



Long-Term Health Related Quality of Life Following Uterine Fibroid Embolization in a Predominantly Black African Population: A Retrospective Cohort Study

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Abstract

Uterine Fibroid Embolization (UFE) is one of the effective options available for treatment of symptomatic uterine fibroids with documented improvement in the quality of life and reduction in symptoms. The study assessed long-term quality of life post-uterine fibroid embolization in a mostly black population, noting scanty local or African research on this topic despite evidence suggesting a higher fibroid burden among black women. This retrospective study examined patients who underwent UFE from 2009 to 2014. Participants completed online demographic and UFS-QOL surveys. Statistical tests included Wilcoxon signed rank tests for HRQOL score differences and Pearson correlation for associations between independent factors and outcomes like quality of life and symptom severity. Data from 77 participants showed a median follow-up of eight years post-UFE. Median health-related quality of life significantly improved from baseline, with a median score of 88.6 (62.9 - 98.3). Symptom severity score also decreased significantly from baseline (54.7 to 21.9, $p < 0.001$). Additionally, 31.1% reported follow-up fibroid treatments, 14.3% had major repeat procedures, and 22% reported pregnancies post-UFE, with 13% having children thereafter.

Subject Areas

Public Health

Keywords

Uterine Fibroid Embolization, Uterine Fibroid Symptom and Quality of Life

1. Introduction

Uterine fibroids, also known as leiomyomas, are the commonest benign pelvic neoplasms among women of reproductive age leading to a significant healthcare burden [1] [2]. Fibroids are estimated to occur in 20% - 40% of all women during their reproductive period [3] and more than half are asymptomatic [4]. Women of African descent have been found to be approximately three times more likely to develop fibroids compared to women of Caucasian descent [2].

Racial differences have also been described with regard to the symptomatology, age of onset, number and size of fibroids, rates of hysterectomy due to fibroids and regression following menopause. Compared to white women, research shows that black women have an increased risk of fibroids, are younger at diagnosis, are more symptomatic, have larger and more numerous fibroids and are more likely to require surgery for fibroids [2] [5]-[10].

Uterine fibroids can cause a range of troublesome symptoms that greatly affect a person's quality of life and overall well-being. Some of these symptoms include heavy menstrual bleeding, pelvic pain, and uncomfortable pressure sensations [11] [12]. These symptoms can significantly impact one's quality of life, making it necessary to seek treatment for uterine fibroids [11].

Pharmacological interventions for the management of symptomatic uterine fibroids often yield short-term effects [13]. The main surgical options for treating symptomatic uterine fibroids are hysterectomy and myomectomy. Hysterectomy is considered a definitive solution, but it may not be suitable for women who want to have children in the future. On the other hand, myomectomy is a major surgical procedure that carries risks of complications and even mortality [14]. Uterine Fibroid Embolization (UFE) is a minimally invasive radiological technique that has been in use for the management of uterine fibroids for roughly two decades now [15]. The goal of this procedure is to interrupt the blood flow in the uterine arteries, which effectively cuts off the blood supply to the fibroid while preserving the blood supply to the normal myometrium. This is made possible by the presence of numerous collateral blood vessels [16].

UFE is currently a standard of treatment in many high-income countries. Although it is used in Africa, it is limited due to the unavailability of expertise and cost implications in resource-constrained settings [17]. Several studies have documented its effectiveness and safety in the management of symptomatic fibroids with a low rate of major adverse events and high patient satisfaction [18] [19]. While fibroid embolization has become a well-established treatment option in Western countries, its effectiveness, safety, and cost considerations in the African setting, where there is a significant burden of fibroid-related disease, are not yet clear. We aimed to assess the long-term quality of life following uterine fibroid embolization at Aga Khan University Hospital, Nairobi-Kenya using a validated disease-specific questionnaire. We conducted this study with the aim of increasing knowledge and understanding of UFE as an alternative treatment option for fibroids in our local setting and in Africa as a whole.

2. Methods

This was a retrospective cohort study done at Aga Khan University Hospital Nairobi (AKUH-N) between July 2019 and March 2020 including patients with symptomatic uterine fibroids who had opted for uterine fibroid embolization (UFE). The primary objective of this study was to determine the long-term health-related quality of life following UFE. Secondary objectives included assessment of the symptom severity among the participants, pregnancy rates and follow up treatments after the initial UFE procedure.

The study used the Uterine Fibroid Symptom and Quality of Life questionnaire (UFS-QOL) to collect the data on ongoing symptoms and the quality of life of the participants. The UFS-QOL questionnaire is a validated disease-specific questionnaire for the assessment of symptoms and quality of life due to uterine fibroids. The UFS-QOL has two scales: the symptom severity scale (SSS) and health-related quality of life scale (HRQOL). The SSS consists of eight questions scored on 5-point Likert scale. The HRQOL on the other hand has 29 questions with six subscales and similarly scored on 5-point Likert score [20]. The higher the score on the HRQOL Scale, the better the quality of life.

Following approval from the Aga Khan University ethics and research committee the study investigators enrolled patients who had UFE at AKUHN between 2009 and 2014. Study investigators and researchers then contacted potential participants via email using the information obtained from the hospital records. Each potential participant was emailed a personalized letter on the survey. The letter introduced the survey by outlining the instructions concerning participation and the purpose of the study. The invitation email also outlined issues such as confidentiality and the benefits of taking part in the survey. Within a week of emailing the letter of introduction, the research assistants called and sent the potential participants a link to the survey via either email, text message or WhatsApp. Clicking on this link redirected the potential participants to the Survey Monkey website specific to the study that had the data collection tools (informed consent, the data demographic tool and the questionnaire).

The collected data were analyzed using IBM SPSS statistics version 23 and descriptive statistics tabulated. Categorical variables were presented as frequencies and percentages. The continuous variables data was skewed hence were presented as median and interquartile range. Evaluation for statistical significance between the current HRQOL score and baseline scores in similar studies was done using one-sample Wilcoxon signed rank test. To evaluate for the statistical significance between baseline and current symptom severity, related samples Wilcoxon signed rank test was employed. Pearson correlation analysis was carried out to evaluate possible associations between various independent factors and specific outcomes of interest such as quality of life and symptom severity score. The strength and direction of association were deemed significant with a p-value of less than 0.05.

3. Results

One hundred and sixty-six were eligible for the study, only 103 responded and consented to participate in the study. Eventually, 77 responses were deemed valid data for analysis. Various demographic characteristics such as baseline age, uterine volume, dominant fibroid volume, symptom score, fibroid number, fertility goal and anemia status were extracted from the AKUHN UFE database. The median age of the study participants was estimated to be 50 years. The median age at the initial UFE procedure was 43 years. The median duration after the UFE procedure was eight years with an interquartile range of 6 - 9 years. Majority of the participants identified as of black race and had achieved a tertiary level of education.

Thirty-four participants (45%) reported a family history of fibroids. Twenty-four participants (31.1%) reported follow-up fibroid treatments after the initial UFE procedure. Eleven participants (14.3%) reported major repeat procedures (myomectomy, hysterectomy and UFE) while thirteen participants (16.9%) reported various medications to control ongoing fibroid symptoms. Forty out of fifty-five participants (72.7%) were reportedly anemic at the initial UFE procedure.

The median uterine and dominant fibroid volume as determined from magnetic resonance imaging using the ellipsoid formula was 632 MLS and 103 mls respectively. Twenty-one out of forty-nine (42.9%) participants had more than twenty fibroids on MRI scan with 33 participants (67.3%) having 10 fibroids or more. Thirty out of fifty-five participants (54.5%) indicated that they had fertility ambitions before the initial UFE procedure. Only seventeen participants (22%) reported having become pregnant since the UFE procedure. Ten of these pregnancies (58.8%) ended up with a live birth while seven (41.2%) ended in a miscarriage. Sixty-two (80.5%) of the participants implied satisfaction with UFE by indicating they would recommend the procedure to a family member or friend.

3.1. Quality of Life Outcomes

The median health-related quality of life score among the participants was 88.9 (62.9, 98.3). Statistical analysis using the one-sample Wilcoxon signed rank test at a significant value of 0.05 indicated was statistically significant different from the study findings [19] [21] [22] in similar studies both at baseline and in the follow up post-intervention as shown in **Table 1**. Our study findings indicated a much better quality of life from the baseline results of these studies.

The mean and median HRQOL subscale domain scores for our study are summarized in **Table 2**. The sexual function subscale domain was leading with a score of 100 while the self-conscious subscale domain was lagging behind with a score of 83.3.

3.2. Symptoms Severity Outcomes

Baseline symptom severity data for 52 participants was available for comparison.

Table 1. Comparison of health-related quality of life outcomes with baseline scores in similar studies.

| Author | Year | N | Baseline HRQOL scores | p-value* |
|----------------------------|------|------|-----------------------|----------|
| Mariara <i>et al.</i> [21] | 2017 | 80 | 51.6 (42.2, 65.6) | 0.007 |
| Spies <i>et al.</i> [18] | 2010 | 274 | 40.8 (22.1) | <0.001 |
| Goodwin <i>et al.</i> [19] | 2008 | 2112 | 46 (29, 65) | <0.001 |

*One sample Wilcoxon signed rank test.

Table 2. Health-related quality of life and subdomain scores.

| Variable (n = 77) | Mean (SD) | Median (IQR) |
|-------------------------|--------------------|---------------------------|
| HRQOL Score | 77.3 (26.3) | 88.9 (66.9 - 98.3) |
| Subdomain Scores | | |
| Concern | 75.3 (31.1) | 90.0 (52.5 - 100.0) |
| Activities | 79.6 (27.3) | 92.9 (73.2 - 100.0) |
| Energy/Mood | 77.6 (27.3) | 89.3 (62.5 - 100.0) |
| Control | 77.0 (27.6) | 90.0 (52.5 - 100.0) |
| Self-Conscious | 75.3 (27.2) | 83.3 (58.3 - 100.0) |
| Sexual Function | 77.1 (31.1) | 100.0 (62.5 - 100.0) |

The median symptom severity among the participants decreased from a baseline score of 54.7 (43.8 - 65.6) to 21.9 (6.3 - 42.2). This decrease was statistically significant using the related samples Wilcoxon signed rank test (p-value < 0.001).

4. Discussion

We evaluated the fibroid-related post-UFE quality of life and symptom severity of 77 women with a median age of 43 at baseline with a median duration of follow-up of 8 years. The 8-year quality of life scores remained high and were statistically and clinically significantly better compared to baseline scores before UFE in similar studies. The symptom severity scores were low compared to baseline scores indicating that the benefits of UFE are persistent in the long-term follow-up.

Various studies have evaluated the quality of life among patients managed for uterine fibroids with varying durations of follow-up of between 1 to 3 years [18] [19] [21]. These studies have evaluated the efficacy of UFE among participants recruited from multiple centers across countries in Europe and the United States. These study results cannot be generalized to a predominantly black population in a low-income sub-Saharan country with complex challenges in health care provision. Our study setting provides insight into the long-term efficacy of UFE among patients with fibroids in this complex healthcare setting. Our study results indicate that the long-term quality of life and symptom severity are com-

parable to results in other studies done in high-income countries. In general, the cost of uterine fibroid embolization (UFE) can be viewed as similar to that of surgery [23]. However, there is a need for additional efforts in the region to expand interventional radiology training, enhance access to suitable facilities, and ensure seamless coordination of referrals and care among radiology and gynecology specialists.

In-depth data analysis revealed also various clinically important and relevant aspects of UFE such as repeat interventions following the UFE procedure due to non-resolution or recurrence of symptoms, fertility rates and patient satisfaction. The low reintervention rates at 14.3% (11 participants) was comparable to results in other studies [24]. Although other studies evaluating this aspect of UFE have documented high reintervention rates of between 25% - 30% [25] [26]. The differences in various studies could be due to different definitions and duration of follow up to determine what constitutes a reintervention.

Several limitations were identified in this study. Some of the data collected retrospectively such as baseline scores and other data elements was either incomplete or entirely missing. Baseline quality of life data was completely missing while data for symptom severity scores was only available for 52/77 participants.

We tried to minimize several biases inherent to our study design. As the participants were being followed up from the same center that carried out the procedure, they have been biased to respond favorably or unfavorably depending of their experience hence leading to skewing of the data distribution. We minimized this bias by reassuring the participants the study responses were confidential. No physicians involved in the initial care of the patients were involved in the data collection process hence minimizing this desirability bias.

Our study has sought to document the long-term quality of life following UFE in a predominantly black population in sub-Saharan Africa. With the immense untapped potential of UFE for the management of symptomatic uterine fibroids, the long-term quality of life is an important consideration among patients. We sought to address this gap by conducting this study to contribute to the body of knowledge on this intervention in this part of the world where fibroids are a significant burden to health care with significant morbidity.

UFE presents a safe, efficacious minimally invasive, uterine sparing alternative in the management of uterine fibroids especially in low-resource settings where transfusion of blood and blood products might be challenging. Clinicians should provide adequate counselling to patients concerning the efficacy and expected follow up after UFE.

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Conflicts of Interest

The authors declare no conflicts of interest.

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