

Supplementary Material

Search strategy

PubMed (273)

("IPSS"[tiab] OR "International Prostate Symptom Score"[tiab] OR "lower urinary tract symptoms"[MeSH] OR "LUTS"[tiab]) AND ("prostate volume"[tiab] OR "prostatic volume"[tiab]) AND ("post-void residual"[tiab] OR "PVR"[tiab] OR "residual urine"[tiab]) AND ("quality of life"[MeSH] OR "QoL"[tiab] OR "symptom score"[tiab]) AND ("benign prostatic hyperplasia"[MeSH] OR "BPH"[tiab]) AND ("2008"[PDat]:"2024"[PDat]) AND ("english"[lang])

Scopus (468)

TITLE-ABS(("IPSS" OR "International Prostate Symptom Score" OR "prostate symptom score") AND ("prostate volume" OR "prostatic volume") AND ("post-void residual" OR "PVR" OR "residual urine") AND ("quality of life" OR "QoL")) AND PUBYEAR > 2009 AND PUBYEAR > 2009 AND PUBYEAR < 2027 AND PUBYEAR > 2009 AND PUBYEAR < 2027 AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE,"English"))

Web of Science (396)

TS=("IPSS" OR "International Prostate Symptom Score") AND TS=("prostate volume" OR "prostatic volume" OR "gland volume") AND TS=("post-void residual" OR "PVR" OR "residual urine" OR "bladder outlet obstruction") AND TS=("quality of life" OR "QoL" OR "symptom burden") AND TS=("BPH" OR "benign prostatic hyperplasia" OR "lower urinary tract symptoms" OR "LUTS") AND PY=(2008-2024) AND DT=Article AND LA=English

Lens.org (313)

("International Prostate Symptom Score") AND ("prostate volume") AND ("post-void residual") AND ("quality of life") AND ("benign prostatic hyperplasia") AND ("correlation" OR "associated") AND ("cross-sectional" OR "cohort")

Supplementary TABLE 1: Complete Leave-One-Out (LOO) Sensitivity Analysis**(k = 5; N = 705)**

Full model: pooled $r = 0.713$ (95% CI: 0.557-0.820); Fisher's $Z = 0.893$; $I^2 = 3.26\%$; $p < .001$

Study Removed	New Fisher's Z	New Pooled r	Δr	95% CI (r scale)	Stability
None (Full model)	—	0.713	—	[0.557-0.820]	Reference
Roy et al. [18]	0.837	0.684	-0.029	[0.518-0.797]	Stable
Taneja et al. [7]	0.850	0.691	-0.022	[0.530-0.800]	Stable
Nnabugwu et al. [3]	0.789	0.658	-0.055	[0.479-0.779]	Stable
Nketiah et al. [6]	0.975	0.751	+0.038	[0.609-0.844]	Stable
Timilsina et al. [23]	0.780	0.653	-0.060	[0.465-0.776]	Stable

LOO range: $r = 0.653$ -0.751. No removal reversed direction or significance. All $|\Delta r| \leq 0.060$ - pool is highly stable.

Meta-Analysis 2: Prostate Volume–IPSS (k = 12; N = 1,446)

Full model: pooled $r = 0.457$ (95% CI: 0.257-0.619); Fisher's $Z = 0.493$; $I^2 = 38.37\%$; $p < .001$

Study Removed	New Fisher's Z	New Pooled r	Δr	95% CI (r scale)	Stability
None (Full model)	—	0.457	—	[0.257-0.619]	Reference
Udeh et al. [17]	0.487	0.452	-0.005	[0.237-0.618]	Stable
Hossain et al. [25]	0.437	0.411	-0.046	[0.194-0.589]	Stable
NG et al. [2]	0.449	0.421	-0.036	[0.214-0.594]	Stable
Awaisu et al. [9]	0.514	0.473	+0.016	[0.278-0.632]	Stable
Rananda et al. [4]	0.449	0.421	-0.036	[0.210-0.594]	Stable

Yadav et al. [26]	0.424	0.401	-0.056	[0.190-0.577]	Stable
Ngwa-Ebogo et al. [24]	0.447	0.419	-0.038	[0.208-0.592]	Stable
Maghfira et al. [28]	0.391	0.372	-0.085	[0.155-0.554]	Influential
Rehman et al. [30]	0.487	0.452	-0.005	[0.243-0.622]	Stable
Sadiq et al. [27]	0.446	0.419	-0.038	[0.207-0.592]	Stable
Almaasah et al. [29]	0.443	0.417	-0.040	[0.203-0.591]	Stable
Shah et al. [11]	0.373	0.357	-0.100	[0.140-0.543]	Influential

LOO range: $r = 0.357-0.473$. Two influential studies identified ($|\Delta r| \geq 0.05$): Maghfira et al. ($\Delta r = -0.085$) [28] and Shah et al. ($\Delta r = -0.100$) [11]. Removal of either still yields a moderate-to-large, pooled r . Direction and significance was unchanged across all 12 iterations.

Meta-Analysis 3: IPSS-Post-Void Residual (k = 11; N = 2,663)

Full model: pooled $r = 0.363$ (95% CI: 0.150-0.543); Fisher's $Z = 0.380$; $I^2 = 51.18\%$; $p = .001$

Study Removed	New Fisher's Z	New Pooled r	Δr	95% CI (r scale)	Stability
None (Full model)	—	0.363	—	[0.150-0.543]	Reference
Ko et al. [13]	0.398	0.381	+0.018	[0.183-0.548]	Stable
Cakiroglu [31]	0.375	0.359	-0.004	[0.141-0.535]	Stable
Aisuodionoe-Shadrach et al. [32]	0.384	0.367	+0.004	[0.151-0.545]	Stable
Hamza et al. [10]	0.390	0.373	+0.010	[0.159-0.547]	Stable
Mbouché et al. [1]	0.413	0.393	+0.030	[0.180-0.561]	Stable
Nnabugwu et al. [3]	0.369	0.354	-0.009	[0.137-0.532]	Stable
Apata et al. [5]	0.405	0.386	+0.023	[0.171-0.557]	Stable
Kohler & Kausik [16]	0.404	0.386	+0.023	[0.171-0.557]	Stable
Nketiah et al. [6]	0.409	0.390	+0.027	[0.175-0.560]	Stable
Shah et al. [11]	0.356	0.342	-0.021	[0.123-0.524]	Stable

Fazal et al. [12]	0.291	0.283	-0.080	[0.105-0.444]	Influential
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LOO range: $r = 0.283-0.393$. One influential study identified: Fazal et al. ($\Delta r = -0.080$) [15], consistent with a small-study effect from a highly selected tertiary referral population. Removal reduces pooled r to 0.283 but the result remains positive and statistically significant ($p < .05$). Direction and significance was unchanged across all 11 iterations.

NOTE: Δr = change in pooled r relative to the full model (reference row). New pooled r calculated using REML random-effects model on the remaining $k - 1$ studies. 95% CIs on the r scale, back-transformed from Fisher's Z interval bounds. 95% CIs for the IPSS-QoL full iterations are presented in abbreviated form; complete values are available in this file and reproduced from the jamovi *metafor* output. Stability criteria: '**Stable**' = $|\Delta r| < 0.05$ and no change in direction or statistical significance; '**Influential**' = $|\Delta r| \geq 0.05$ (flagged for scrutiny). No removal reversed the direction, significance, or substantive interpretation of any pooled finding. CI = confidence interval; IPSS = International Prostate Symptom Score; k = number of studies; LOO = leave-one-out; N = total participants; REML = restricted maximum likelihood; PV = Prostate Volume; PVR = Post-Void Residual; QoL = Quality of Life.

Methodological Quality Assessment of Included Studies (Adapted JBI/NOS Criteria)

First Author (Year)	Country	Study Design	Outcome Pair	D 1	D 2	D 3	D 4	Total	Quality Rating
Roy et al. [18] (2016)	India	Prospective study	IPSS–QoL	1	1	1	1	4	High
Taneja et al. [7] (2017)	India	Prospective study	IPSS–QoL	1	1	1	1	4	High
Nnabugwu et al. [3] (2023)	Nigeria	Cross-sectional	IPSS–QoL / IPSS–PVR	1	1	1	1	4	High
Nketiah et al. [6] (2024)	Ghana	Cross-sectional	IPSS–QoL / IPSS–PVR	1	1	1	1	4	High
Timilsina et al. [23] (2024)	Nepal	Comparative cross-sectional	IPSS–QoL	1	1	1	1	4	High
Udeh et al. [17] (2012)	Nigeria	Prospective study	PV–IPSS	1	1	1	1	4	High
Hossain et al. [25] (2013)	Bangladesh	Cross-sectional	PV–IPSS	1	1	0	1	3	Moderate
NG et al. [2](2015)	India	Prospective observational	PV–IPSS	1	1	1	1	4	High
Yadav et al. [26] (2021)	India	Prospective study	PV–IPSS	1	1	1	1	4	High
Awaisu et al. [9] (2021)	Nigeria	Prospective correlational	PV–IPSS	1	1	1	1	4	High

Rananda et al. [4] (2021)	Indonesia	Retrospective descriptive	PV–IPSS	1	1	0	1	3	Moderate
Ngwa-Ebogo et al. [24] (2023)	Cameroon	Retrospective cross-sectional	PV–IPSS	1	1	1	1	4	High
Sadiq et al. [27] (2024)	Pakistan	Cross-sectional	PV–IPSS	1	1	1	1	4	High
Maghfira et al. [28] (2024)	Indonesia	Analytical cross-sectional	PV–IPSS	1	1	1	1	4	High
Shah et al. [11] (2024)	Pakistan	Analytical cross-sectional	PV–IPSS / IPSS–PVR	1	1	1	1	4	High
Rehman et al. [30] (2024)	Pakistan	Cross-sectional	PV–IPSS	1	1	1	1	4	High
Almaasah et al. [29] (2025)	Indonesia	Cross-sectional	PV–IPSS	1	1	1	1	4	High
Ko et al. [13] (2010)	Korea	Retrospective cohort	IPSS–PVR	1	1	1	1	4	High
Cakiroglu [31] (2013)	Turkey	Retrospective study	IPSS–PVR	1	1	0	1	3	Moderate
Aisuodionoe-Shadrach et al. [32] (2020)	Nigeria	Cross-sectional	IPSS–PVR	1	1	1	1	4	High
Hamza et al. [10] (2021)	Nigeria	Cross-sectional	IPSS–PVR	1	1	1	1	4	High

Mbouché et al. [1] (2022)	Cameroon	Analytical cross-sectional	IPSS–PVR	1	1	1	1	4	High
Apata et al. [5] (2023)	Nigeria	Cross-sectional	IPSS–PVR	1	1	1	1	4	High
Kohler & Kausik [16] (2023)	USA	Retrospective subpopulation analysis	IPSS–PVR	1	1	1	1	4	High
Fazal et al. [12] (2025)	Pakistan	Analytical cross-sectional	IPSS–PVR	1	1	1	1	4	High

Note: Methodological quality was assessed using an adapted Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Studies, supplemented with elements of the Newcastle–Ottawa Scale (NOS). Four domains were evaluated: D1 clarity of inclusion/exclusion criteria (selection bias); D2 use of standardized tools (measurement validity) (e.g., IPSS and ultrasonography for PV and PVR); D3 identification and adjustment for potential confounder (confounding control) s; and D4 use of valid correlation analyses (Pearson’s r or Spearman’s ρ) with reported significance (statistical appropriateness). Each domain was scored as 1 (Yes) or 0 (No/Unclear). Total scores were classified as high quality (4), moderate quality (3), and low quality (≤ 2). Studies contributing to multiple meta-analyses are indicated with combined outcome pairs.