Association of Glycemic Control and Inflammation with Sexual Function Indices: Insights from the International Index of Erectile Function (IIEF) and Female Sexual Function Index (FSFI) in Diabetes Mellitus

Running Title: Glycemic Control, Inflammation, and Sexual Function in Diabetes

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Abstract: <u>Background</u>; Diabetes Mellitus (DM) is the most prevalent endocrine disorder worldwide. It is responsible for most of the world's burden of preventable blindness, end stage renal disease. It disrupts sexual function in both men and women via diabetic - induced end organ damage and psychological stress. Men with diabetes have a threefold increased risk of erectile dysfunction as compared with non - diabetic men similarly contributing to significant morbidity in females. Erectile dysfunction (ED) can be taken as marker for sexual dysfunction for males, measured by International Index of Erectile Function. While female dysfunction can be measured in domain of desire, arousal, lubrication, orgasm, satisfaction, and pain via the or Female Sexual Function Index questionnaire. Neutrophil to lymphocyte ratio (NLR) is easy to obtain marker. Change in NLR over time can serve as marker of inflammation. While glycemic control's impact on sexual dysfunction is known, the role of inflammatory markers like neutrophil - to - lymphocyte ratio in diabetic sexual dysfunction is less understood. <u>Methodology</u>: This cross - sectional observational study included 110 diabetic patients aged 18 years or older from Moti Lal Nehru Medical College, Prayagraj, India. Participants completed the International Index of Erectile Function (IIEF) or Female Sexual Function Index (FSFI) questionnaires, assessing sexual function across multiple domains. NLR and HbA1c levels were measured, along with other clinical parameters (e.g., complete blood count, liver and kidney function tests, lipid profile). Statistical analysis utilized Chi - square and paired t - tests to compare data, with significance set at p < 0.05. Spearman's correlation was applied to examine associations between NLR, HbA1c, age, and sexual dysfunction scores. Results: Sexual dysfunction was reported in 51.8% of the participants, with a higher prevalence in males (58.2%) than females (35.5%). In males, significant negative correlations were found between sexual dysfunction score and both the neutrophil - to - lymphocyte ratio (NLR) (rho = -0.279, p = 0.013) and HbA1c (rho = -0.279) and HbA1c (rho = -0.279 0.345, p = 0.002), suggesting that higher NLR and HbA1c levels are associated with increased sexual dysfunction. In females, significant negative correlations were observed between sexual dysfunction score and NLR (rho = -0.383, p = 0.034), indicating that higher NLR may contribute to sexual dysfunction in this group. Males with sexual dysfunction had higher HbA1c levels ($10.42\% \pm 3.34$) compared to those without (8.83% \pm 2.58, p = 0.025). Similarly, females with sexual dysfunction exhibited higher HbA1c levels (10.36% \pm 4.17) compared to those without (7.94% \pm 2.29, p = 0.044). Elevated HbA1c and NLR was associated with more severe sexual dysfunction in both genders, as indicated by lower IIEF and FSFI scores. <u>Conclusion</u>: This study highlights a significant association between poor glycemic control and inflammation with sexual dysfunction in diabetic individuals. Higher HbA1c and NLR levels were linked to more severe sexual dysfunction, underscoring the need for optimal glycemic management to improve sexual health and quality of life in this population.

Keywords: Diabetes Mellitus, Sexual Dysfunction, Glycemic Control, HbA1c, International Index of Erectile Function (IIEF), Female Sexual Function Index (FSFI).

1. Background

Diabetes mellitus is a collection of metabolic disorders characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or a combination of both [1]. It is one of the most widespread and rapidly growing diseases worldwide, projected to affect 693 million adults by 2045, representing a substantial increase from 2017 [2]. Diabetes can be classified into four main categories: Type 1 diabetes mellitus (T1DM), Type 2 diabetes mellitus (T2DM), gestational diabetes mellitus (GDM), and diabetes associated with specific conditions or pathologies [4].

Chronic hyperglycemia in diabetes has been linked to increased risks of both microvascular and macrovascular complications, driven by mechanisms such as nonenzymatic glycosylation of proteins and lipids, and oxidative stress from pathways like mitochondrial overproduction of superoxide anion (O - 2) and activation of protein kinase C (PKC), which collectively promote inflammation through cytokine induction [5].

Diabetes mellitus impacts sexual function in both men and women due to end - organ damage and psychological stress, with diabetic men facing a threefold higher risk of erectile dysfunction (ED) than non - diabetic men [6]. Research suggests that women with diabetes also have a higher prevalence of sexual dysfunction compared to non - diabetic women, though evidence is more variable. In men, diabetes can lead to several sexual problems, including ED, reduced libido, orgasmic disorders, and retrograde ejaculation [7] [8]. ED may act as an early indicator of diabetes and often occurs 10–15 years earlier in diabetic men, with prevalence estimates as high as 50.4% among Indian diabetic men [9] [10]. The International Index of Erectile Function (IIEF), particularly the IIEF - 5, is frequently used to assess ED severity and its effects on sexual satisfaction [11].

Female sexual health is complex and influenced by psychological and social factors, with diabetic women more prone to dysfunction in areas such as desire, arousal, and lubrication than non - diabetic women [13, 14]. Autonomic neuropathy and endothelial dysfunction in diabetes can impair genital sensitivity, reducing clitoral engorgement, which affects arousal and orgasm potential [15]. The Female Sexual Function Index (FSFI) is a widely used tool that measures various facets of female sexual function, aligning with diagnostic categories of sexual dysfunction as described in the DSM - IV and ICD - 10 [16, 17].

The neutrophil - to - lymphocyte ratio (NLR) serves as a potential marker of inflammation for a range of cardiac and non - cardiac conditions. NLR's predictive ability parallels that of other inflammatory markers, including C - reactive protein (CRP), tumor necrosis factor (TNF - α), and interleukin - 6 (IL - 6), which help identify subclinical inflammation and endothelial dysfunction in clinical settings [18, 19]. As a cost - effective and accessible biomarker, NLR reflects the balance between acute and chronic inflammation and adaptive immunity, with changes in NLR over time indicating possible immune dysfunction [20, 21].

Thus, the aim of this study was to investigate the impact of diabetes mellitus on sexual function in both men and women, examining the prevalence and mechanisms of sexual dysfunction linked to diabetes, including vascular, neural, and hormonal influences. Additionally, the study sought to evaluate the role of the neutrophil - to - lymphocyte ratio (NLR) as an inflammatory biomarker associated with diabetes - related complications, exploring its predictive potential in identifying subclinical inflammation and endothelial dysfunction in diabetic patients.

2. Methodology

Study Design:

This study employed a cross - sectional observational design to explore the association between the neutrophil - to lymphocyte ratio (NLR) and sexual dysfunction in patients with diabetes mellitus. The data were collected from patients presenting to the medical department at Moti Lal Nehru Medical College (MLNMC) in Prayagraj, Uttar Pradesh, India.

Study Participants:

Participants included diabetic patients aged 18 years and above, encompassing both newly diagnosed and previously diagnosed cases. Eligible participants consented to participate by completing the International Index of Erectile Function (IIEF) questionnaire for males or the Female Sexual Function Index (FSFI) questionnaire for females, which assess various domains of sexual functioning.

Inclusion and Exclusion Criteria:

Inclusion criteria for the study required patients to be 18 years or older with a confirmed diagnosis of diabetes mellitus and a willingness to undergo IIEF or FSFI scoring. Exclusion criteria included patients with lower urinary tract symptoms attributable to benign prostatic hyperplasia, those with a history of substance abuse (alcohol or smoking), individuals who had undergone radiation or surgery for prostate cancer, and patients with lower spinal cord injury. Additionally, patients taking medications known to interfere with sexual function, such as thiazides, spironolactone, calcium channel blockers, beta - blockers, methyldopa, clonidine, reserpine, clofibrate, cimetidine, ranitidine, corticosteroids, methotrexate, cytotoxic agents, selective serotonin reuptake inhibitors (SSRIs), and tricyclic antidepressants (TCAs), were also excluded from the study.

Study Procedure:

Diabetic patients were evaluated using either the IIEF (for males) or FSFI (for females) questionnaires, with scoring based on established cut - off values indicating sexual dysfunction. The neutrophil - to - lymphocyte ratio (NLR) was measured for all participants, and comparisons were made between individuals with scores below the cut - off (indicative of sexual dysfunction) and those scoring above it. Other investigations included a complete blood count (CBC), serum electrolytes, lipid profile, HbA1c, fasting and postprandial blood sugar, urine routine microscopy, urine microalbumin, liver function tests (ALT, AST, ALP, total protein, serum albumin), and kidney function tests (serum urea and serum creatinine).

3. Statistical Analysis

Data were summarized with categorical variables as numbers and percentages, and continuous variables as mean \pm SD. Paired t - tests were used for baseline and follow - up comparisons, and categorical data were analyzed using Chi square or Fisher's exact tests, with significance set at p < 0.05. SPSS version 23.0 was used for analysis. Descriptive statistics included the arithmetic mean, standard deviation, and range. Spearman's correlation coefficient assessed

relationships between variables, ranging from very weak to very strong correlations.

4. Results

Table 1: Demographic Distribution of Study Population

Age Intervals	Frequency	Percent (%)
18 - 30 years	16	14.5
31 - 40 years	49	44.5
41 - 50 years	34	30.9
51 - 60 years	11	10.0
Male	79	71.8
Female	31	28.2

The study comprised 110 participants, ranging in age from 20 to 58 years, with an average age of 40.07 years (SD = 8.72) and a median age of 38. Age distribution showed that 14.5% of participants were between 18 and 30 years, 44.5% between 31 and 40 years, 30.9% between 41 and 50 years, and 10.0% between 51 and 60 years. The gender distribution revealed that 71.8% of participants were male (n=79) and 28.2% were female (n=31). This demographic data provides a foundational understanding of the study population's age and gender composition.

Table	2: De	escriptive	Statistics	for	Hematol	ogical	Parameters	of total	110	patients
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	Mean	SD	Median	Min	Max	Valid N
HB gm/dl	11.7	1.59	11.64	7.4	15.6	110
TLC cells/mm ³	7555.41	2175.14	7332.5	3260	14599	110
L cells/mm ³	4784.55	1598.88	4626.5	1444	10045	110
N cells/mm ³	2105.15	585.64	2034	516	3629	110
NLR	2.33	0.59	2.3	1.21	5.1	110
MCV (fl)	91.75	66.12	85.3	69.4	776.3	110

This table summarizes the hematological parameters of 110 diabetic patients. The mean hemoglobin (HB) level was 11.70 g/dL (SD = 1.59), with values ranging from 7.40 to 15.60 g/dL. The total leukocyte count (TLC) had a mean of 7555.41 cells/mm³ (SD = 2175.14), with a median of 7332.50 and a range from 3260 to 14599 cells/mm³. Lymphocyte count averaged 4784.55 cells/mm³ (SD = 1598.88), and neutrophil count had a mean of 2105.15 cells/mm³ (SD = 585.64), with respective medians of

4626.50 and 2034.00 cells/mm³. The neutrophil - to lymphocyte ratio (NLR) averaged 2.33 (SD = 0.59), with a median of 2.30, ranging from 1.21 to 5.10. The mean corpuscular volume (MCV) showed a mean value of 91.75 fl (SD = 66.12), with a median of 85.30 and values spanning from 69.40 to 776.30 fl. These data provide insight into the hematological profiles and variability within this diabetic population.

Table 3: Descriptive Statistics of Liver and Kidney function tests

Parameter	Mean	SD	Median	Min	Max	Valid N
SGOT (U/L)	43.15	28.04	34.00	12.00	203.00	110
SGPT (U/L)	37.29	22.07	30.00	11.00	110.00	110
Urea (mg/dL)	29.22	9.37	28.00	13.00	66.00	110
Creatinine (mg/dL)	0.962	0.314	0.980	0.300	2.100	110

The liver and kidney function parameters of the study population are summarized here. The mean SGOT level was 43.15 U/L (SD = 28.04), with a median of 34.00 U/L and a range of 12.00 to 203.00 U/L. For SGPT, the mean was 37.29 U/L (SD = 22.07), with a median of 30.00 U/L and values ranging from 11.00 to 110.00 U/L. The mean urea level was

29.22 mg/dL (SD = 9.37), with a median of 28.00 mg/dL, ranging from 13.00 to 66.00 mg/dL. Creatinine levels averaged 0.962 mg/dL (SD = 0.314), with a median of 0.980 mg/dL, and a range from 0.300 to 2.100 mg/dL. These values provide an overview of liver and kidney function among the diabetic patients in the study.

Table 4: Descriptive Statistics for Blood Sugar Levels, Lipid Profile, and Biochemical Parameters

Parameter	Mean	SD	Median	Min	Max	Valid N
FBS (mg/dL)	182.64	59.26	164.50	112.00	351.00	110
PPBS (mg/dL)	294.89	78.62	265.00	150.00	535.00	110
HbA1c (%)	9.49	3.18	8.40	5.80	18.60	110
Cholesterol (mg/dL)	145.91	48.66	140.50	61.00	259.00	110
Triglyceride (mg/dL)	158.04	69.47	145.00	53.00	410.00	110
HDL (mg/dL)	67.22	20.33	66.50	28.00	156.00	110
LDL (mg/dL)	53.03	30.42	49.50	2.00	131.00	110
VLDL (mg/dL)	30.62	14.35	27.00	9.00	75.00	110
Urine Microalbumin (mg/dL)	44.69	29.37	33.54	2.30	187.75	110
Sodium (mmol/L)	139.58	4.84	139.00	126.00	152.00	110
Potassium (mmol/L)	4.05	0.58	4.00	2.90	5.70	110

This table presents an overview of blood sugar levels, lipid profile, and biochemical parameters for the study population. The mean fasting blood sugar (FBS) level was 182.64 mg/dL, and postprandial blood sugar (PPBS) averaged 294.89 mg/dL,

while the mean HbA1c was 9.49%, indicating elevated blood glucose levels among participants. For lipid parameters, the mean cholesterol level was 145.91 mg/dL, triglycerides averaged 158.04 mg/dL, and HDL, LDL, and VLDL had

means of 67.22 mg/dL, 53.03 mg/dL, and 30.62 mg/dL, respectively. Biochemically, the mean urine microalbumin level was 44.69 mg/dL, indicating renal status, with sodium and potassium levels averaging 139.58 mmol/L and 4.05

mmol/L, respectively, showing electrolyte balance within the population. These data provide a comprehensive snapshot of key metabolic and biochemical indicators in diabetic patients.

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Sexual	Total Population	Percentage	Diabetic Males	Percentage	Diabetic Females	Percentage				
Dysfunction	(N=110)	(%)	(N=79)	(%)	(N=31)	(%)				
Present	57	51.8	46	58.2	11	35.5				
Absent	53	48.2	33	41.8	20	64.5				
Total	110	100.0	79	100.0	31	100.0				

Table 5: Prevalence of Sexual Dysfunction in Study Population by Gender

This table presents the prevalence of sexual dysfunction in a sample of 110 diabetic individuals, segmented by gender. Overall, 57 individuals (51.8%) reported sexual dysfunction, with a higher prevalence observed in males (58.2%) compared to females (35.5%). Among the male participants

(N=79), 46 reported sexual dysfunction, while 33 did not. In contrast, among female participants (N=31), 11 reported sexual dysfunction, and 20 did not. These results highlight a higher incidence of sexual dysfunction in diabetic males compared to females within the study population.

Table 6: Mean Comparison of Age, NLR, and HbA1c According to Sexual Dysfunction Status in Males and Females

Gender	Parameter	Sexual Dysfunction Present	SD	Sexual Dysfunction Absent	SD	p - value
	Age (years)	42.43	9.47	40.12	8.94	0.276
Male	NLR	2.47	0.67	2.16	0.49	0.026
	HbA1c (%)	10.42	3.34	8.83	2.58	0.025
	Age (years)	38.82	6.78	35.25	5.13	0.109
Female	NLR	2.67	0.49	2.08	0.44	0.002
	HbA1c (%)	10.36	4.17	7.94	2.29	0.044

This table compares age, neutrophil - to - lymphocyte ratio (NLR), and HbA1c levels between diabetic patients with and without sexual dysfunction, for both males and females. Among males, those with sexual dysfunction had a higher mean age (42.43 years) compared to those without (40.12 years), although this difference was not statistically significant (p = 0.276). Significant differences were observed in NLR and HbA1c levels between the two groups; males with sexual dysfunction had higher NLR (mean = 2.47) and HbA1c (mean = 10.42%) compared to those without sexual dysfunction (NLR = 2.16, HbA1c = 8.83%), with p - values

of 0.026 and 0.025, respectively. In females, those with sexual dysfunction also showed higher NLR and HbA1c values (mean NLR = 2.67, HbA1c = 10.36%) than those without sexual dysfunction (mean NLR = 2.08, HbA1c = 7.94%), with significant p - values of 0.002 and 0.044. Although the mean age was slightly higher in females with sexual dysfunction (38.82 years) than those without (35.25 years), this difference was not statistically significant (p = 0.109). These findings suggest that elevated NLR and poor glycemic control (as indicated by higher HbA1c) are associated with an increased risk of sexual dysfunction in diabetic individuals.

Table 7: Correlation Analysis of Sexual Dysfunction Scores with Clinical Parameters in Males and Females

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Parameter	Spearman's rho	p - value	N	Spearman's rho	p - value	N
	(Males)	(Males)	(Males)	(Females)	(Females)	(Females)
Sexual Dysfunction	1	-	79	1	-	31
Age (years)	- 0.064	0.573	79	- 0.398	0.027	31
Hemoglobin (g/dL)	- 0.035	0.762	79	0.091	0.626	31
Total Leukocyte Count	- 0.127	0.266	79	0.115	0.536	31
Lymphocytes (cells/mm ³)	- 0.032	0.782	79	0.055	0.768	31
Neutrophils (cells/mm ³)	0.155	0.172	79	0.304	0.097	31
Neutrophil - to - Lymphocyte Ratio (NLR)	- 0.279	0.013	79	- 0.383	0.034	31
Mean Corpuscular Volume (MCV)	0.035	0.763	79	- 0.053	0.775	31
SGOT (IU/L)	0.158	0.164	79	- 0.127	0.498	31
SGPT (IU/L)	0.186	0.101	79	0.120	0.521	31
Urea (mg/dL)	- 0.083	0.468	79	0.120	0.520	31
Creatinine (mg/dL)	0.103	0.366	79	0.018	0.925	31
Fasting Blood Sugar (FBS) (mg/dL)	- 0.004	0.974	79	- 0.347	0.055	31
Postprandial Blood Sugar (PPBS) (mg/dL)	- 0.030	0.793	79	- 0.317	0.083	31
HbA1c (%)	- 0.345	0.002	79	- 0.259	0.159	31
Cholesterol (mg/dL)	- 0.198	0.080	79	- 0.068	0.716	31
Triglycerides (mg/dL)	- 0.076	0.507	79	0.125	0.503	31
HDL (mg/dL)	- 0.045	0.691	79	0.024	0.899	31
LDL (mg/dL)	- 0.088	0.441	79	- 0.070	0.708	31
VLDL (mg/dL)	0.010	0.934	79	0.117	0.532	31
Urine Microalbumin (mg/dL)	- 0.125	0.271	79	- 0.044	0.813	31
Sodium (mmol/L)	- 0.155	0.174	79	- 0.092	0.623	31
Potassium (mmol/L)	0.207	0.068	79	0.111	0.554	31

In this correlation analysis, significant relationships were observed between sexual dysfunction scores and certain clinical parameters among diabetic males and females. In males, significant negative correlations were found between sexual dysfunction score and both the neutrophil - to - lymphocyte ratio (NLR) (rho = - 0.279, p = 0.013) and HbA1c (rho = - 0.345, p = 0.002), suggesting that higher NLR and HbA1c levels are associated with increased sexual dysfunction. In females, significant negative correlations

were observed between sexual dysfunction score and both NLR (rho = -0.383, p = 0.034) and age (rho = -0.398, p = 0.027), indicating that higher NLR and age may contribute to sexual dysfunction in this group. No other parameters showed significant correlations with sexual dysfunction in either gender, highlighting the unique associations of inflammation (as indicated by NLR), glycemic control (HbA1c), and age with sexual dysfunction (indicated by scores) in diabetic patients.



Figure 1: Scatter plots and Spearman's correlation coefficient between NLR and sexual dysfunction scores in males



Figure 2: Scatter plots and Spearman's correlation coefficient between HBA1C and sexual dysfunction scores in males



Figure 3: Scatter plots and Spearman's correlation coefficient between age and sexual dysfunction scores in females



Figure 4: Scatter plots and Spearman's correlation coefficient between NLR and sexual dysfunction scores in females.

5. Discussion

The primary aim of this cross - sectional observational study was to evaluate the prevalence of sexual dysfunction (SD) in male and female diabetic patients and its association with neutrophil - to - lymphocyte ratio (NLR). This study involved 110 diabetic individuals attending the Department of Medicine at Moti Lal Nehru Medical College (MLNMC), Prayagraj, Uttar Pradesh, India. The participants, predominantly male, had an average age of 40.07 ± 8.72 years, with most falling between 31 and 50 years. The study measured multiple clinical parameters, including hemoglobin (HB), total leukocyte count (TLC), lymphocyte count (L), neutrophil count (N), NLR, mean corpuscular volume (MCV), SGOT, SGPT, urea, creatinine, fasting blood sugar (FBS), postprandial blood sugar (PPBS),

HBA1c, cholesterol, triglycerides, HDL, LDL, VLDL, urine microalbumin, sodium, and potassium, among others.

The results indicated that 57 out of 110 participants (51.8%) experienced sexual dysfunction, aligning with findings from a meta - analysis by Natnael Atnafu Gebeyehu et al., which reported a 61.4% prevalence of SD in the diabetic population [22]. In this study, male participants had a significantly higher prevalence of SD compared to females, with 46 of the 79 men reporting erectile dysfunction (ED) at a rate of 58.2%. This result closely aligns with findings from Parmar and Ramakesh, who reported an ED prevalence of 59.38% in diabetic men [22], and Adele Bahar et al., who reported a 62.5% prevalence in diabetic males [24]. Among the female participants, only 11 out of 31 reported SD (35.5%), a lower rate than that observed in studies by Elyasi et al. (78.7%) [25] and Vafaeimanesh et al. (53.6%) [26]. In terms of specific sexual function domains, decreased desire was the most commonly affected area among diabetic females (90.9%), followed by issues with lubrication (81.8%). These results are consistent with Ravikant et al., who found that desire and lubrication were affected in 92% and 88% of diabetic females, respectively [27].

Further analysis of male participants with erectile dysfunction (ED) showed that those with lower IIEF scores had significantly higher mean NLR (2.47 ± 0.67) and HbA1c (10.42 ± 3.34) compared to men without ED, whose mean values were NLR = 2.16 ± 0.49 and HbA1c = 8.83 ± 2.58 (*p* = 0.026 and p = 0.025, respectively). The mean age of men with ED was slightly higher (42.43 \pm 9.47) compared to those without ED (40.12 \pm 8.94), although this difference was not statistically significant (p > 0.05). These findings suggest that poor glycemic control and systemic inflammation, as reflected by elevated HbA1c and NLR, respectively, are associated with lower IIEF scores, indicating more severe ED. Previous studies, such as those by Parmar and Ramakesh [22], similarly identified significant associations between age and ED, although their findings did not demonstrate a relationship between HbA1c and ED, contrasting with the results of this study.

Among female participants, those with sexual dysfunction had significantly lower FSFI scores, with higher mean NLR (2.67 ± 0.49) and HbA1c (10.36 ± 4.17) compared to females without sexual dysfunction, who exhibited mean values of NLR = 2.08 ± 0.44 and HbA1c = 7.94 ± 2.29 (*p* = 0.002 and p = 0.044, respectively). The mean age of females with sexual dysfunction was higher (38.82 ± 6.78) than those without (35.25 ± 5.13) , although this difference did not reach statistical significance (p > 0.05). This highlights that both elevated inflammatory markers (NLR) and poor glycemic control (HbA1c) negatively impact FSFI scores, reflecting more severe sexual dysfunction. While some studies, such as those by John Olarinoye et al. [28] and Fatemi et al. [29], did not find significant correlations between glycemic control and sexual dysfunction, this study demonstrated a clear association between higher HbA1c and lower FSFI scores, suggesting that glycemic status plays a critical role in female sexual health.

These findings are consistent with research by Sambel et al. [30] and Aslan et al. [31], which reported significant

negative correlations between NLR and IIEF scores in males, indicating that systemic inflammation exacerbates ED severity. In this study, Spearman's rho correlation analysis confirmed a significant negative relationship between NLR and IIEF scores (rho = -0.279, p = 0.013) and between HbA1c and IIEF scores (rho = -0.345, p = 0.002). Similarly, in females, NLR showed a significant negative correlation with FSFI scores (rho = -0.383, p = 0.034), reinforcing the role of inflammation in sexual dysfunction in both genders. These findings emphasize the importance of addressing both glycemic control and inflammation to improve sexual function outcomes, as reflected by higher IIEF and FSFI scores, in diabetic patients.

Among female participants, Spearman's rho analysis indicated a significant positive association between sexual dysfunction and NLR, along with a strong negative relationship between sexual function scores on the FSFI and age (rho = -0.398, p = 0.027). Consistent with these findings, Esposito et al. [32] observed that older diabetic women had lower FSFI scores (p < 0.001) but did not find a significant relationship between HbA1c and FSFI scores. While most research has focused on the correlation between NLR and IIEF scores in men, this study contributes novel insights by identifying a significant negative correlation between NLR and FSFI scores in diabetic women, suggesting that inflammation, as indicated by NLR, may play a critical role in female sexual dysfunction in diabetes.

6. Conclusion

This study demonstrates a significant prevalence of sexual dysfunction in diabetic individuals, with males showing lower scores on the **International Index of Erectile Function (IIEF)** and females on the **Female Sexual Function Index (FSFI).** Poor glycemic control and systemic inflammation were strongly associated with more severe sexual dysfunction in both genders. In males, poor glycemic status and higher inflammation levels were linked to worse erectile function, while in females, systemic inflammation and advancing age contributed to reduced sexual function. These findings highlight the importance of managing glycemic levels and addressing inflammation as integral components of diabetes care to improve sexual health and overall quality of life, as reflected in better IIEF and FSFI scores.

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