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Association of Hemoglobin, albumin, lymphocyte, and platelet scores with the risk of overactive bladder syndrome in U.S. adults: A Nationwide cross-sectional study

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ABSTRACT

Objective: The pathogenesis of overactive bladder (OAB) is associated with inflammation, yet specific indicators remain unclear. This study aimed to evaluate the association between the hemoglobin, albumin, lymphocyte, and platelet (HALP) score—a composite marker of inflammation and nutritional status—and the risk of OAB in a nationally representative adult population in the United States.

Method: We analyzed data from 24,939 participants in the U.S. National Health and Nutrition Examination Survey (NHANES) between 2005 and 2016. Participants were categorized into quartiles based on HALP scores. Weighted multivariable logistic regression models were used to examine the association between HALP scores and the risk of OAB, adjusting for relevant covariates. Additionally, smooth curve fitting was performed to assess nonlinear relationships.

Result: After adjusting for confounders, higher HALP scores were significantly associated with a lower risk of OAB (odds ratio [OR] 0.965, 95 % confidence interval [CI]: 0.951–0.980). Participants in the highest HALP quartile had a 20 % lower likelihood of OAB compared to those in the lowest quartile (OR 0.800, 95 % CI: 0.729–0.878). A nonlinear inverse relationship was observed between HALP score and OAB risk.

Conclusion: In this large, population-based study, higher HALP scores were independently associated with a lower risk of OAB among U.S. adults. These findings suggest that the HALP score may serve as a useful marker in the prediction and early identification of individuals at risk for OAB.

1. Introduction

Overactive bladder (OAB) is a lower urinary tract symptomatic syndrome characterized by storage phase symptoms, predominantly urinary frequency, with or without urge incontinence (Abrams et al., 2003; Tubaro, 2004). It has been reported that OAB is about 14 % common in European nations and 9 % common in China (Wang et al., 2011), while in the US population, the prevalence can be as high as 30 % in women and 17 % in men, although, these prevalence rates may remain low compared to reality due to the fact that some individuals go undiagnosed (Coyne et al., 2009). However, the pathogenesis of OAB is still unclear. Current evidence suggests it may be associated with factors such as obesity, oxidative stress, lifestyle habits, pelvic floor muscle insufficiency, and inflammatory responses (Hao et al., 2024; Qin et al., 2021). Additionally, OAB significantly impacts patients' quality of life and sexual health (Melotti et al., 2017), often leading to anxiety and depression and placing considerable financial burden on those affected. Moreover, the presence of OAB affects both life quality and sexual life quality, causes anxiety and depression in patients, and greatly increases the economic pressure on them (El-Zawahry, 2019; Stewart et al., 2003; Wu et al., 2021; Durden et al., 2018).

Numerous studies have examined inflammatory indicators of OAB. Various immuno-inflammatory markers—such as the systemic inflammatory response index (SIRI), neutrophil-to-lymphocyte ratio (NLR), aggregate inflammatory syndrome index (AISI), monocyte-to-lymphocyte ratio (MLR), platelet-to-lymphocyte ratio (PLR), and

Abbreviations: OAB, Overactive bladder; NHANES, National Health and Nutrition Examination Survey; HALP, hemoglobin, albumin, lymphocyte, and platelet; UUI, Urgency Urinary Incontinence; OABSS, Overactive Bladder Syndrome Score; PIR, Income to poverty ratio; BMI, Body mass index.

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systemic inflammation index (SII)—are commonly used to evaluate systemic inflammation, with several studies observing their relationship with OAB. Recently, the HALP score has become a novel marker for assessing inflammation and nutritional status. The HALP score is an indicator obtained by calculating the hemoglobin level, albumin level, lymphocyte count, and platelet count, and when the body produces an inflammatory response, the lymphocyte and platelet counts change accordingly, and when the inflammatory response occurs, it will stimulate the body to develop an oxidative stress response, which increases the hemoglobin and albumin levels in a short period of time, causing an increase in HALP. Inflammation will further stimulate the body to develop oxidative stress, which will increase the hemoglobin and albumin levels in a short period of time, thus causing the HALP to rise. Meanwhile, it is also confirmed that inflammation and oxidative stress may be related to the occurrence of OAB, so we consider that the high level of HALP may be related to the development of OAB with a certain degree of pathophysiological significance. HALP score has been shown to correlate with cardiovascular diseases (Yilmaz et al., 2024; Kiliç et al., 2024; Karakayali et al., 2023), various tumors (Fu et al., 2024; Ozdemir et al., 2024), and diabetes-related complications (Wang et al., 2024). Therefore, in this study, we aimed to investigate the association between hemoglobin, albumin, lymphocyte, and platelet (HALP) scores and the risk of overactive bladder (OAB) in U.S. adults. Using data from the National Health and Nutrition Examination Survey (NHANES) from 2005 to 2016, we sought to determine whether HALP scores could serve as a potential indicator for predicting the presence of OAB, considering the score's established role as a marker of systemic inflammation and nutritional status.

2. Materials and methods

This cross-sectional study utilized publicly available data from the National Health and Nutrition Examination Survey (NHANES), a nationally representative program conducted by the National Center for Health Statistics (NCHS). NHANES uses a multistage, stratified probability sampling design to assess the health and nutritional status of the civilian, non-institutionalized U.S. population. Data from the 2005 to 2016 NHANES cycles were included. All participants provided informed consent, and the NHANES protocol was approved by the NCHS Ethics Review Board.

Participants under 20 years of age, or those with missing data on overactive bladder (OAB) status, HALP score components, or key covariates were excluded. The final analytical sample included 24,939 adults.

2.1. Exposure and outcome variables

The exposure variable was the HALP score; which was calculated as follows: hemoglobin level (g/L) × albumin level (g/L) × lymphocyte count (/L)/ platelet count (/L). Levels of hemoglobin, albumin, platelets, and lymphocytes in venous blood samples were compiled from data collected through a mobile examination center (MEC).

The outcome variable was OAB; the diagnostic criteria for OAB were based on the International Classification of Diseases, Tenth Revision (ICD-10). Diseases such as urinary tract infections, mild prostatic hyperplasia, and urinary tract tumors were excluded.Standardized questionnaires were used in in-person interviews done by trained personnel. Obtained through surveys of urinary incontinence scores (UUI) and nocturia scores, the Urgency Urinary Incontinence (UUI) score consists of multiple inquiries, such as: "In the last 12 months, have you experienced urine leakage or lack of control due to unexpected cravings or pressure to urinate? Did you have to go to the restroom quickly?" to determine if this is the case, and "How often does this happen?" to measure the severity. Participants were asked on the Nocturia Score Questionnaire, "In the past 30 days, from the time you went to bed at night until you woke up in the morning, how often did you get up to urinate?" This question was used to assess the severity of nocturia. The UUI score and the Nocturia score are added to determine the Overactive Bladder Syndrome Score (OABSS). The Nocturia score ranges from 0 to 3, as does the UUI score. As a result, the OABSS value ranges from 0 to 6. An OABSS value of ≥3 quantifies the presence of OAB (Zhu et al., 2023).

2.2. Covariates

Covariates were selected based on prior literature identifying potential confounders in the association between systemic inflammation and OAB (Zheng et al., 2025). The following variables were included: Demographics: age (20–39, 40–59, ≥60 years), sex (male/female), race/ethnicity (non-Hispanic White, non-Hispanic Black, Mexican American, other Hispanic, other); Socioeconomic factors: education level (less than high school, high school or above), marital status (married/partnered, widowed/divorced/separated, never married), family income-to-poverty ratio (PIR: <1.3, 1.3–3.5, ≥3.5); **Health conditions**: body mass index (BMI: <25, 25–30, >30), hypertension (yes/no), diabetes mellitus (yes/no/borderline), sleep disorders (yes/no), alcohol use (yes/no).

2.3. Statistical analysis

For continuous variables, the mean ± standard deviation was used, whereas percentages are used for categorical variables. Depending on the data distribution, differences between continuous variables were assessed using the *t*-test under the assumption of normality. For categorical variables, the chi-square test was used. The association between HALP and OAB was analyzed through multiple logistic regression models: Model 1 was unadjusted to establish the preliminary association; Model 2, adjusted for age, gender, race, education level, marital status, PIR, hypertension, BMI, diabetes, alcohol use and sleep disorder. Model 2 also assessed the non-linear relationship between HALP and OAB using a generalized additive model (GAM) with a smooth curve fit. Subgroup analyses were conducted to examine whether the HALP-OAB association remained consistent across various populations. All statistical analyses were conducted using R and EmpowerStats (version 4.2), with significance set at $p < 0.05$.

3. Results

3.1. Participant characteristics

A total of 24,939 participants from the NHANES dataset were included in the final analysis. Among them, 5850 individuals (23.45 %) were identified as having OAB. The flowchart for participant enrollment is presented in Fig. 1.

Table 1 presents the baseline characteristics of the study population, stratified by OAB status. Participants with OAB were more likely to be older, female, and have lower HALP scores compared to those without OAB ($p < 0.001$ for all comparisons). The mean HALP score was 5.323 in the OAB group and 5.639 in the non-OAB group.

Table 2 presents the results of multiple logistic regression analysis assessing the association between continuous HALP scores, HALP quartiles, and OAB. Participants were grouped by HALP quartiles, with the first quartile (Q1) as the reference. In the unadjusted model, participants in the highest quartile (Q4) had a 43 % lower risk of OAB compared to Q1 (OR 0.57, 95 % CI 0.530–0.625). Model 2, adjusted for age, gender, race, education level, marital status, PIR, hypertension, BMI, diabetes, alcohol use and sleep disorder, showed a 20 % reduction in OAB risk at the Q4 level compared to Q1 (OR 0.800, 95 % CI 0.729–0.878; p for trend <0.001).

Fig. 2, which analyzes the association between HALP scores and OAB using a smoothed curve-fitting, suggests a non-linear relationship between HALP scores and OAB in Model 3, after adjustment for gender, age, race, education level, marital status, PIR, hypertension, diabetes

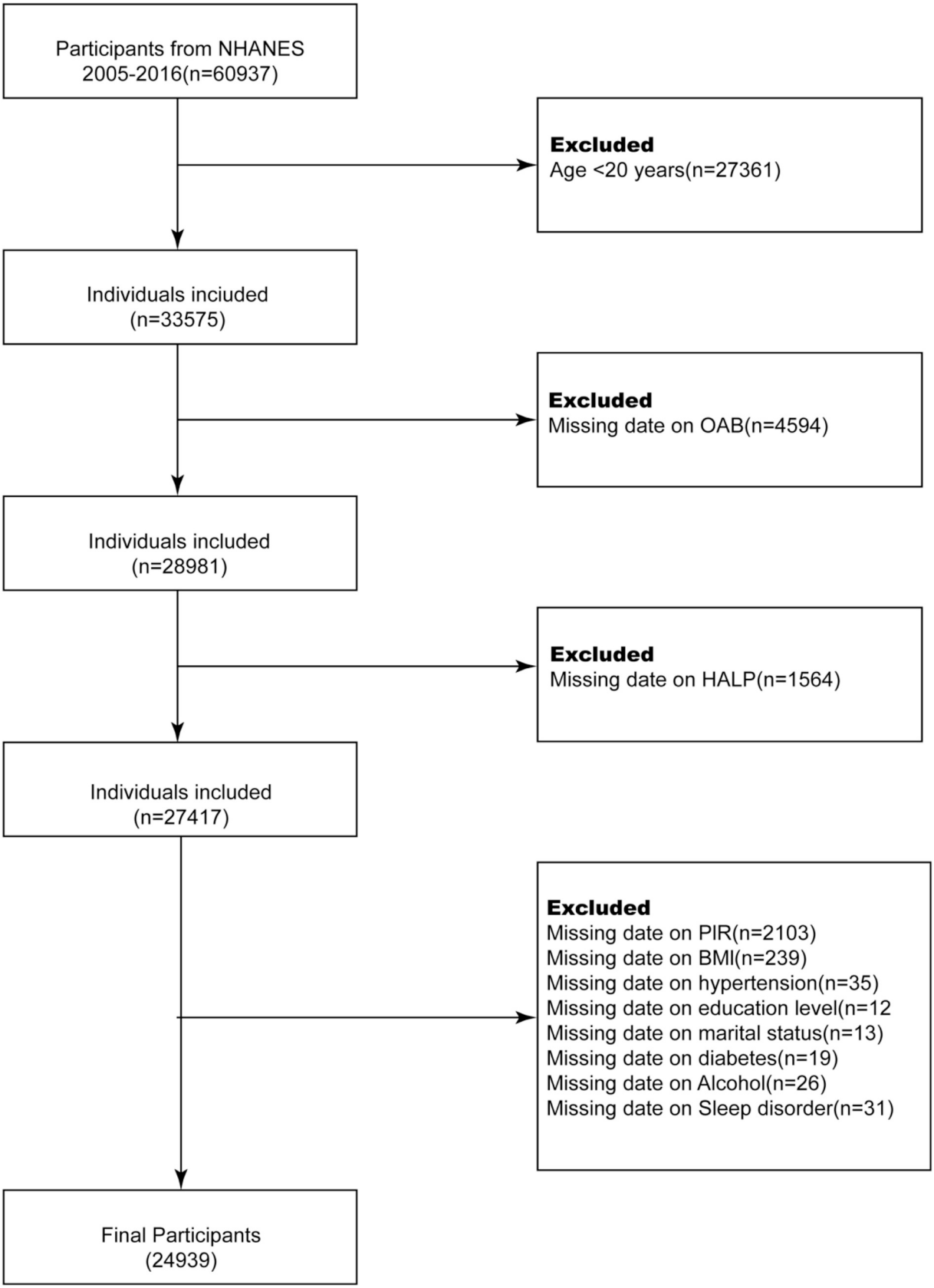

Fig. 1. Flowchart of participant selection for U.S. adults aged 20 years and older at risk for overactive bladder syndrome from NHANES 2005–2016.
Abbreviations: NHANES, National Health and Nutrition Examination Survey; OAB, overactive bladder syndrome; HALP,hemoglobin, albumin, lymphocyte, and platelet score; PIR, poverty income ratio; BMI, body mass index.

Table 1
Descriptive characteristics of U.S. adults aged 20 years and older with and without overactive bladder syndrome from the 2005–2016 NHANES Survey.

	Total	OAB		*P* value
	(*n* = 24,939)	NO (*n* = 19,089)	YES (*n* = 5850)	
Age(years)(%)				<0.001
20–40	8296 (33.2)	7381 (38.6)	915 (15.6)	
40–60	8897 (35.6)	6975 (36.5)	1922 (32.8)	
>60	7746 (31.1)	4733 (24.9)	3013 (51.6)	
Gender(%)				<0.001
Male	12,303 (49.3)	10,190 (53.4)	2113 (36.1)	
Female	12,636 (50.67)	8899 (46.6)	3737 (63.9)	
Race/ethnicity(%)				<0.001
Mexican American	3923 (15.7)	3026 (15.8)	897 (15.3)	
Other Hispanic	2276 (9.1)	1737 (9.1)	539 (9.2)	
Non-Hispanic White	11,500 (46.1)	8797 (46.1)	2703 (46.2)	
Non-Hispanic Black	4988 (20.0)	3611 (18.9)	1377 (23.6)	
Other Race	2252 (9.1)	1918 (10.1)	334 (5.7)	
Education(%)				<0.001
Less than high school	6055 (24.3)	4130 (21.6)	1925 (32.9)	
High school and More than high school	18,884 (75.7)	14,959 (78.4)	3925 (67.1)	
Marital(%)				<0.001
Widowed/Divorced/ Separated	5561 (22.3)	3626 (18.9)	1935 (33.1)	
Married/Living with partner	15,272 (61.2)	12,022 (62.9)	3250 (55.5)	
Never married	4106 (16.5)	3441 (18.2)	665 (11.4)	
PIR(%)				<0.001
0–1.5	7709 (30.1)	6090 (31.9)	1619 (27.7)	
1.5–3.5	8747 (35.7)	6346 (33.2)	2401 (41.0)	
>3.5	8483 (34.2)	6653 (34.9)	1830 (31.3)	
Hypertension(%)				<0.001
Yes	8994 (36.1)	5763 (30.2)	3231 (55.2)	
No	15,945 (63.9)	13,326 (69.8)	2619 (44.8)	
BMI(%)				<0.001
0–25	7052 (28.3)	5888 (30.8)	1164 (19.9)	
25–30	8447 (33.9)	6652 (34.8)	1795 (30.7)	
>30	9440 (37.8)	6549 (34.4)	2891 (49.4)	
Diabetes(%)				<0.001
Yes	3099 (12.4)	1787 (9.4)	1312 (22.4)	
No	21,289 (85.3)	16,962 (88.8)	4327 (73.9)	
Borderline	551 (2.3)	340 (1.8)	211 (3.7)	
Alcohol(%)				<0.001
Yes	17,947 (71.9)	14,134 (74.)	3813 (65.2)	
No	6992 (28.)	4955 (25.9)	2037 (34.8)	
Sleep disorder(%)				<0.001
Yes	6371 (25.5)	4219 (22.1)	2152 (36.8)	
No	18,568 (74.5)	14,870 (77.9)	3698 (63.2)	
HALP (categorical)	313.372 ± 289.676	4355 (22.8)	1879 (32.2)	<0.001
Q1	6234 (25.0)	4355 (22.8)	1879 (32.2)	
Q2	6235 (25.0)	4782 (25.1)	1453 (24.8)	
Q3	6235 (25.0)	4958 (25.973 %)	1277 (21.8)	
Q4	6235 (25.0)	4994 (26.2)	1241 (21.2)	
HALP (continuous)	5.56 ± 5.98	5.63 ± 5.16	5.32 ± 8.08	<0.001

Abbreviations: NHANES, National Health and Nutrition Examination Survey; OAB, overactive bladder syndrome; HALP,hemoglobin, albumin, lymphocyte, and platelet score; PIR, poverty income ratio; BMI, body mass index.
Note: Values are shown as % for categorical variables and mean ± standard deviation for continuous variables.

Table 2
Logistic regression analysis of the association between hemoglobin, albumin, lymphocyte, and platelet score and risk of overactive bladder syndrome in U.S. Adults aged 20 years and older from NHANES 2005–2016.

Characteristic	Model 1[a]	Model 2[b]
	OR[c] (95 % CI[d])	OR[c] (95 % CI[d])
HALP	0.91 (0.90,0.92)	0.96 (0.95,0.98)
HALP (categorical)		
Q1	1.00	1.00
Q2	0.70 (0.65,0.76)	0.89 (0.83,0.96)
Q3	0.59 (0.55,0.64)	0.84 (0.88,0.91)
Q4	0.57 (0.53,0.62)	0.80 (0.72,0.87)

Abbreviations: NHANES, National Health and Nutrition Examination Survey; HALP,hemoglobin, albumin, lymphocyte, and platelet score; PIR, poverty income ratio; BMI, body mass index.
[a] Model 1, no covariates were adjusted.
[b] Model 2, age, gender, race, education level, marital status, PIR, hypertension, BMI, diabetes, alcohol use and sleep disorder were adjusted.

mellitus, BMI, alcohol use, and sleep disorders ($p < 0.01$).

Table 3 suggests an inflection point of 4.66 for the L-shaped association between HALP scores and OAB. Our findings indicate that at the inflection point's right side, there was no significant association between HALP and OAB, with an effect size of 1.01 (95 % CI: 0.99–1.03; $p = 0.48$). Nonetheless, a pronounced inverse relationship between HALP scores and OAB was noted on the left side of the inflection point, with an effect size of 0.85 (95 % CI: 0.82–0.89; $p < 0.01$). This shows that having lower HALP scores is connected with a higher risk of OAB.

4. Discussion

This study included 24,939 participants in the NHANES dataset from 2005 to 2016, of whom 5850 were diagnosed with OAB based on the OABSS score.Our analysis showed that higher HALP scores were associated with a lower risk of OAB detection. In Model 3, after adjusting for all covariates, subgroup Q4 had a much lower risk of OAB than subgroups Q1, Q2, and Q3. After adjusting for the various covariates, there was now a significant negative association between HALP score OAB and a 20 % decrease in the incidence of OAB at the highest quartile level of HALP, and smoothed curve fitting showed a nonlinear association between HALP score and OAB.

While HALP scores have previously been validated as correlating with cardiovascular disease and diabetic retinopathy, this research is the inaugural attempt to investigate the connection between OAB and HALP scores.The HALP score is derived using the values of hemoglobin level (g/L), albumin level (g/L), lymphocyte count (/L), and platelet count

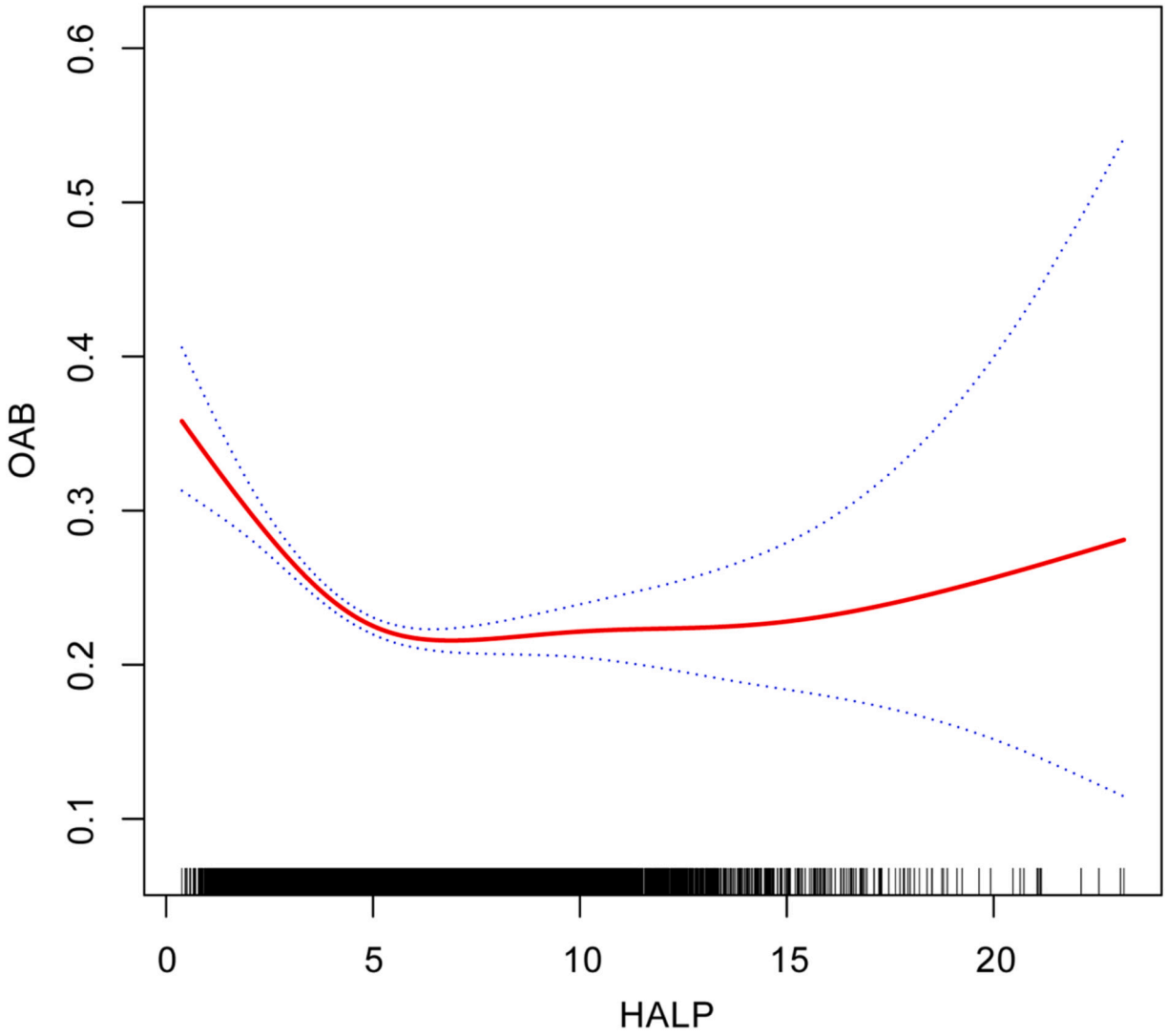

Fig. 2. Restricted cubic spline analysis of the association between hemoglobin, albumin, lymphocyte, and platelet score and risk of overactive bladder syndrome in U.S. adults aged 20 years and older from NHANES 2005–2016.
Note: The restricted cubic spline model was adjusted for age, gender, race, education level, marital status, PIR, hypertension, BMI, diabetes, alcohol use and sleep disorder. Only 99 % of the data is displayed.
Abbreviations: NHANES, National Health and Nutrition Examination Survey; OAB, overactive bladder syndrome; HALP,hemoglobin, albumin, lymphocyte, and platelet score; PIR, poverty income ratio; BMI, body mass index.

Table 3
Threshold effect analysis of hemoglobin, albumin, lymphocyte, and platelet score and risk of overactive bladder syndrome in U.S. adults aged 20 years and older from NHANES 2005–2016.

Variable	Adjusted[a] OR (95 %CI)
Fitting by standard linear model	
OR (95 % CI)	0.97 (0.95, 0.98)
P-value	< 0.001
Fitting by two-piecewise linear model	
HALP	
Breakpoint (K)	4.66
OR1 (< 4.66)	0.85 (0.82, 0.89) < 0.001
OR2 (> 4.66)	1.01 (0.99, 1.03) 0.48
OR2/OR1	1.18 (1.12, 1.25) < 0.001
Logarithmic likelihood ratio test *P*-value	< 0.001

Abbreviations: NHANES, National Health and Nutrition Examination Survey; HALP,hemoglobin, albumin, lymphocyte, and platelet score; PIR, poverty income ratio; BMI, body mass index.
[a] Adjusted for age, gender, race, education level, marital status, PIR, hypertension, BMI, diabetes, alcohol use and sleep disorder.

(/L). It displays both dietary status and systemic inflammation. The HALP score plays a crucial role in predicting various diseases, including neoplasms, heart failure, myocardial infarction, ischemic stroke, diabetic retinopathy, and nephropathy. Additionally, it is significant in prognostic evaluation. In 2015, Chen et al. introduced the concept of using the HALP score as a predictive tool (Chen et al., 2015). In much of the literature, the HALP score has been used as a predictive biomarker for a variety of tumors (Farag et al., 2023), such as gastric, lung (Shen et al., 2019), bladder (Peng et al., 2018), and prostate cancers (Chen et al., 2024). Some researchers have discovered that the HALP score is also linked to the risk of heart failure, coronary heart disease, and ST-segment total elevation myocardial infarction (Karakayali et al., 2023; Pan and Lin, 2023). Additionally, the hemoglobin level, and platelet count in the HALP score significantly influence these outcomes. Similarly, Toprak K et al. found that HALP acts as a trustworthy forecaster for the prognosis of myocardial infarction and can be used as an independent predictor for assessing short-term mortality. This conclusion was drawn from a study involving 1817 patients who underwent percutaneous coronary access for myocardial infarction (Toprak et al., 2024).

Additionally, Wang et al. collected data from 634 individuals with type 2 diabetes mellitus and categorized the participants into retinopathy and non-retinopathy groups, they found that there was a significant correlation between HALP and type 2 diabetic retinopathy. Higher HALP scores were discovered to be linked to a decreased prevalence of type 2 diabetic retinopathy (Wang et al., 2024). In addition, a retrospective single-center study analyzing 895 patients diagnosed with IgA nephropathy found that HALP could serve as a predictor of IgA nephropathy (Yuan et al., 2024). It was noted that patients with lower HALP may exhibit more severe symptoms. However, based on the current data, there are no studies examining the relationship between overactive bladder (OAB) risk and HALP scores. Our study found that an increased HALP score is linked to a decreased risk of OAB.

Overactive bladder (OAB) is a syndrome characterized primarily by symptoms of the lower urinary tract. Its pathogenesis is thought to involve various factors, including both known and unidentified disease-related contributors, nutritional influences, social determinants, and environmental conditions (Dallosso et al., 2003). Numerous studies have investigated these factors, examining elements such as individual dietary status, education level, and daily exposure to environmental substances (Xue et al., 2024). Research has increasingly focused on the mechanisms underlying OAB. For instance, disease-related factors such as diabetes mellitus (Makki et al., 2013), pelvic floor muscle insufficiency (Song et al., 2023), obesity (Dallosso et al., 2004), peripheral nerve injury (de Groat, 1997), and inflammation have been implicated in the development of OAB. Several reports suggest a significant link between OAB pathogenesis and inflammation (Wei et al., 2024). Inflammatory stimulation of the bladder surface may lead to alterations in bladder function, increasing bladder sensitivity and resulting in OAB symptoms (Peyronnet et al., 2019). Additionally, studies have found that patients with OAB exhibit inflammatory cell infiltration in the bladder mucosa, including neutrophils, eosinophils, and mast cells. Increased activity of these cells may contribute to bladder inflammation and exacerbate OAB symptoms (He et al., 2016). Furthermore, several inflammatory markers—including the Systemic Inflammatory Response Index (SIRI), Neutrophil-to-Lymphocyte Ratio (NLR), Aggregate Inflammatory Syndrome Index (AISI), Monocyte-to-Lymphocyte Ratio (MLR), Platelet-to-Lymphocyte Ratio (PLR), and Systemic Inflammatory Index (SII) (Wei et al., 2024; Kim et al., 2021)—have been shown to correlate with OAB. An increased risk of developing OAB is linked to higher levels of these markers. In summary, the current study highlights a strong association between nutritional status, inflammatory responses, and the risk of developing OAB.

The study involved 24,939 participants and found that the non-OAB group's HALP score was considerably greater than the OAB group's. Lymphocyte and platelet levels reflect the body's inflammatory state; inflammation reduces the lymphocyte-to-platelet ratio, which may increase the risk of developing OAB. On the other hand, hemoglobin and albumin levels indicate nutritional status. Hemoglobin primarily transports oxygen, and a decrease in hemoglobin levels can lead to hypoxia and anemia, potentially enhancing oxidative stress. Similarly, a decrease in albumin levels can result in malnutrition and a weakened immune system, potentially triggering inflammatory responses. Oxidative stress and inflammation have been shown to disrupt the physiological function of endothelial cells on the bladder surface, contributing to the development of OAB. A lower lymphocyte-to-platelet ratio, along with reduced hemoglobin and albumin levels, can lead to a lower HALP score, suggesting that a decreased risk of OAB may be linked to a higher HALP score. This finding is in line with our findings, further supporting HALP as a useful tool for predicting OAB risk.

5. Strengths and limitations

The study's strength is its innovative identification of a association between the OAB risk and HALP score, clarifying that a lower risk of OAB is linked to a higher HALP score. This suggests that enhancing nutritional status and reducing inflammation may lower OAB incidence. However, this study has certain limitations. First, our data were derived from the NHANES database; while we included several covariates and made relevant adjustments, data on some potentially influential covariates, such as chronic prostatitis in men and chronic cystitis in women, were unavailable. Additionally, as our study population was based in the United States, the findings may not be generalizable globally, highlighting the need for further research involving a broader, more diverse population.

6. Conclusion

Our research revealed a non-linear relationship between the risk of overactive bladder (OAB) and HALP scores, and confirmed a negative association between the two. This association was found to be more significant among male participants. According to these results, the HALP score could be a useful predictor of OAB risk.Moreover, we can use this association between HALP and OAB to assess high-risk groups and develop individualized prevention and treatment programs based on the pathophysiological mechanisms of their development.

CRediT authorship contribution statement

Mingchu Jin: Writing – original draft, Methodology, Data curation. **Heng Liu:** Writing – original draft, Validation, Software, Data curation. **Hao Peng:** Validation, Software. **Jie Xu:** Writing – original draft, Methodology, Investigation. **Haidong Hao:** Writing – review & editing, Writing – original draft, Methodology. **Hongtao Jia:** Writing – review & editing, Validation, Supervision, Conceptualization.

Ethical statement

The portions of this study involving human participants, human materials, or human data were conducted in accordance with the Declaration of Helsinki and were approved by the National Center for Health Statistics (NCHS) Ethics Review Board. The patients/participants provided their written informed consent to participate in this study.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

All data used in this study are available in the NHANES database, accessible at https://www.cdc.gov/nchs/nhanes/index.htm.

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