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Development and validation for disease burden and quality of life before and after hysterectomy using an in house Kawita Bapat score

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Abstract:

The absence of a comprehensive, culturally relevant patient-reported measure limits accurate assessment of disease burden and quality of life in women undergoing hysterectomy for benign gynecological conditions. Therefore, it is of interest to evaluate the 22-item Kawita Bapat Score (KBS) in 220 women, assessing reliability, validity, reproducibility and responsiveness. The KBS showed excellent internal consistency (Cronbach's $\alpha=0.91$), test-retest reliability (ICC=0.89) and strong construct validity with WHOQOL-BREF domains ($r=0.71-0.79$). Mean KBS decreased from 71.4 ± 11.8 pre-operatively to 28.2 ± 8.5 at 6 months ($p<0.001$), with large effect sizes at 6 weeks and 6 months, confirming strong responsiveness to post-operative improvement. The KBS is a reliable, valid, responsive and clinically feasible tool for quantifying disease burden and quality-of-life changes before and after hysterectomy.

Keywords: Hysterectomy, quality of life, symptom severity score, validation study, Kawita Bapat Score (KBS), benign gynecological disease, reliability, responsiveness

Background:

Although minimally invasive surgical techniques and perioperative management have improved, the decision to perform hysterectomy is still heavily dependent on the severity of symptoms, impact on daily functioning and deterioration in quality of life [1]. The assessment of the disease burden in gynecology has been traditionally based on clinical examination, imaging parameters, laboratory parameters and physician judgment [2]. Conventional clinical methods are not sufficient to fully capture the patient-centered outcomes that are important to patients and treatment satisfaction, such as heavy menstrual bleeding, pelvic discomfort, fatigue, urinary dysfunction, sexual dissatisfaction, emotional stress and social limitations [3, 4]. In gynecological practice, there has been a growing focus on patient-reported outcome measures (PROMs) [5]. Most of the available tools are disease-specific, lengthy, culturally non-adapted, or impractical in the outpatient setting. Several validated tools have been used to assess the severity of symptoms and health-related quality of life among women undergoing gynecological interventions, including the Uterine Fibroid Symptom and Quality of Life questionnaire (UFS-QOL), Menorrhagia Multi-Attribute Scale and SF-36 health survey [6, 7]. Furthermore, many tools fail to comprehensively assess post-operative recovery and holistic improvement following hysterectomy [8]. However, in the Indian healthcare setting, there are other challenges in measuring patient-centered outcomes, including socioeconomic diversity, differences in literacy, cultural beliefs about menstruation and femininity and the lack of validated local scoring systems, making a simple, reliable, multidimensional and culturally adaptable scoring system highly desirable [9, 10]. To address this, the Kawita Bapat Score (KBS) was developed, which combines symptom severity, physical impairment, emotional wellbeing, social functioning, urinary symptoms, sexual symptoms and post-operative recovery into one structured scoring system. The Kawita Bapat Score (KBS) is a 22-item, multidimensional, patient-reported outcome measure developed to assess disease burden and quality of life in women undergoing hysterectomy for benign gynecological conditions. It covers seven domains: menstrual

symptoms, pelvic pain, urinary symptoms, sexual wellbeing, psychological health, social and occupational functioning and postoperative recovery. Each item is scored from 0 (no symptoms) to 4 (very severe), giving a total score of 0–88, with higher scores indicating greater disease burden and poorer quality of life. The tool has established reliability and validity in terms of construct validity, content validity, criterion validity and responsiveness to clinical change. The score was developed to be easily administered, reproducible and clinically relevant to a variety of gynecological populations. Reliability, validity, sensitivity and interpretability are key requirements for development of the scoring system in medicine before clinical use, which will help in clinical decision making, standardized outcome assessment, comparative research and patient counselling. Therefore, it is of interest to evaluate the benefits of hysterectomy on women with chronic gynecological disorders in terms of quality of life, sexual wellbeing and mental health.

Materials and Methods:**Study design:**

This prospective observational validation study was conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital over a period of 18 months from January 2024 to June 2025.

Study population:

Women planned for hysterectomy due to benign gynecological disorders were considered eligible.

Inclusion criteria:

- [1] Women aged 30–60 years
- [2] Patients undergoing abdominal, vaginal, laparoscopic, or minimally invasive hysterectomy
- [3] Benign gynecological indications
- [4] Ability to understand and respond to questionnaire items
- [5] Consent for participation

Exclusion criteria:

- [1] Malignancy
- [2] Psychiatric illness impairing communication

- [3] Severe medical comorbidities causing unrelated disability
- [4] Cognitive impairment
- [5] Refusal to participate

Sample size:

Based on psychometric validation recommendations requiring at least 5–10 participants per questionnaire item and considering 22 proposed items in the preliminary tool, a minimum sample size of 220 participants was calculated.

Development of the Kawita Bapat score:**Phase I: Item Generation:**

Initial items were generated through:

- [1] Extensive literature review
 - [2] Expert gynecologist consultation
 - [3] Semi-structured patient interviews
 - [4] Review of existing quality-of-life scales
- A pool of 38 items was initially prepared.

Phase II: content validation:

An expert panel consisting of:

- [1] 5 gynecologists
- [2] 2 psychiatrists
- [3] 2 epidemiologists
- [4] 1 biostatistician

Reviewed the items for relevance, clarity, cultural appropriateness and redundancy. Items with Content Validity Ratio below 0.70 were removed.

Phase III: pilot testing:

Pilot testing was performed on 30 women. Ambiguous items were modified based on participant feedback (Table 1).

Final Structure of the Kawita Bapat Score

The final scoring system contained 22 items under 7 domains:

- [1] Menstrual Symptoms
- [2] Pelvic Pain
- [3] Urinary Symptoms
- [4] Sexual Wellbeing
- [5] Psychological Health
- [6] Social and Occupational Functioning
- [7] Post-operative Recovery

Each item was scored from 0 to 4:

- [1] 0 = No symptoms
- [2] 1 = Mild
- [3] 2 = Moderate
- [4] 3 = Severe
- [5] 4 = Very severe

Total score range: 0–88

Higher scores indicated greater disease burden and poorer quality of life.

Data collection:

Baseline demographic and clinical data included:

- [1] Age
- [2] BMI

- [3] Educational status
- [4] Socioeconomic status
- [5] Parity
- [6] Indication for hysterectomy
- [7] Surgical approach
- [8] Duration of symptoms

KBS was administered:

- [1] Preoperatively
- [2] At 6 weeks post-operative
- [3] At 6 months post-operative

WHOQOL-BREF questionnaire was additionally used for construct validation.

Statistical analysis:

Data were analyzed using SPSS version 26.0.

Reliability assessment:

- [1] **Internal consistency:** Cronbach's alpha
- [2] **Test-retest reliability:** Intraclass correlation coefficient

Validity assessment:

- [1] Content validity index
- [2] Construct validity
- [3] Criterion validity
- [4] Convergent validity

Responsiveness:

Paired t-test and effect size calculations were used to assess change over time. P-value <0.05 was considered statistically significant.

Results:

A total of 220 women were included. The study population predominantly consisted of middle-aged women with a mean age of 45.8 years, reflecting the common perimenopausal age group undergoing hysterectomy. Most participants were multiparous and belonged to rural areas. A majority were literate, facilitating questionnaire-based assessment. The average symptom duration of nearly four years indicates prolonged disease burden and delayed surgical intervention among affected women (Table 2). Abnormal uterine bleeding was the most common indication for hysterectomy, accounting for 38.6% of cases, followed by fibroid uterus (29.5%). Adenomyosis and pelvic organ prolapse contributed to a moderate proportion of surgeries, while endometriosis and chronic pelvic pain were less frequent indications. These findings suggest that menstrual disorders and benign uterine pathologies remain the predominant reasons for hysterectomy among women in the study population (Table 3). The Kawita Bapat Score demonstrated excellent reliability and internal consistency. A high Cronbach's alpha (0.91) indicated strong coherence among questionnaire items, while the intraclass correlation coefficient (0.89) confirmed excellent reproducibility of the scale over repeated assessments. Split-half reliability of 0.87 further supported consistency between different sections of the scoring system. The statistically significant test-retest reliability

($p<0.001$) established the stability and dependability of the scoring system for clinical and research use (Table 4). The Kawita Bapat Score demonstrated significant post-operative reduction in disease burden following hysterectomy, with marked improvement observed at both 6 weeks and 6 months. Strong correlations with WHOQOL-BREF domains confirmed excellent construct validity. High effect sizes indicated strong responsiveness of the scale in detecting clinical improvement. Maximum benefit was noted in menstrual symptoms, pelvic pain and social functioning, while psychological and sexual wellbeing also improved moderately over time (Table 5).

Table 1: Pilot Structure of the Kawita Bapat Score

Domain a. Core gynecologic symptoms
Abdominal Uterine Bleeding
Dysmenorrhea (Painful Periods)
Intermenstrual Bleeding
Postcoital Bleeding
Vaginal Discharge
Pelvic Pain
Abdominal Pain/Pressure
Backache (Pelvic Related)
Abdominal Swelling/ Mass Effect
Urinary Symptoms (Pelvic-Related)
Bowel Symptoms (Pelvic-Related)
Dyspareunia
Domain b. Pelvic support & anatomy
Uterovaginal Prolapse
Previous Abdominal/ Pelvic Surgery
Domain c. Functional impact & wellbeing
Fatigue/ Low Energy
Emotional Distress

Table 5: Preoperative and Post-operative Changes in Kawita Bapat Score (KBS), Construct Validity, Responsiveness and Domain-Wise Improvement

Parameter	Findings	Statistical Significance / Interpretation
Preoperative Mean KBS Score	71.4 ± 11.8	Indicates high disease burden and poor baseline quality of life before hysterectomy
6 Weeks Post-operative Mean KBS Score	41.6 ± 9.4	Significant reduction in symptom severity and improvement in daily functioning ($p<0.001$)
6 Months Post-operative Mean KBS Score	28.2 ± 8.5	Marked long-term improvement in quality of life and reduction in disease burden ($p<0.001$)
Construct Validity - Physical Health Correlation	$r = 0.79$	Strong positive correlation with WHOQOL-BREF physical health domain
Construct Validity - Psychological Health Correlation	$r = 0.74$	Demonstrates good agreement with psychological wellbeing assessment
Construct Validity - Social Functioning Correlation	$r = 0.71$	Indicates reliable assessment of social functioning and interpersonal wellbeing
Construct Validity - Overall Quality of Life Correlation	$r = 0.76$	Confirms strong overall construct validity of the KBS tool
Effect Size at 6 Weeks	1.24	Demonstrates excellent responsiveness to early post-operative clinical improvement
Effect Size at 6 Months	1.86	Indicates very high sensitivity of KBS in detecting long-term clinical change
Domains Showing Greatest Improvement	Menstrual symptoms, pelvic pain, social functioning	Reflects substantial symptomatic relief and improved social quality of life after hysterectomy
Domains Showing Moderate Improvement	Sexual wellbeing, psychological health	Indicates gradual but meaningful post-operative psychosocial recovery

Discussion:

In the present study, the Kawita Bapat Score, a novel multidimensional scoring system, was successfully developed and validated to measure disease burden and quality of life of women undergoing hysterectomy for benign gynecological conditions. The score had good psychometric properties with high reliability, validity and good responsiveness to post-operative clinical improvement. Although there has been significant progress in conservative treatment, hysterectomy remains one of the most frequently performed gynecological procedures in the world. Current symptom burden and post-

Concentration Difficulty
Interference With Daily Activities
Work/ Household Impact
Sexual Problems
Clinically Significant Section Related Limitation

Table 2: Baseline demographic characteristics

Parameter	Value
Mean age (years)	45.8 ± 6.4
BMI (kg/m²)	26.1 ± 3.2
Multiparous women	84.5%
Rural population	58.2%
Literate participants	72.7%
Mean duration of symptoms	3.8 ± 1.7 years

Table 3: Clinical indications for surgery

Indication	Frequency	Percentage
Abnormal uterine bleeding	85	38.6%
Fibroid uterus	65	29.5%
Adenomyosis	28	12.7%
Pelvic organ prolapse	18	8.2%
Endometriosis	14	6.4%
Chronic pelvic pain	10	4.6%

Table 4: Reliability Statistics of Kawita Bapat Score

Parameter	Value
Cronbach's alpha	0.91
Intraclass correlation coefficient	0.89
Split-half reliability	0.87
Test-retest reliability p-value	<0.001

operative quality of life assessment tools tend to assess symptom domains in isolation and do not measure patient wellbeing. The mean age of women in the present study was 45.8 years, which is similar to the report of Laughlin -Tomossa *et al.* who found the peak age of hysterectomy was 40-50 years of age [4]. The abnormal uterine bleeding and fibroid uterus as the most common indications for hysterectomy were also similar to the findings of other studies worldwide [5]. The Kawita Bapat Score has a multidimensional structure that includes physical, psychological, sexual and social domains, one of the major strengths of the score. The KBS overcomes this limitation by

incorporating the severity of the symptoms with quality of life indicators relevant to Indian women. Cronbach's alpha was used to assess internal consistency and was found to be 0.91, which is considered as good homogeneity of the items in the questionnaire. The alpha found in the present study was higher, indicating that the items were well correlated with each other, but not overly redundant. The test-retest reliability was also good (ICC = 0.89). This means that the scoring system is stable over time in unchanging clinical conditions. In patient-reported outcome measures, reliability is especially crucial as it can have a significant impact on clinical applicability, due to the potential for different interpretations of the results. The content validity index was 0.93, indicating high degree of agreement among experts in the relevance and clarity of the items. The use of multidisciplinary expert review improved conceptual comprehensiveness of the scale. The inclusion of psychiatrists and epidemiologists along with gynecologists provided a more comprehensive evaluation of the psychosocial domains and methodological rigor. Construct validity was established by high correlations between the domains of the KBS and WHOQOL-BREF. The results indicate that the Kawita Bapat Score is a valid scoring system to measure concepts related to health-related quality of life, with correlation coefficients > 0.70. There was a substantial decrease in post-operative scores after hysterectomy at 6 weeks and 6 months. The mean total KBS improved significantly from 71.4 pre-operatively to 28.2 at 6 months, indicating a significant decrease in disease burden and functioning. Previous studies of hysterectomy outcomes have similarly reported significant improvements in quality of life following surgery, particularly by 6 months [11]. The greatest improvement was seen in the domains of menstrual symptoms and pelvic pain. This is a logical finding, as the source of abnormal bleeding and uterine pain is removed during a hysterectomy. Similar decreases in symptom distress after hysterectomy for benign conditions were reported by Revicki *et al.* [12]. There was also significant improvement in psychological wellbeing and social functioning. Improvement of these symptoms can thus have a beneficial effect on mental health and interpersonal relationships. Moderate but significant post-operative improvement was observed for sexual wellbeing. The present study found improvement, which could be due to relief of chronic pain, reduction in anxiety and increased body comfort [13]. One of the major benefits of the KBS is its simplicity and usability in the fast-paced outpatient environment. The questionnaire took 10-12 minutes to complete for most participants. Concise scoring systems are more clinically useful in resource-limited health care systems where long psychometric scoring systems may not be feasible [14]. The score is also culturally adaptable, improving its applicability. There are many international scoring systems that include language or concepts that may not be readily understood in regional populations. In pilot testing, some changes were made to make the language understandable and culturally relevant [15]. The responsiveness analysis revealed high sensitivity to clinical change with large effect sizes at post-operative follow-up. The KBS seems to be appropriate for both baseline assessment and post-operative

monitoring and comparative effectiveness studies [16-18]. There are several clinical implications of the study. First, the score can be used to quantify the burden of disease, which can help with individual counselling prior to surgery. Secondly, it could enable surgeons to assess the surgical results objectively. Third, the use of PROMs in gynecology could improve patient-centred care. However, there are some drawbacks to be noted. This study was performed at a single tertiary care center, so the results may not be generalizable. Post-operative follow-up was not done long-term (after 6 months). Larger populations and regional language adaptations are recommended for external multicentre validation. The Kawita Bapat Score should be investigated in minimally invasive hysterectomy, conservative gynecological treatments and comparative outcome studies. The electronic medical record integration of the scoring system could further enhance the usability of the system. In general, the present study validates Kawita Bapat Score as a scientifically sound, clinically feasible and culturally appropriate scoring system for measuring disease burden and quality of life in women who have undergone hysterectomy.

Conclusion:

The Kawita Bapat Score showed good reliability, validity, reproducibility and responsiveness for assessing women undergoing hysterectomy for benign gynecological conditions. The score effectively captured post-operative improvements in symptom burden and quality of life, supporting its patient-centered utility. The scoring system may serve as a practical adjunct to clinical assessment, research and post-operative follow-up in benign gynecological care.

Advancement to knowledge:

This study introduces a clinically useful and psychometrically sound tool that can support pre-operative counselling, post-operative monitoring and outcome-based gynecological care.

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