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Unmasking mental health symptoms in female professional football players: a 12-month follow-up study

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ABSTRACT

Objective To calculate the prevalence rates of mental health symptoms among female professional football players over a 12-month period and to explore the associations of severe injury and related surgery with mental health symptoms among female professional footballers.

Methods An observational prospective cohort study was conducted over a 12-month follow-up period by distributing an electronic questionnaire three times. The questionnaire was based on validated screening tools for assessing mental health symptoms.

Results A total of 74 female professional football players participated in this study. Mental health symptoms ranged from 1% for substance misuse to 65% for sport-psychological distress at baseline, from 6% for anxiety to 53% for sport-psychological distress 6 months postbaseline and from 3% for substance misuse to 55% for sport-psychological distress 12 months postbaseline. The prevalence of disordered eating remained between 15% and 20% over the 12-month period. Only one of the associations was statistically significant. Female professional football players were nearly twice as likely to report sport-related psychological distress following every surgery.

Conclusions The substantial prevalence of mental health symptoms among female professional football players emphasises the need for increased attention, awareness and interventions. Additionally, female professional football players are nearly twice as likely to report sport-related psychological distress after each surgery. Sports medicine physicians and mental health professionals working in female football should provide standard care, which involves identifying, monitoring and implementing tailored interventions for mental health symptoms.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Mental health symptoms are increasingly under scrutiny in professional football.
⇒ In women's football, empirical studies are scarce, showing a prevalence of mental health symptoms ranging from 13% for depression to 63% for sport-related distress.
⇒ Potential stressors such as severe injuries and adverse life events may induce the occurrence of mental health symptoms in male professional football players.

WHAT THIS STUDY ADDS

⇒ The prevalence of mental health symptoms among female professional football players ranged from 1% for substance misuse to 65% for sport-psychological distress at baseline, from 6% for anxiety to 53% for sport-psychological distress 6 months postbaseline and from 3% for substance misuse to 55% for sport-psychological distress 12 months postbaseline.
⇒ The prevalence of disordered eating among female professional football players remained between 15% and 20% over the 12-month period.
⇒ Female professional football players are nearly twice as likely to report sport-related psychological distress after each surgery.

INTRODUCTION

Women's football is experiencing an exhilarating period, marked by a rise in global popularity and positive media coverage.[1] Despite an increase in female football players, and the number of professional competitions, health research in women's football is still limited with the historical focus on men's football.[1 2] Further, mental health symptoms are increasingly under scrutiny in professional football. It refers to adverse/abnormal thoughts, feelings and/or behaviours, that may be significant but do not occur in a pattern meeting specific diagnostic criteria and do not necessarily cause significant distress or functional impairment.[3 4] In men's professional football, recent cross-sectional studies showed that the prevalence of mental health symptoms ranged from 10% for distress to 19% for adverse alcohol use and 38% for anxiety/depression.[5 6] These studies showed that potential stressors such as severe injuries and adverse life events may induce the occurrence of mental health symptoms in male professional football players.[5 6] In women's football, empirical studies are scarce,

showing a prevalence of mental health symptoms ranging from 13% for depression to 44% for alcohol misuse and 63% for sport-related distress.[7–9] Recently, the need for scientific research related to female players' physical and mental health was an outcome of a survey held among almost 1000 players and coaches from several women's leagues.[1] Therefore, the primary objective of our study was to calculate the prevalence rates of mental health symptoms (eg, anxiety, depression) among female professional footballers over a 12-month period. A secondary objective was to explore the associations of severe injury and related surgery with mental health symptoms (eg, anxiety, depression) among female professional footballers.

METHODS

Design

An observational prospective cohort study over a follow-up period of 12 months was conducted, following the Strengthening the Reporting of Observational Studies in Epidemiology statement to ensure the quality of reporting.[10]

Participants

The study population consisted of female professional footballers recruited by Football Players Worldwide (FIFPRO) and affiliated national unions. Inclusion criteria were as follows: (a) being a professional footballer; (b) being female and (c) being able to read and comprehend texts in English or French. In our study, the definition for a professional footballer was that she (1) trains to improve performances, (2) competes in the highest or second highest national league and (3) has football training and competition as major activity (way of living) or focus of personal interest, devoting several hours in all or most of the days for these activities, and exceeding the time allocated to other types of professional or leisure activities. Sample size calculation indicated that at least 70 participants were needed to reach a power of 80% (CI of 95% and absolute precision of 7%) under the assumption of an anticipated population proportion (prevalence) of 10%.[11]

Mental health symptoms (dependent variables)

Mental health symptoms were operationalised according to the International Olympic Committee (IOC) Sport Mental Health Assessment Tool 1 (SMHAT-1), which assessed symptoms of distress, anxiety, depression, sleep disturbance, alcohol misuse, drug misuse and disordered eating.[12]

Distress in the previous 4 weeks was assessed using the Athlete Psychological Strain Questionnaire (APSQ) based on 10 items (eg, 'During the past 4 weeks, I could not stop worrying about injury or my performance') scored on a 5-point scale (from 'none of the time' to 'all of the time').[13] The APSQ has been recently validated in the athletic population (internal consistency: 0.5–0.9; criterion-related validity: area under receiver operating characteristic (ROC) curve >0.9).[13 14] A total score ranging from 10 to 50 was obtained by summing up the answers on the 10 items, with a score of 17 or more indicating an elevated or high risk for (athletic) distress.[13 14]

The 7-item General Anxiety Disorder-7 (GAD-7) was used to assess symptoms related to anxiety in the previous 4 weeks (eg, 'Have you been feeling nervous, anxious or on edge?') scored on a 4-point scale (from 'not at all' to 'nearly every day').[15] The GAD-7 has been validated in several populations and European languages (internal consistency: 0.9; test–retest reliability: 0.8; criterion-related validity: sensitivity 0.9, specificity 0.8, area under ROC curve >0.9).[15] A total score ranging from 0 to 21 was calculated by summing up the answers on the 7 items, with a score of 10 or more indicating the presence of moderate anxiety.[15]

The Patient Health Questionnaire-9 (PHQ-9) was used to assess the presence of symptoms of depression in the previous 4 weeks (eg, 'Have you been feeling down, depressed or hopeless?') scored on a 4-point scale (from 'not at all' to 'nearly every day').[16 17] The PHQ-9 has been validated in several populations and European languages (internal consistency: >0.8; criterion-related validity: sensitivity >0.8, specificity >0.8, area under ROC curve >0.9).[16 17] A total score ranging from 0 to 27 was calculated by summing up the answers on the 9 items, with a score of 10 or more indicating the presence of moderate depression.[16 17]

Measured using the shortened Athlete Sleep Screening Questionnaire (ASSQ), sleep disturbance in the previous 4 weeks was assessed through 5 items (eg, 'How satisfied/dissatisfied are you with the quality of your sleep?') scored on 4-point and 5-point scales.[18 19] The ASSQ has been validated in athletes (internal consistency: >0.7; test–retest reliability: >0.8; criterion-related validity: sensitivity >0.8, specificity >0.9).[18 19] A total score ranging from 1 to 17 was obtained by summing up the answers to the 5 items, a score of 8 or more indicating the presence of moderate sleep disturbance.[18 19]

Level of alcohol consumption was detected using the validated 3-item Alcohol Use Disorders Identification Test (AUDIT-C; eg, 'How many standard drinks containing alcohol do you have on a typical day?').[20] The AUDIT-C has been validated in several populations and European languages (test–retest coefficients: 0.6–0.9; criterion-related validity: area under ROC curve 0.70–<1.0).[20 21] A total score ranging from 0 to 12 was obtained by summing up the answers on the 3 items, a score of 3 or more indicating the presence of alcohol misuse.[20]

Based on the Cutting down, Annoyance by criticism, Guilty feeling and Eye-openers Adapted to Include Drugs (CAGE-AID), drug(s) misuse in the previous 3 months was assessed through 4 items (eg, 'In the last 3 months, has anyone annoyed you or gotten on your nerves by telling you to cut down or stop using drugs?') scored as yes or no.[22 23] The CAGE-AID has been validated in several populations and European languages (reliability: >0.9; sensitivity: >79%; specificity: >97%).[22 23] A total

Table 1 Baseline characteristics of the participants

Variables	N=74	
Age (in years; mean±SD)	25.0± 2.7	
Height (in cm; mean±SD)	168.4±5.4	
Weight (in kg; mean±SD)	62.8±5.4	
Duration of football career (in years; mean±SD)	5.7±3.1	
Number of official matches per season (mean±SD)	28.0±10.0	
Number of training hours per week (mean±SD)	30.0±8.3	
Level of football (highest national level; %)	87	
Field position (%)		
Goalkeeper	13	
Defender	34	
Midfielder	23	
Forward	30	
Level of education (%)		
No school completed	1	
High school	26	
Vocational/technical school	5	
College/university/equivalent school	68	
Studying next to football (%)	42	
Number of hours studying per week (mean±SD)	15.3±10.8	
Working next to football (%)	30	
Number of hours working per week (mean±SD)	22.3±13.2	
Total number of injuries (mean±SD)	2.4±2.0	
Total number of surgeries (mean±SD)	0.7±1.2	
Previous mental health disorder (%)		
Self	8	
Family member	27	
Smoking in the past 30 days (%)	0	
Use of sleeping tablets (prescribed, over-the-counter; %)		
No	96	92
Yearly or less	4	3
Monthly	0	4
Weekly	0	1
Daily	0	0
Use of antidepressants (prescribed; %)		
No	99	
Yearly or less	0	
Monthly	0	
Weekly	0	
Daily	1	

%, percentage; cm, centimetres; kg, kilograms; N, number of participants; SD, standard deviation.

score ranging from 0 to 4 was obtained by summing up the answers to the four questions, with a score of 2 or more indicating the presence of drug misuse.[22 23]

The Brief Eating Disorder in Athletes Questionnaire (BEDA-Q) was used to assess the presence of disordered eating in the previous 4 weeks through 9 items (eg, 'I feel extremely guilty after overeating') scored on several scales.[24] The BEDA-Q has been validated in athletes (internal consistency: >0.8; criterion-related validity: sensitivity >0.8, specificity >0.8, area under ROC curve >0.7).[24] A total score ranging from 0 to 18 was calculated by summing up the answers on the first 6 items, with a score of 2 or more indicating the presence of disordered eating.[12]

Severe injury and related surgery (independent variable)

History of severe injury and related surgery in hips, knees and ankles was examined through 12 questions (eg, 'How many severe injuries in your left knee have you had so far as professional footballer?') as used in previous studies.[5 6 9 25] In our study, a severe injury was defined as an injury that involved the given joint (hip, knee and/or ankles), occurred during team activities (training or match) and led to either training or match absence for more than 28 days.[26] For this question, participants were requested to consult either their medical record or their team physician. The total number of severe injuries and related surgeries was calculated.

Procedures

A baseline and two follow-up electronic questionnaires were set up in English and French (CastorEDC, CIWIT B.V., Amsterdam, the Netherlands), including all variables from the study. In addition, the following descriptive variables were added to the baseline questionnaire: age, height, body weight, level of education, parallel activity (eg, study, work), field position, level of football, number of seasons as professional footballer, exposure to training and matches, history of mental health disorders, smoking status and use of medications (sleeping tablets, antidepressants). Information about the study was sent per email to potential participants by FIFPRO and affiliated national unions, procedures being hidden from the principal researcher for privacy reasons. If interested in the study, all participants gave their informed consent and were given access to the baseline (T0) questionnaire. Follow-up questionnaires were sent 6 (T1) and 12 (T2) months later. Each questionnaire took about 15–20 min to complete. The questionnaire responses were coded and anonymised for privacy and confidentiality reasons. Once completed, the electronic questionnaires were saved automatically on a secured electronic server that only the principal researcher could access. Players participated voluntarily in the study and did not receive any reward for their participation.

Statistical analyses

The statistical software IBM SPSS V.26.0 for Apple Mac was used to perform all data analyses. Descriptive analyses (mean, SD, frequency and range) were performed for all variables included in the study. Prevalence rates (expressed as percentage) of mental health symptoms were calculated at T0, T1 and T2, using the adjusted Wald method for CIs (95% CI).[11] Prevalence was calculated as the proportion of the number of participants with a given

Table 2 Prevalence rates (%; 95% CI) of mental health symptoms in female professional footballers over a 12-month period

	T0 (baseline)	T1 (baseline+6 month)	T2 (baseline+12 month)
Sport-related psychological distress	64.9 (53.5 to 74.8)	52.9 (41.3 to 64.1)	55.4 (43.3 to 66.8)
Anxiety	6.8 (2.6 to 15.2)	5.7 (1.8 to 14.2)	9.2 (4.0 to 19.0)
Depression	5.4 (1.7 to 13.5)	10.0 (4.6 to 19.5)	9.2 (4.0 to 19.0)
Sleep disturbance	24.3 (15.9 to 35.3)	31.4 (21.7 to 43.1)	32.3 (22.2 to 44.4)
Alcohol misuse	45.9 (35.1 to 57.2)	48.6 (37.2 to 60.0)	41.5 (30.4 to 53.7)
Substance misuse	1.4 (0.0 to 8.0)	0.0	3.1 (0.2 to 11.2)
Disordered eating	17.6 (10.4 to 27.9)	18.9 (11.0 to 29.4)	15.4 (8.4 to 26.3)

%, percentage; CI, confidence interval; N, number of participants.

mental health condition relative to the total number of participants.[11] In order to test the (baseline) association of severe injury and surgery with mental health symptoms, separate logistic regression analyses (expressed as OR and 95% CI) were performed for severe injuries and surgeries (mental health condition introduced as dichotomous dependent variable and injury/surgery as continuous independent variables). The significance threshold was set at 0.10.[27]

RESULTS

Participants

A total of 74 female professional footballers (mean age of 25 years) were enrolled in the study and gave their informed consent. Participants were playing professional football for 6 years on average, most of them (87%) at the highest national level (13% as goalkeeper, 34% as defender, 23% as midfielder, 30% as forward). They reported playing 28 official matches per season on average and training around 30 hours per week, while 30%–42% were studying or working next to their football career (15–22 hours per week on average). On average (at baseline), the female professional football players had a history of 2.4±2.0 (mean±SD) severe injuries and a history of 0.7±1.2 (mean±SD) related surgeries. Around 1 out of 10 participants had been diagnosed previously with a mental health disorder, while 1 out of 4 participants reported a family member had been diagnosed in the past with a mental health disorder. None of the participants smoked 30 days prior baseline, and more than 90% did not use sleeping tablets or antidepressants. All baseline characteristics of the participants are presented in table 1.

Prevalence

All prevalence rates of mental health symptoms over a 12-month period are presented in table 2. At T0 (baseline), prevalence rates ranged from 1% for substance misuse and around 6% for anxiety and depression, to 46% for alcohol misuse and 65% for sport-psychological distress. At T1 (6 months postbaseline), prevalence rates ranged from 6% for anxiety and 31% for sleeping disturbance, to 49% for alcohol misuse and 53% for sport-psychological distress. At T2 (12 months postbaseline), prevalence rates ranged from 3% for substance misuse and 9% for anxiety and depression, to 42% for alcohol misuse and 55% for sport-psychological distress. At T0, T1 and T2, the prevalence of disordered eating remained between 15% and 20%.

Associations

All associations are presented in table 3. We found only one statistically significant association (p<0.10), namely, players were nearly twice as likely to report sport-related psychological distress following every surgery (OR 2.0; 95% CI 0.9 to 3.8, p=0.1). All other associations explored were not statistically significant. However, we found that players with a higher number of severe injuries were more likely to report sport-psychological distress (OR 1.2; 95% CI 0.9 to 1.5, p=0.2), anxiety (OR 1.3; 95% CI 0.8 to 1.9, p=0.3) and depression (OR 1.2; 95% CI 0.8 to 2.0, p=0.4), while players with a higher number of surgeries were more likely to report sleep disturbance (OR 1.1; 95% CI 0.7 to 1.7, p=0.6), disordered eating (OR 1.2; 95% CI 0.7 to 1.9, p=0.5) and substance misuse (OR 1.2; 95% CI 0.3 to 4.5, p=0.8).

Table 3 Association (OR and 95% CI) between potential contributing factors and mental health symptoms among female professional football players

Female professional football players							
	Distress	Anxiety	Depression	Sleep disturbance	Alcohol misuse	Drug misuse	Disordered eating
Severe injuries (n)	1.2 (0.9 to 1.5)	1.3 (0.8 to 1.9)	1.2 (0.8 to 2.0)	0.9 (0.7 to 1.3)	1.0 (0.8 to 1.3)	0.5 (0.1 to 3.2)	1.1 (0.8 to 1.5)
Surgeries (n)	2.0 (0.9 to 3.8)	0.9 (0.4 to 2.2)	*	1.1 (0.7 to 1.7)	0.9 (0.6 to 1.4)	1.2 (0.3 to 4.5)	1.2 (0.7 to 1.9)

*Logistic regression could not converge.

DISCUSSION

Our longitudinal study aimed to establish the prevalence rates of mental health symptoms among female professional footballers over a 12-month period, while we also explored the association of severe injury and surgery with mental health symptoms. We found prevalence rates ranging from 1% for substance misuse to 65% for sport-psychological distress at baseline, from 6% for anxiety to 53% for sport-psychological distress 6 months post-baseline and from 3% for substance misuse to 55% for sport-psychological distress 12 months postbaseline. The prevalence of disordered eating remained between 15% and 20% over the 12-month period. Only one of the associations was statistically significant, which showed that players were nearly twice as likely to report sport-related psychological distress following every surgery.

Comparison with other studies in professional football

Our findings regarding several mental health symptoms are comparable with recent studies among female professional football players.[7–9] A recent study among Australian female professional football players reported almost similar results to our study regarding symptoms of distress, sleep disturbance and alcohol misuse.[9] The results of a prior study on Swiss female players also align with our findings regarding symptoms of depression.[7] In contrast, a study involving German professional female football players reported a higher prevalence rate of 31% for depression.[8] These varied results are probably due to the use of different screening instruments as well as the potential variance in population characteristics, as the studies were done in teams from different countries.

In men's professional football, the prevalence of mental health symptoms was shown to range from 10% for distress to 19% for adverse alcohol use and 38% for anxiety/depression, whereas our study among female players reached higher prevalence rates for distress (53%–65%) and adverse alcohol use (42%–49%), but lower prevalence for anxiety/depression (6%–10%).[5 6] The lower prevalence of anxiety/depression among female football players in our study contradicts recent literature, which reports higher prevalence rates for depression in female athletes compared with male athletes.[7 28–33] Also, the correlation between severe injuries and mental health symptoms as well as the association between the number of surgeries and adverse nutrition behaviour shown in previous literature among male professional football players is not in accordance with our study.[5 25] We only found one significant association, namely between the number of surgeries and sport-related psychological distress. There are several potential explanations for the differences in findings between these studies. One factor is that our study exclusively involves female professional football players, highlighting the possible influence of other risk factors among female players on the occurrence of mental health symptoms. Additionally, it's crucial to acknowledge that the present study was longitudinal, whereas some previous studies were cross-sectional. The difference in study design could also be a potential explanation for the variations in findings between male and female football players.

Comparison with elite athletes from other disciplines

A recent meta-analysis among current elite female and male athletes from various sport types (cricket, football, handball, ice hockey, rugby, boxing, judo, gymnastics, rowing and swimming) reported a prevalence of mental health symptoms reaching 20% for distress, 34% for anxiety/depression and 19% for alcohol misuse.[34] Our longitudinal study demonstrated higher prevalence rates for distress (53%–65%) and alcohol misuse (42%–49%), but lower prevalence rates for symptoms of anxiety (6%–10%) and depression (5%–10%) compared with the recent meta-analysis.[34] Caution is necessary in interpreting these comparisons as the population characteristics, study characteristics and representativeness may differ between these studies. Compared with another longitudinal study among Canadian elite athletes that used the SMHAT-1 as screening instrument, our findings regarding the presence of sleep disturbance and alcohol misuse were in line with theirs.[35] However, our findings regarding anxiety, depression and disordered eating reached lower prevalence rates in comparison with that study.[35] As for psychological distress, our study reached higher prevalence rates (53%–65%) than the previous study among Canadian elite athletes (24%–40%).[35] This may be attributed to the fact that our study exclusively involves female players, and according to recent literature, female athletes report higher rates of sport-related psychological distress than male athletes.[14 36] Moreover, in recent literature, female athletes noted a higher incidence of various adverse life events than their male counterparts.[36] These events included interpersonal conflict, financial difficulties and experiences of discrimination.[36]

Comparison with the general population

A previous survey study reported mental health symptoms among the Australian female general population ranging from 4% for anxiety/depression to 2% for alcohol misuse and 0.5% for drug misuse.[37] Furthermore, the prevalence of psychological distress in the working population ranged from 5% to 18%.[38] Our findings suggest that female professional football players report a higher prevalence of mental health symptoms in comparison to the general population in Australia. Notably, a comparison with these previous studies is limited due to the use of different screening instruments. The higher prevalence rates of mental health symptoms might be due to the specific sport-related stressors that may have an impact on elite athletes during their career.[39]

Limitations of our study

One of the limitations of our study is the lower-than-expected number of enrolled participants, which could possibly influence the generalisability of our findings. It

is important to acknowledge that in our study, mental health symptoms were self-reported by the participants. Therefore, subjectivity in the outcomes may be introduced, while as for any questionnaire, the reliability and validity of the questionnaires we used in our longitudinal study could be questioned as recently suggested.[40] This could have led to a possible underestimation or overestimation of the extent of the problem. Due to self-reported assessment, recall bias may affect the results. Moreover, we focused on mental health symptoms, while clinically diagnosed mental health disorders by a medical professional would be an added value to our study. Furthermore, we had limited ability to observe potential differences with the general population as our study did not include a reference or comparison group from a non-athlete population. Lastly, the questionnaires were administered across various competitions in different regions. As competition seasons vary between regions, the questionnaires were not completed at the same time point in the season by all female professional football players. Hereby, it should be noted that this variability in timing may have influenced our results, as different time points in the season could affect mental health symptoms differently.

Recommendations for practice

Our results indicate that mental health symptoms among female professional football players are prevalent, and female professional football players are likely to report sport-related psychological distress nearly twice more by every surgery. Therefore, it emphasises the need for more attention and awareness of female football players' mental health. In female football, it is crucial for sports medicine physicians and/or mental health professionals to provide standard care that includes identification and monitoring of mental health symptoms, with an awareness that sport-related psychological distress is prevalent among female professional football players. Sports medicine physicians and other licensed/registered health professionals working in female football should use the IOC SMHAT-1 during the precompetition period, preferably a few weeks after the initiation of sports training. It should also be used following any significant life events such as major injury/illness, unexplained performance concerns, end of the competitive cycle, suspected harassment/abuse, adverse life events and transitioning out of football to support players who are at risk for developing mental health symptoms.[12] Subsequently, early detection of mental health symptoms becomes possible. If needed, early treatment can be provided, thereby enhancing the overall quality of life and performance and possibly preventing the development of mental health disorders in the long run. Furthermore, prioritising education on the consequences of alcohol misuse is crucial. This educational initiative can play a crucial role in enhancing coping behaviours, as previous research demonstrated a bidirectional association between alcohol misuse and mental health symptoms such as sleep disturbance and anxiety.[41 42] Prior research has highlighted a gap in the knowledge of mental health symptoms and support among professional football players and club physicians.[43 44] Therefore, educating players and other stakeholders about mental health, ultimately increasing mental health literacy, can increase help-seeking among these athletes.[45]

Recommendations for research

Gender-based variations in the occurrence of different symptoms and disorders indicate that the existence of different specific stressors, such as challenges within the athletes' social, personal and sporting environments, is associated with psychopathology.[46] Future research should focus on understanding how variations in psychopathology could influence the development of mental health symptoms.[43] Therefore, researchers must test interventions across various subpopulations within elite sports as different factors (eg, severe injuries, life events), along with diverse characteristics among athletes, might require a different approach. It is crucial to create and implement effective antistigma intervention programmes to address the ongoing stigma surrounding mental health, which may be viewed as a weakness and consequently hinder treatment-seeking among players.[45 47–49] This can improve help-seeking among players by establishing a destigmatising environment for athletes, where mental health is considered a necessity.

CONCLUSION

The substantial prevalence of mental health symptoms among female professional football players emphasises the need for increased attention, awareness and interventions. Additionally, female professional football players are nearly twice as likely to report sport-related psychological distress after each surgery. Therefore, sports medicine physicians and mental health professionals working in female football should provide standard care, which involves identifying, monitoring and implementing tailored interventions for mental health symptoms.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

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