Mental Health and Physical Activity in Hypertensive Patients Attending Family Medicine Outpatient Clinics at Kasr Alainy Hospitals, Egypt

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ABSTRACT

Background: The mental health of hypertensive patients is usually under-assessed compared to physical health. The role of physical activity in improving mental status in hypertensive patients is emerging. An adequate level of daily physical activity can improve mental health status and consequently lead to better disease control. **Objectives:** The study aimed to explore the relationship between physical activity and mental health in hypertensive patients. **Methods:** This is a cross-sectional study in which 260 hypertensive patients were interviewed using a systematic random technique using structured questionnaires. The evaluation of their physical activity levels by the global physical assessment questionnaire (GPAQ) and screening for their mental health status by the depression anxiety stress scale 21 (DASS 21) were also included. **Results:** Anxiety was the most prevalent disorder among the study participants (73.8%), followed by depression (61.5%) and stress (50.4%). Although 50% of the study participants had sufficient physical activity levels, there was no significant relationship between physical activity status and the frequency of these disorders. **Conclusions:** Mental disorders are prevalent among hypertensive patients, whether controlled or not. The occurrence of these disorders was not affected by the physical activity status of the patients

Keywords: Hypertension, Mental health, Physical activity.

INTRODUCTION

Chronic essential hypertension (HTN) is a significant cause of illness and mortality, posing a primary public health concern worldwide. HTN impacts most organs and systems in the body and is characterized by persistently elevated blood pressure (BP) that exceeds the normal range, which varies by age group and race. [1]

HTN has a constantly growing prevalence owing to many factors such as genetic factors, unhealthy lifestyles, lack of physical activity, and stressful life conditions. According to estimates, 21% of

Egyptians older than 40 have HTN. [2] Diabetes mellitus, dyslipidemia, renal illness, stroke, retinal damage, and heart disease are some of the most typical

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complications of hypertension. The most common complications included diabetes mellitus, followed by dyslipidemia, renal disease, and stroke. [3]

Egypt aims to reduce the prevalence of elevated blood pressure by 2025 to be less than 30%. [4] Non-adherence to antihypertensive medications is a common health problem. [5]

Hypertension also has an impact on mental health as well as physical health. However, studies on the relationship between hypertensive patients' mental health and their blood pressure levels are insufficient, and cognitive status is often underestimated and under-assessed during hypertensive patient assessment. [6]

Mental health assessment in hypertensive patients should be considered as crucial as physical complication assessment because the patient's mental health affects how well they will be compliant with non-pharmacological and pharmacological treatment.

Mental disorders are more prevalent among those with elevated blood pressure, even those in the pre-hypertensive stage of the disease. Moreover, the severity of mental disorders rises in proportion to the stages of hypertension, clearly illustrating the connection between elevated blood pressure and a patient's mental health. [7]

Physical activity has been shown to improve psychological well-being and reduce symptoms of many psychiatric disorders. Fewer self-reported days of poor mental health were correlated with higher levels of physical exercise. [8]

Adults may choose to practice specific types of exercise to increase their physical stamina, functional capacity, and balance and to feel less depressed and anxious. [9]

Primary care is in an excellent position to close the treatment gap between patients who have mental illness and chronic diseases such as hypertension, not only regarding screening and assessment but also regarding education about healthy habits such as physical activity, which is beneficial for both mental diseases and hypertension. [10]

Despite growing awareness of the importance of mental health, there remains a notable gap in research specifically examining the connection between physical activity and mental well-being in individuals with hypertension.

This study investigates this relationship, investigating whether physical activity (PA) can positively impact mental health among hypertensive patients. Engaging in regular physical activity may serve as a beneficial influence on the mental health of those living with hypertension.

MATERIAL AND METHODS

Study design and setting:

This was a cross-sectional descriptive study in which 260 hypertensive patients who attended Family Medicine outpatient clinics at Kasr Alainy Hospital were enrolled after ensuring they met the inclusion criteria and agreed to participate.

Study participants:

The targeted population was any known hypertensive patient, aged 18 to 65, who visited Family Medicine outpatient clinics at Kasr Alainy Hospital from July 2022 to August 2023.

Sample size:

The Epi Info statistical package performed sample size estimation [(11)]. Based on previous studies done by to explore the prevalence of mental disorders in hypertensive patients, the percentage of mental affection among hypertensive patients was 78.4% [(12)]. So, a sample size of about 260 patients was appropriate to provide a two-sided 95% confidence interval for a single proportion using the large sample normal approximation and extended by 5% from the observed proportion.

Sampling procedure:

A systematic random technique was used in which hypertensive patients who met the inclusion criteria and not the exclusion criteria during the study period were invited to participate.

Inclusion Criteria: Adults with hypertension, aged 18 to 65 years.

Exclusion criteria: The following patients were excluded:

- Patients diagnosed with any mental illness before they were diagnosed with hypertension.
- Patients with a family history of mental diseases.
- Females with premenstrual syndrome during their premenstrual period.
- Patients receiving medications affecting their psychological status, e.g., beta-blockers, and hormonal contraceptives.
- Pregnant females.
- Patients known to have any chronic co-morbidities other than HTN.

Data collection:

After confirming their eligibility based on the inclusion and exclusion criteria, two hundred sixty participants were invited for a structured interview. The interview lasted approximately 12 to 15 minutes and included collecting the participants' medical and personal histories, conducting a general examination to eliminate exclusion criteria, and measuring their blood pressure.

Participants were also asked to complete the following questionnaires:

1- The valid Arabic version of the global physical assessment questionnaire (GPAQ) was used to evaluate the participants' physical activity level. The WHO developed the questionnaire to monitor physical activity; it gathers data on sedentary behavior and involvement in three types of physical exercise. [13] The GPAQ consisted of 16 questions, from questions 1 to 6 measuring PA at work, 7 to 9 evaluating PA during travelling, questions 10 to 15 screening for recreational activities, and question 16 screening for sedentary behavior. The GPAQ was scored by calculating the average daily time spent in each activity domain, considering its intensity. Based on these calculations, each participant's level of physical activity was classified as sufficient or insufficient. [14]

2- The valid Arabic version of the depression anxiety stress scale 21(DASS 21) was used to screen mental disorders among the study participants. The questionnaire consisted of three self-report scales in the DASS set that were used to assess stress, anxiety, and depressive symptoms [15]. Each of them consisted of seven items and was divided into subscales. Scores were calculated by summing the scores for each relevant disorder individually, then each score was multiplied by two to calculate the final score of each disorder. Each of the three disorders is then classified into mild, moderate, severe, and extremely severe according to each item's final score. [16]

Implementation of the study:

The study activities were conducted from July 2022 to August 2023. During this period, the following had been done: -

- Literature review of related articles and studies.

Formulation of the study protocol and its approval by the scientific committee of the family medicine department (approved on 14 September 2022) and by the ethical committee of the faculty of medicine at Cairo University (approved on 8 November 2022).

- Develop data collection tools and formulate questionnaires.

Participants were chosen using a systematic random technique and offered to participate in the study after giving informed consent, a brief explanation of the aims, steps, potential outcomes of the study, and the items of the questionnaires, followed by assurances about the security of the data obtained.

Statistical analysis

The data was analyzed using an advanced statistical package for social science (SPSS) version 27. Numerical data were presented as means, standard deviation, median, and ranges as appropriate.

At the same time, categorical data was presented as frequencies and percentages. Data were explored for normality using the Kolmogorov-Smirnov test and the Shapiro-Wilk test.

A comparison between two groups of normally distributed numerical data was performed using a Student t-test, while non-normally distributed numeric variables were analyzed using the Mann-Whitney test. Comparison between groups of categorical data was performed using the Chi-Squared test.

Pearson's correlation coefficients were computed to measure the strength of association between the normally distributed measurements. All tests were two-tailed. A probability (p-value) equal to or less than 0.05 was considered significant.

Ethical consideration

The study protocol was approved by the Faculty of Medicine, Cairo University's scientific research ethical committee of the Family Medicine Department and the research ethics committee of the Faculty of Medicine at Cairo University. The approval code is MS-483-2022.

Results

The study included two hundred sixty hypertensive adult patients, and their responses were analyzed. The participants' ages ranged from 20 to 65, with a mean of 49.9 and a standard deviation 12.1.

The study included 120 males (46%) and 140 females (54%). Most participants (74%) were married, and about 53% lived in rural areas. Regarding occupation, 16.9% were not working, while the majority (40.8%) were employed in jobs requiring moderate activity.

Most participants (93.8%) were nonsmokers. Additionally, 54.2% had uncontrolled blood pressure (≥140/90). The majority of participants (51.5%) were receiving a single medication for hypertension. The mean duration of hypertension among participants was 6.6 years, with a standard deviation of 5.4.

Figure (I) shows that anxiety was the most prevalent disorder among participants, with only 26.2% free of anxiety; the remaining participants experienced various levels of anxiety.

Depression was the second most common disorder, with only 38.5% of participants indicating they were free from depression.

Stress ranked third, with 49.6% of participants reporting no stress. Among those with anxiety, the highest proportion experienced extremely severe symptoms (29.2%).

For participants suffering from depression, moderate symptoms were the most common (23.8%), while mild symptoms predominated among those with stress (17.3%).

Table 1 demonstrates statistically significant differences in participants with severe and extremely severe anxiety disorder among controlled and non-controlled groups, with a higher prevalence among the non-controlled group, with a p-value of 0.045. Otherwise, there was no statistically significant relationship between depression and stress disorders among controlled and non-controlled participants.

Table 2 shows that there was no statistical relationship between physical activity and mental disorders occurrences among the study participants.

Table (3) demonstrates statistically significant differences in participants with severe and extremely severe anxiety disorder among controlled and non-controlled groups, with a higher prevalence among the non-controlled group, with a p-value of 0.045. Otherwise, there was no statistically significant relationship regarding depression and stress disorders among controlled and non-controlled participants.

Table 4 demonstrates that the mean age of participants with sufficient and insufficient physical activity levels was 48.4 and 51.6, respectively, with SDs of 12.9 and 11.1. Males with sufficient PA constituted 53.3%, and 47.9% of females were sufficiently active. PA level had no statistical association with marital status. Among participants from rural areas, 50.7% had sufficient physical activity, compared to 50% of those from urban areas. Half of the nonsmokers' participants were active, and the other half were inactive. Median duration of hypertension was 5 years in both active and inactive participants.

Discussion

This cross-sectional study was implemented to explore the relationship between physical activity and mental health status in hypertensive patients attending Family Medicine clinics at Kasr Alainy hospitals.

The results of the study revealed that anxiety was the most prevalent psychiatric disorder among hypertensive participants who were enrolled in the study with 73.8% percentage, the highest rate was found to be in patients with extremely severe symptoms

(DASS score > 20) 29.2 % followed by moderate symptoms (DASS score10-14) 22% with no difference in age, gender or disease duration.

Contradicting (17) a study done in a tertiary care hospital in Nepal in 2022 with the same sample size as our study (260) revealed that depression was more prevalent than anxiety among hypertensive patients tested in their research with a percentage approaching 65%, anxiety prevalence was only 19.6% of moderate to severe severity.

The higher rate of anxiety among the study participants may be related to socioeconomic stressors and lack of access to mental healthcare.

Although anxiety prevalence in this study is higher than the result of a similar study conducted on 417 patients in a hospital in Ethiopia in 2016, where anxiety was found in 26.5 % of participants (18), this may be attributed to racial factors, different environmental, and social circumstances, and other methods of anxiety screening as they used the anxiety subscale of the hospital anxiety and depression scale (HADS).

In this study, symptoms of depressive disorder were present in 62.5%, with moderate symptoms predominating in about 23%. In a study conducted in a family medicine outpatient clinic at Suez Canal University in Egypt in 2021 on 274 hypertensive patients, it was found that 39.8% of hypertensive individuals screened in the study showed low to mild depression.

There were no occurrences of moderate or severe depression. A higher frequency of mild depression symptoms was observed in hypertensive men, 58% (19).

On the other hand, a lower depression prevalence was found in another study performed in a primary health care (PHC) center in Saudi Arabia in 2021 where depressive symptoms were found in about 19.6 % out of 342 patients with a positive association between depression, old age, physical inactivity and increased disease duration (20).

Nearly half of the study participants, 50.4%, were suffering from various degrees of stress, with a high proportion of mild stress. This agrees with (21), a study conducted to estimate the effect of stress on hypertension using a convenience sample of 798 participants.

They regarded stress as one of the cardiovascular risk factors, with a frequency of 65.4% among hypertensive patients enrolled in their study.

Screening for mental disorders among the study participants showed a statistically significant association between depression,

stress, and anxiety symptoms, with a Pearson Correlation of 0.796.

This is consistent with (22) as patients with major depressive disorder frequently experience anxiety symptoms, as it is a bidirectional relationship, it is often unclear whether the anxiety problem came first or whether the major depressive disorder came first.

Physical activity screening results showed that half of the participants were sufficiently active, even though most of the participants enrolled in the study were not working in jobs requiring vigorous activities.

In jobs requiring moderate activities, more than half of the participants were not working in such moderate activity jobs, 59%. The leisure time activities analysis revealed that most participants were not involved in vigorous or moderate activity sports.

Also, there was no difference in PA level between males and females; this is likely justified by the fact that Egyptian women became more involved in the labor market than before.

This comes in disagreement with (23) a study conducted on 134 patients attending five hospitals in Kenya, which showed that 63 % of hypertensive patients in their study were physically inactive. At the same time, physical activity was more prevalent among hypertensive women.

Our study findings clarified that there was no significant difference in the frequency of depression or stress between controlled and non-controlled hypertensive participants, contradicting a study performed in the PHC unit in China with 1856 hypertensive patients (24), as they revealed a substantial link between uncontrolled hypertension and depression, where depression prevalence was high among non-controlled patients.

Anxiety disorders were more commonly found in the non-controlled participants, with exceptionally moderate and severe symptoms. This is consistent with a similar study done in two hospitals in Nigeria, which included 321 patients (25), as they found that among the uncontrolled participants in their study, anxiety was found in 23.4%. At the same time, the prevalence of depression was 14%.

The prevalence of anxiety, depression, and stress did not show a statistically significant difference between individuals with sufficient and insufficient levels of physical activity.

This contrasts with the findings of reference (26), a narrative review on physical activity and mental health, which

suggested potential protective benefits of being active for patients with mental disorders and indicated a higher prevalence of various mental disorders among individuals with sedentary lifestyles.

Limitations of the study

Results may be affected by memory, truthfulness, and respondents' perceptions of the effort they put into answering some items (such as minutes or hours of physical activity).

Conclusion

From the previous results, it can be concluded that mental disorders are a prevalent problem among hypertensive patients, especially anxiety, depression, and stress. Mental disorders were not associated with the physical activity level of hypertensive patients.

Anxiety disorder was more prevalent among non-controlled participants, so screening of mental disorders, especially anxiety, among uncontrolled hypertensive patients is mandatory.

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Conflict of Interest disclosure

The authors declare that there are no conflicts of interest.

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Table 1. Relationship between mental disorders and Blood pressure control among the study participants.

Mental Disorder	Severity	Controlled BP n=119 (%)	Non-controlled BP n=141 (%)	P value
Depression	Normal	49	51	0.202
	Mild	22	17	0.202
	Moderate	26	36	0.202
	Severe	11	25	0.202
	Extremely Severe	11	12	0.202
Anxiety	Normal	37	31	0.045
	Mild	12	14	0.045
	Moderate	31	27	0.045
	Severe	8	24	0.045
	Extremely Severe	31	45	0.045
Stress	Normal	64	65	0.504
	Mild	18	27	0.504
	Moderate	14	25	0.504
	Severe	15	14	0.504
	Extremely Severe	8	10	0.504

P<0.05 is statistically significant.

Table 2. Relationship between mental disorders and Physical Activity levels among the study participants.

Mental Disorder	Severity	Sufficient Physical Activity n=131 (%)	Insufficient Physical Activity n=129 (%)	P value
Depression	Normal	49 (49.0)	51 (51.0)	0.550
	Mild	16 (41.0)	23 (59.0)	
	Moderate	36 (58.1)	26 (41.9)	
	Severe	19 (52.8)	17 (47.2)	
	Extremely Severe	11 (47.8)	12 (52.2)	
Anxiety	Normal	35 (51.5)	33 (48.5)	0.918
	Mild	12 (46.2)	14 (53.8)	
	Moderate	27 (46.6)	31 (53.4)	
	Severe	16 (50.0)	16 (50.0)	
	Extremely Severe	41 (53.9)	35 (46.1)	
Stress	Normal	60 (46.5)	69 (53.5)	0.428
	Mild	27 (60.0)	18 (40.0)	
	Moderate	21 (53.8)	18 (46.2)	
	Severe	16 (55.2)	13 (44.8)	
	Extremely Severe	7 (38.9)	11 (61.1)	

P<0.05 is statistically significant.

Table 3. The relation between mental disorders and BP control among the study participants.

Mental Disorder	Severity	Controlled n=119 (%)	Non-Controlled n=141 (%)	P value
Depression	Normal	49 (41.2)	51 (36.2)	0.202
	Mild	22 (18.5)	17 (12.1)	
	Moderate	26 (21.8)	36 (25.5)	
	Severe	11 (9.2)	25 (17.7)	
	Extremely Severe	11 (9.2)	12 (8.5)	
Anxiety	Normal	37 (31.1)	31 (22.0)	0.045
	Mild	12 (10.1)	14 (9.9)	
	Moderate	31 (26.1)	27 (19.1)	
	Severe	8 (6.7)	24 (17.0)	
	Extremely Severe	31 (26.1)	45 (31.9)	
Stress	Normal	64 (53.8)	65 (46.1)	0.504
	Mild	18 (15.1)	27 (19.1)	
	Moderate	14 (11.8)	25 (17.7)	
	Severe	15 (12.6)	14 (9.9)	
	Extremely Severe	8 (6.7)	10 (7.1)	

P<0.05 is statistically significant.

Table 4. Relationship between socio-demographic data, medical data, and PA level.

Variable	Category	Sufficient PA (n=131)	Insufficient PA (n=129)	P value
Age (years)	Mean ± SD	48.4 ± 12.9	51.6 ± 11.1	**0.035***
	Range	20–84	20–70	
Gender	Male	64 (53.3%)	56 (46.7%)	0.379
	Female	67 (47.9%)	73 (52.1%)	
Marital Status	Single	6 (50.0%)	6 (50.0%)	0.951
	Married	97 (50.3%)	96 (49.9%)	
	Divorced	7 (58.3%)	5 (41.7%)	
	Widow	21 (48.8%)	22 (51.2%)	
Residence	Rural	70 (50.7%)	68 (49.3%)	0.907
	Urban	61 (50.0%)	61 (50.0%)	
Smoking	Yes	9 (56.3%)	7 (43.8%)	0.628
	No	122 (50.0%)	122 (50.0%)	
HTN Duration (years)	Median (Range)	5 (1–30)	5 (1–30)	0.952

P<0.05 is statistically significant.

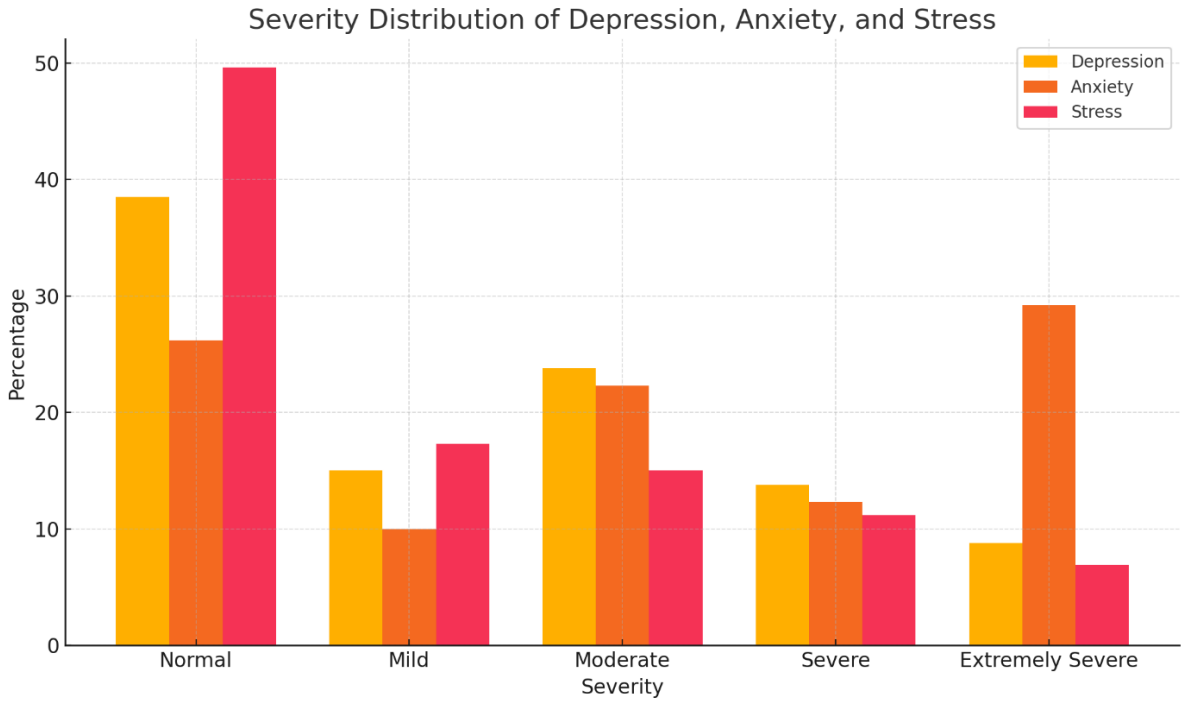

Figure I. Prevalence of mental disorders among the study participants.

الملخص العربى

الصحة النفسية والنشاط البدني لدى مرضى ارتفاع ضغط الدم المراجعين لعيادات طب الأسرة بمستشفيات القصر العيني، مصر

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الخلفية والأهمية: تعد الصحة النفسية عاملاً حاسماً في مسار مرض ارتفاع ضغط الدم، حيث يمكن أن تؤثر سلباً على قدرة المرضى في التعامل مع المرض والالتزام بالعلاج، مما ينعكس على مستوى التحكم فيه. وفي المقابل، تشير الأدلة العلمية إلى أن النشاط البدني قد يكون له تأثير إيجابي مزدوج، حيث يسهم في تحسين السيطرة على ضغط الدم ويعزز الصحة النفسية. لذلك، هدفت هذه الدراسة إلى استكشاف العلاقة بين النشاط البدني والصحة النفسية بين مرضى ارتفاع ضغط الدم المراجعين للعيادات الخارجية لطب الأسرة في مستشفيات جامعة القاهرة. **منهجية الدراسة:** اعتمدت الدراسة على منهج وصفي مقطعي، حيث تم إجراء مقابلات منظمة مع ٢٦٠ مريضاً من مرتادي العيادات الخارجية. تضمنت الإجراءات جمع البيانات الديموغرافية والسريرية، وإجراء الفحوصات العامة، وتطبيق استبيانات معيارية لتقييم مستوى النشاط البدني والاضطرابات النفسية. استغرقت المرحلة التحضيرية شهرين ونصف (يوليو - سبتمبر ٢٠٢٢)، وشملت مراجعة الأدبيات وإعداد الأدوات وإجراء دراسة تجريبية. أما جمع البيانات الرئيسي فاستمر لمدة ١١ شهراً (يوليو ٢٠٢٢ - يونيو ٢٠٢٣)، واختتمت الدراسة بتحليل البيانات والإبلاغ عن النتائج في أغسطس ٢٠٢٣ . **النتائج الرئيسية:** أظهرت النتائج أن معدل انتشار الاضطرابات النفسية كان مرتفعاً بين المشاركين، مع تفشي واضح لاضطراب القلق، خاصة لدى المرضى الذين يعانون من ضعف التحكم في ضغط الدم. ومع ذلك، لم تسجل الدراسة ارتباطاً إحصائياً بين مستويات النشاط البدني ووجود اضطرابات نفسية، كما لم تلاحظ فروقاً في مستوى التحكم بالمرض بين المرضى بناءً على أنماط نشاطهم البدني. **الاستنتاج والتوصيات :** على الرغم من عدم وجود علاقة واضحة بين النشاط البدني والصحة النفسية في هذه الدراسة، إلا أن النتائج تؤكد على الحاجة إلى الاهتمام بالصحة النفسية لمرضى ارتفاع ضغط الدم، نظراً لانتشار الاضطرابات النفسية بينهم. نوصي بإدراج الفحوصات النفسية الدورية ضمن برامج المتابعة الروتينية لهؤلاء المرضى، مع التركيز على تدخلات نفسية اجتماعية فعالة. كما نؤكد على أهمية إجراء المزيد من الدراسات لاستكشاف العوامل المؤثرة في الصحة النفسية لهذه الفئة، بما في ذلك دور النشاط البدني في سياقات مختلفة.