70)	<0.001
Mania (F30, F31)	20.5 (9 to 44)	29 (13 to 54)	0.0003
Depression and anxiety (F32-F49)	12 (4 to 27)	14 (5 to 33)	<0.001
Eating disorders (F50)	16 (4 to 48)	48 (16 to 111)	0.0029
Other (F51-F69, F99)	8 (3 to 20)	11 (4 to 29)	<0.001
None of above codes	7 (3 to 21)	12 (4 to 33)	<0.001

*From Wilcoxon's rank sum test.

WHAT IS ALREADY KNOWN ON THIS TOPIC

The risk of suicide in the month after discharge from psychiatric care is about 100 times greater than that for the general population

The incidence of non-fatal self-harm and risk factors for self harm shortly after discharge are unknown

WHAT THIS STUDY ADDS

More than 6% of patients discharged from psychiatric inpatient care were readmitted for self harm in the following year, with a third of readmissions occurring within one month of discharge

The strongest risk factor for self harm was admission for self harm in the year before psychiatric admission

The risk of self harm was higher in females than in males and declined with increasing age and length of hospital stay and was greatest in people with diagnoses of personality disorder, depression, and substance misuse

self harm after discharge is even more common and may occur in over 10% of patients after discharge, and the risk is greatest in the first month. This indicates both the stresses faced by patients after discharge and the large burden on healthcare services of self harm after discharge. Our findings suggest that those patients who have self harmed previously are at the greatest risk of self harm after discharge. Other groups at increased risk include females, young people, and those with diagnoses of depression, personality disorder, and substance misuse, as well as people with short lengths of stay. These factors could perhaps assist in identifying patients that might be targeted for extra support.

Explanations for the increased risk after discharge include the perceived loss of support or supervision in the hospital environment, renewed exposure to difficulties in the home environment that may have prompted admission, and breaks in the continuity of care or treatment that may occur without the supervision provided by hospital staff.¹⁴ Further investigation of the key contributors to increased risk at this time is required. Persisting psychiatric disorder and personality disorder are other likely contributors. Approaches to reducing self harm after discharge might therefore include provision of support in the early weeks, good communication, closer integration between hospital and community mental health services, and early follow-up of patients.¹³

Patients with short lengths of stay seemed to be most vulnerable to episodes of self harm. There are several possible explanations for this observation. Firstly, patients discharged earlier in the trajectory of an acute episode of illness may be at increased risk compared with those discharged later as the risk of suicide declines after successful treatment. Secondly, patients who are at increased risk of self harm may self discharge from hospital before assessments and treatment have been completed. Thirdly, some patients with relatively short lengths of stay could have been discharged early from hospital owing to pressures on beds; such patients may have less coherent follow-up procedures in place in the community. Finally, patients

discharged earlier may have different psychiatric and psychological characteristics from those with longer stays.

Our findings suggest there might be opportunities to develop interventions for the reduction of rates of suicide and self harm after discharge. Some evidence from the United States shows that regular letter based contacts with patients in the years after discharge may reduce the risk of suicide.^{14 15} A challenge with replicating such studies is the large sample size required to detect an impact of interventions on suicide. A randomised trial powered to detect a 15% reduction in suicide rates among patients in the year after discharge from a psychiatric hospital would require the inclusion of 142 000 patients,¹⁶ and this would necessitate the cooperation of all hospitals in England. Our analysis indicates that the epidemiology of non-fatal self harm after discharge follows that for suicide, therefore self harm may be a reasonable proxy outcome for a trial. Based on our data indicating that 6% of patients are admitted to hospital after self harm in the year after discharge from psychiatric inpatient care and an estimated 12% (n=10 000) present to emergency departments with self harm, the sample sizes required to detect a 15% reduction in episodes of non-fatal self harm in the year after discharge would be about 9800 patients. Sample sizes would need to be larger (n=20 800) if only inpatient admissions for self harm were used as the outcome measure. Such studies are clearly feasible: over the period of our analysis 75 000 patients were discharged from psychiatric inpatient care among people aged 16-64 years and so only around 10-20% of UK hospitals would need to be included in the study, an aspiration now made possible by the national Mental Health Research Network (www.mhrn.info/dnn/).

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Contributors: DG had the idea for the study, designed the analysis plan, analysed the data, and wrote the first draft of the paper. NK, KH, and JE helped develop the analysis plan, interpreted the analysis, and contributed to writing the paper. DH extracted the data and drafted the methods section of the paper. SO'C, JP, and JD interpreted the findings and contributed to the writing of the paper. All authors have seen and approved the final version of the manuscript. DG is guarantor.

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