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Author(s)	Muhammad Qasim Rana, N. Saher, Angela Lee and Z. Shabbir
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Article

Fuzzy Synthetic Evaluation of the Barriers and Sustainable Pathways for Women During the Transition from Higher Education to Empowerment in Pakistan

Muhammad Qasim Rana [1,*], Noreen Saher [2], Angela Lee [1] and Zeba Shabbir [3,*]

1   School of Built Environment, University College of Estate Management, Reading RG1 4BS, UK;
    a.lee@ucem.ac.uk
2   Department of Sociology and Anthropology, Faculty of Social Sciences, International Islamic University,
    Islamabad 44000, Pakistan; noreen.saher@iiu.edu.pk
3   National University of Science and Technology, Islamabad 44000, Pakistan
*   Correspondence: m.rana@ucem.ac.uk (M.Q.R.); zeba.msie23nbs@student.nust.edu.pk (Z.S.)

Abstract: This study explores the barriers that impede women's transition from higher education to empowerment in Pakistan. It uses Fuzzy Synthetic Evaluation (FSE). By integrating qualitative and quantitative data, this research identifies six primary barriers: sociocultural values, family-related issues, freedom and mobility, violence and harassment, economic factors, and gendered norms. Data were collected through a survey of 500 women across various regions of Pakistan, with a valid response rate of 79.8% (N = 399), providing a comprehensive analysis of the most significant obstacles to women's empowerment. The findings reveal the intricate and pervasive nature of these challenges, with sociocultural values, family-related issues, and restrictions on freedom and mobility emerging as the most critical. These traditional norms and patriarchal structures (index 3.942) significantly hinder women's educational and professional progress. Family-related issues (index 3.840) and restrictions on freedom and mobility (index 3.820) also play a substantial role. Violence and harassment (index 3.705) further deter women from pursuing their goals, while economic factors (index 3.695) and gendered norms (index 3.631) contribute to the persistent gender disparities. This study concludes with a call to action, emphasising the urgent need to address these barriers. To boost women's empowerment and advance gender equality in Pakistan, comprehensive solutions comprising targeted interventions, societal change, and policy reforms are required. By prioritising these challenges, stakeholders can develop practical solutions. This research provides invaluable insights for policymakers, educators, and advocates, urging them to work towards creating an inclusive and equitable environment for women's advancement.

Keywords: gender inclusion; gender equality; higher education; career progression

1. Introduction

Gender inequality is a persistent challenge in Pakistan, significantly impacting women's empowerment across all sectors. Despite making up 49% of the population, women represent only 24% of the workforce, in stark contrast to men, who account for 82.5% of workforce participation (Mujahid and Zafar 2022). Pakistan's position on the Global Gender Gap Index further emphasises this disparity, ranking it among the lowest globally regarding women's access to education, economic opportunities, and healthcare.

An essential component of women's empowerment is education. However, data indicate that adult Pakistani women and men have a worryingly different level of education. Compared to 47.3% of men, only 26.7% of adult women have completed secondary school (Adeel et al. 2016; Dadras et al. 2022). In addition to affecting women's participation in the workforce, this disparity impedes their socioeconomic advancement and general empowerment. Globally, HE has a well-established track record of supporting women's

emancipation. Education improves women's decision-making skills, self-esteem, and social status while providing them with the knowledge and abilities they need to contribute successfully to the workforce. However, in many developing countries, including Pakistan, the journey from HE to empowerment is fraught with challenges deeply rooted in socio-cultural, economic, and institutional structures. In the case of Pakistan, these structures include patriarchal norms, limited economic opportunities for women, and institutional biases that favour men in leadership positions.

Past studies have highlighted various barriers to women's empowerment in Pakistan, including restrictive sociocultural norms, gender-based violence, economic constraints, and limited mobility. These barriers affect women's educational attainment and their ability to translate academic success into professional and personal empowerment. Addressing these barriers is essential for harnessing women's full potential and promoting gender equality. The purpose of this study is to methodically identify and rank the obstacles that Pakistani women face as they move from higher education to empowerment. This paper provides a nuanced understanding of these barriers by employing Fuzzy Synthetic Evaluation (FSE). This robust multi-criterion decision-making tool considers multiple factors and their degrees of importance. It offers actionable insights for policymakers, educators, and advocates.

This study's objectives are threefold: first, to find the key barriers faced by women in their pursuit of HE and professional careers, such as societal expectations of women's roles, lack of access to quality education, and gender-based discrimination in the workplace; second, to quantify the significance of these barriers using FSE; and third, to provide recommendations for targeted interventions that can mitigate these barriers and promote women's empowerment.

This research underwrites the expanding corpus of literature on gender and education in Pakistan and offers a comprehensive framework for addressing women's complex challenges. By highlighting the most critical barriers and proposing practical, actionable solutions, this study seeks to inform policy and practice, ultimately aiming to establish a more fair and welcoming atmosphere for Pakistani women's progress.

2. Literature Review

This literature review explores the challenges women in Pakistan face on their journey from HE to professional empowerment, highlighting the impact of sociocultural norms, economic barriers, patriarchal systems, and workplace discrimination. It also discusses issues like the wage gap, job-hunting difficulties, family support, harassment, and transportation challenges, all contributing to gender inequality. Notwithstanding these challenges, this study emphasises the necessity of plans to advance gender equality and provide women more influence in a variety of fields.

Human rights-based women's empowerment highlights how crucial it is for women to be in charge of their own lives and choices (Leder 2016; MacIsaac and Domene 2014). Given that women make up about half of the world's population, this empowerment is crucial for global development (Upadhyay et al. 2014).

Despite constituting 49% of the population, women's labour force participation is a mere 24%, compared to 82.5% for men (Abbasi et al. 2019). The country performs poorly on global gender gap indices, indicating restricted access to economic opportunities, education, and healthcare for women. Pakistan is among the bottom ten countries worldwide in terms of women's workforce participation (Abbasi et al. 2019; Jamal et al. 2023). The Employment-to-Population Ratio (EPR) in Pakistan reveals a significant gender disparity: Only 20% of women are employed compared to 64% of men. This disparity highlights the substantial underutilisation of female labour, with 80% of women facing job underutilisation and often encountering sectoral or occupational segregation (Ahmad 2018).

2.1. Challenges Faced by Working Women

2.1.1. Sociocultural Norms

Women in Pakistan face significant obstacles due to entrenched social and cultural norms, impacting their access to financial services, business ownership, and entrepreneurship (Bishu and Headley 2020; Galea et al. 2020; Raza et al. 2023). Gender roles, inheritance laws, and disparities in education and labour participation exacerbate these issues (Choudhry et al. 2019; Arif and Bannian 2022).

The 2018 report notes that social norms and the lack of affordable childcare limit women's employment opportunities, while traditional gender roles restrict female workforce participation (Felicio and Gauri 2018). These barriers, including inflexible work hours and cultural expectations, also affect women in various professions (Alshdiefat et al. 2024a; World Bank 2019).

Stereotypes that undercut women's abilities in senior posts are reinforced by cultural attitudes that continue to regard leadership as male (Alhejji et al. 2018; Diehl 2014; Yousaf and Schmiede 2017). Because of this bias, women are under-represented in academia, where deliberate discrimination and the belief that they lack skills are common (Maheshwari and Nayak 2022; Yousaf and Schmiede 2017). Furthermore, women's confidence and involvement in STEM subjects are impeded by societal stereotypes (Sharif et al. 2024a).

2.1.2. Patriarchy

Women's empowerment in Pakistan faces substantial challenges rooted in patriarchal norms, male dominance in household decision-making, and low levels of female education, expertise, and skill (Ahmad et al. 2019; Khalid et al. 2022; Jamshaid and Ayyaz 2022; Rubab et al. 2023). These societal and cultural norms limit women's economic participation and create significant barriers to their engagement in diverse professions, including entrepreneurship and the hospitality industry (Khalid et al. 2022).

2.1.3. Economic Challenges

Economic barriers significantly hinder women's empowerment in Pakistan. Economic factors are pivotal in shaping women's empowerment, with opportunities and active participation crucial for aligning with Sustainable Development Goal 5 (Bano et al. 2021; Arif and Bannian 2022). Financial constraints and gender disparities notably affect female HE (Ali et al. 2021a; Mursaleen and Taimur 2023; Ullah and Skelton 2013; Saher et al. 2023).

In a resource-constrained economy, women's limited financial participation impedes their empowerment and economic improvement (Ibtasam et al. 2018). Efforts to enhance economic involvement are essential for sustainable development and growth (Mubeen et al. 2022). Persistent challenges such as inadequate wages, unsafe working conditions, and gender-based violence hinder progress (Akhtar et al. 2021).

Economic disparities also impact girls' education, with low family income leading to the prioritisation of boys for education, as they are viewed as future family supporters (Rana et al. 2024c; Sharif et al. 2024b). Promoting gender equality and enhancing general well-being in Pakistan require addressing these economic obstacles (Ali et al. 2021b).

2.1.4. Wage Pay Gap

Globally, women's earnings are 77.9% of men's, reflecting a 22.9% wage gap (Talpur 2017). In Pakistan, this gap is even more pronounced at nearly 36%, with women earning an average of 9746 rupees per month compared to 15,884 rupees for men (International Labor Organisation 2017). Women often receive half the pay of their male counterparts and hold only 15% of wage employment opportunities, many of which are unpaid family work (Ahmad 2018).

Women typically occupy lower-tier positions with fewer job options, limited authority, and lower wages (UN Women & ILO 2022). This wage disparity is particularly evident in the private sector, where women are paid less than men (Diehl and Dzubinski 2016; Wynen et al. 2018; Zhong et al. 2018). Regardless of the introduction of flexible work options,

women frequently remain in lower-paid roles due to the lack of flexibility at senior levels (Rana et al. 2024a; Sharif et al. (2024a, 2024b)).

2.1.5. Family Support and Concerns

In Pakistan, parental decisions regarding their daughters' professions are heavily influenced by cultural norms, societal values, and the opinions of relatives and neighbours. Parents typically restrict their daughters' career choices to just two options: medicine and education. These fields are perceived as safe for women because they allow for easy segregation of sexes. As such, few women choose careers that are dominated by men, and they frequently face discouragement from their family and society (Hussain 2014; Naqvi 2016).

Balancing work and family responsibilities presents a significant challenge for women in the construction industry, often negatively affecting personal and professional relationships (Cavagnis et al. 2023). Women find it challenging to successfully balance their home responsibilities and professional goals (Razzaz and Selwaness 2022). Women's capacity to perform household chores and participate in extracurricular activities is further limited by long work hours in professions like architecture and civil engineering (Sangweni and Root 2015). Additionally, women face invisible barriers that limit their professional opportunities compared to men (Barreto et al. 2017).

Studies highlight that one of the key challenges hindering women from reaching leadership roles is the difficulty in achieving a balanced work and personal life (Alshdiefat et al. 2024a).

The study noted that family support helped women advance their careers, but continuous development of leadership skills was essential to maintaining this balance (Alshdiefat et al. 2024b).

2.1.6. Job Hunting Difficulties for Women

Women in Pakistan encounter formidable obstacles in the job market (Ejaz and Qayum 2023). They often must conform to familial expectations when selecting jobs and convince employers that personal matters will not affect their work performance. These challenges are exacerbated in male-dominated fields, where women's employment prospects remain disproportionately low despite stereotypes suggesting they have an advantage in hiring (Abbasi et al. 2019; Jayachandran 2021). Women are predominantly employed in health, education, and clerical sectors, which are traditionally less attractive to men (Hussain 2014). This limited sectoral scope restricts women's access to career advancement opportunities in higher-paying roles. Pakistan offers few job prospects for women, with only a small fraction employed in multinational corporations, reflecting a broader trend of underrepresentation in top-tier positions (Khan 2017).

Since women are not usually encouraged to acquire leadership abilities at an early age, social expectations in the male-dominated industry frequently deter women from pursuing leadership roles from an early age (Dow 2001). Their confidence and readiness for leadership roles are impacted by this lack of support since it restricts their access to leadership-enhancing education and training (Ntseane 2000). Furthermore, as their careers progress, women in the construction sector usually face limited educational possibilities and insufficient professional counselling (Whittock 2002). While job sharing has been proposed as a strategy to retain more women in leadership roles, it is seldom promoted during recruitment, perpetuating gender inequality (Barrett and Barrett 2011).

When advancing their careers, women prioritise job quality, stability, and rewards over professional associations or supportive legislation (Sharif et al. 2024b).

2.1.7. Workplace Harassment and Gender Inequality

Women often face significant gender bias and discrimination in the workplace, leading to restricted career progression, inequitable opportunities, and wage disparities (Bishu and Headley 2020; Galea et al. 2020; Raza et al. 2023). In Pakistan, workplace harassment includes inappropriate staring, vulgar comments, molestation, and unwanted physical

contact. Despite the enactment of the 'Protection against Harassment at the Workplace' law in 2010, this legislation has not effectively addressed the issue (Khan 2017). Many female university graduates struggle with unemployment due to unsafe working environments (Rana et al. 2024b; Cheema 2023).

Gender inequality persists, with women facing discrimination from management and male colleagues, being stereotyped as unreliable, emotional, and weak. Leadership opportunities are limited due to perceptions that women lack the necessary skills, and demotivating actions from colleagues reinforce feelings of inferiority (Abbasi et al. 2019). Significant family obligations, such as childcare and community service, also result in stress and health problems, which further affect performance at work.

2.1.8. Transport and Mobility

Transport and mobility challenges in Pakistan hinder women's advancement, as many cannot afford cars, and public transport is unsafe, leading to frequent harassment. Women must share live locations, use Google Maps for tracking, carry pepper spray, and constantly check mirrors to ensure safety. They also worry about their attire being 'appropriate' and face societal blame if something goes wrong when exercising their rights (Cheema 2023). Many women face severe restrictions on their mobility, often confined to their homes or allowed limited time outside, strictly enforced after sunset due to safety concerns (Jordan and Gibson 2005; Harris and Wilson 2007; Stevenson 2016). This is not just about conservative family attitudes but also reflects the unsafe environment women face both during the day and at night. Women also endure unwelcome comments from strangers while commuting to work, adding to their challenges. Moreover, parental safety concerns prevent many women from pursuing career opportunities in other cities, leading to missed career prospects (Abbasi et al. 2019; Gardner et al. 2017; Hoor-Ul-Ain 2020; Sundling and Ceccato 2022).

In conclusion, the journey from HE to entering professional life presents women with significant barriers. A holistic approach that advances gender equality expands access to professional networks and mentorship and combats societal biases that perpetuate gender discrepancies is necessary to overcome these barriers.

3. Methodology

3.1. Research Design

This study investigated the barriers facing women during the transition from HE to empowerment in Pakistan. To address this, barriers were identified through an extensive review of existing studies on gender challenges in higher education and empowerment, ensuring a thorough and comprehensive exploration of the relevant issues. A descriptive survey design was used to obtain a large response from the sample population (Ponto 2015). To ensure content validity, the questionnaire was reviewed by a panel of three experts in gender studies and higher education, and two students in Pakistan, to evaluate the clarity, relevance, and usability of the survey. Based on their feedback, minor revisions were made, including rephrasing ambiguous questions for greater clarity, adding an additional item to the 'violence and harassment' construction to capture more nuanced experiences, and improving question flow. Finally, the five hundred respondents from various Pakistani universities and the alumni networks connected to them were given the survey. A total of 79.8% of the 500 disseminated questionnaires were returned, 416 of which were retrieved again, and 399 of which were judged appropriate for study.

The primary objective of this study was to identify and prioritise the barriers that impede women's transition from HE to empowerment in Pakistan. This study's findings, which comprehensively inform policy and intervention strategies, are important in understanding and addressing these barriers.

3.2. Research Approach

This study employed a quantitative approach, utilising Fuzzy Synthetic Evaluation (FSE) to assess and prioritise identified barriers systematically. FSE is a multi-criteria decision-making tool that is particularly effective in dealing with complex, qualitative issues by converting them into quantitative measures (Corder and Foreman 2014).

Fuzzy Synthetic Evaluation (FSE) is crucial for this study, as it systematically converts complex, qualitative barriers faced by women into quantifiable measures, facilitating precise prioritisation. It effectively manages uncertainty and subjectivity, reflecting the diverse experiences of women and providing a comprehensive view of the challenges they encounter. By integrating multiple criteria, FSE delivers a detailed and actionable analysis, allowing policymakers to target the most significant barriers and implement effective interventions. This makes FSE an exceptionally powerful tool for addressing the multifaceted issues in women's transition from HE to empowerment.

3.3. Data Collection

Survey Instrument

A structured survey was designed to collect data from women across various regions of Pakistan. The survey comprised multiple sections, each focusing on a different category of barriers:

- Sociocultural values;
- Family-related issues;
- Freedom and mobility;
- Violence and harassment;
- Economic factors;
- Gendered norms.

Each section contained a series of Likert-scale questions designed to gauge the extent to which respondents experienced each barrier. The survey instrument employed a 5-point Likert scale, with options ranging from 1 ('Strongly Disagree') to 5 ('Strongly Agree'). The phrase 'Do not agree' was synonymous with selecting option 1 ('Strongly Disagree'), ensuring consistency in participant responses. This phrasing was aligned with common linguistic usage to ensure clarity and respondent understanding during the survey.

3.4. Sampling

This study employed a purposive sampling technique to ensure a diverse representation of women from different socioeconomic backgrounds, regions, and educational levels. This approach was crucial for capturing the multifaceted barriers faced by women in Pakistan, as it allowed for a comprehensive understanding of how these barriers vary across different contexts. This inclusive approach, with a total of 500 women participating in the survey, was sufficient to provide a reliable and comprehensive overview of the barriers faced by women in Pakistan.

3.5. Data Analysis

To prioritise the barriers identified, this study utilised Fuzzy Synthetic Evaluation (FSE), a systematic and robust method for converting qualitative data into quantitative measures. The process involved four steps:

1. Identification of Evaluation Criteria: The survey questions were categorised into six main barriers.
2. Fuzzification of Data: Respondents' answers were converted into fuzzy numbers to handle the inherent uncertainty and subjectivity.
3. Weight Assignment: Each barrier was assigned a weight based on its perceived importance, as determined by preliminary analyses and expert consultations. Weights were assigned based on consultations with the aforementioned three subject-matter

experts as part of the pilot study. The weights reflect the perceived significance of each barrier and were validated through inter-rater reliability measures.

4. Aggregation of Fuzzy Numbers: The fuzzy numbers were aggregated to calculate the overall significance index for each barrier.

3.6. Statistical Analysis

In addition to FSE, descriptive statistics were used to summarise the demographic characteristics of the respondents and their responses to individual survey items. For instance, most respondents were from rural areas, had completed secondary education, and were unemployed. Cross-tabulation analyses explored differences in barrier perceptions across different groups (e.g., by region, education level, and employment status).

3.7. Validity and Reliability

To ensure content validity, the survey instrument was developed based on a comprehensive literature review and consultations with experts in gender studies and HE. This involved rigorous item selection, modification, and elimination to ensure that the survey items accurately captured the intended barriers. A pilot study was conducted to test the instrument and refine the survey items based on feedback.

The reliability of the survey instrument was assessed using Cronbach's alpha, ensuring the internal consistency of the items within each barrier category. The FSE methodology also inherently increases the reliability of the findings by systematically aggregating diverse responses. The inter-rater reliability was assessed to ensure consistency in the weight assignment process. This was measured using the Intraclass Correlation Coefficient (ICC), which yielded a value of 0.82. This high ICC score reflects a strong level of agreement among the consulted experts, demonstrating the reliability of the evaluation process.

This study adhered to ethical guidelines for research involving human subjects. Informed consent was obtained from all participants, ensuring their voluntary participation and confidentiality. The survey design and data handling processes were approved by an institutional review board (IRB). This research design, which provided a systematic and rigorous approach to identifying and prioritising the barriers women face in Pakistan as they transition from HE to empowerment, instils confidence in the validity and reliability of the findings. By combining quantitative survey methods with FSE, this study produced robust, actionable insights to inform policy and practice.

3.8. Questionnaire Development and Data Collection

The questionnaire was structured into two parts: (1) demographic information and (2) 25 identified barriers that women in Pakistan encounter in their transition from higher education to empowerment based on existing literature. The second section employed a 5-point Likert scale, with 1 representing 'strongly disagree' and 5 representing 'strongly agree', to assess respondents' views. Out of the 500 distributed questionnaires, 416 were returned, achieving a 79.8% response rate, with 399 deemed suitable for analysis.

3.9. Methods of Data Analysis

To evaluate the data and prioritise the challenges faced by Pakistani women in their journey from education to empowerment, Fuzzy Synthetic Evaluation (FSE) was applied. This method integrates fuzzy set theory, which utilises fuzzy logic to assess the reliability of human judgment (Deng et al. 2021). FSE is particularly effective for ranking multiple factors. The process of identifying the obstacles women face during their transition from education to employment involved following the four key stages of FSE: setting up the FSE index system, computing the mean score and weights (W) of different variables and factors, determining the membership function (MF), and calculating the importance of each index in the analysis. The linear membership function was chosen due to its simplicity and suitability for transforming Likert-scale responses into fuzzy scores. Other membership

functions, such as triangular or trapezoidal functions, were considered; however, the linear function was deemed most appropriate given the structured and ordinal nature of the data

Setting up the FSE index system is the first stage in the FSE computation process (Zhou and Xu 2020). For example, U = (u1, u2, u3, u4, u5) was the definition of the first-level evaluation index system for five-factor grouping in a factor, where u1, u2, u3, u4, and u5 stand for the factors formed, respectively. Each factor's second-level evaluation index was u1 = (u11, u12,..., u1n), where n is the number of variables that make up u1. V = (1, 2, 3, 4, 5) was the rating scale that was used to assess the variables. In the second phase, the weighting (W) of the elements and variables is calculated using Equation (2) and expressed in the rating scale's order.

$$Mean\ Score\ (i) = \frac{\sum_{i=1}^{N} X_i Y_i}{N} \tag{1}$$

$$Weighting\ (Wi) = \frac{i}{\sum_{i=1}^{5} i}, 0 \leq Wi \leq 1, \sum (Wi) = 1 \tag{2}$$

Finding each variable's membership function (MF) and the factors to which it belongs is the third stage. Equation (3), where MFvm is the MF of a variable vm; Xbvm (b = 1, 2, 3, 4, 5) is the percentage of a score the respondents assigned to a variable vm; and Xbvm /Vb explains the relationship between Xbvm and its associated grade alternative based on the rating scale, was used to determine the MF of each variable based on the weights that the respondents assigned to it.

$$MF_{vm} = \frac{X_{1v_m}}{V_1} + \frac{X_{2v_m}}{V_2} + \frac{X_{3v_m}}{V_3} + \frac{X_{4v_m}}{V_4} + \frac{X_{5v_m}}{V_5} \tag{3}$$

A factor's MF (Ci) is determined by multiplying the weighting indices by the fuzzy matrix of the MFs (Ri) of its associated variables. Equations (4) and (5) can be used to calculate Ci and Ri, respectively.

$$C_i = [MF_{vi1}\ MF_{vi2}\ MF_{vi3}\ \cdots\ MF_{vin}]$$
$$= [X_{1vi1}\ X_{2vi1}\ X_{3vi1}\ X_{4vi1}\ X_{5vi1}\ X_{1vi2}\ X_{2vi2}\ X_{3vi2}\ X_{4vi2}\ X_{5vi2}\ X_{1vi3}\ X_{2vi3}\ X_{3vi3}\ X_{4vi3}\ X_{5vi3}\ \cdots\ \cdots\ \cdots\ \cdots\ X_{1vin}\ X_{2vin}\ X_{3vin}\ X_{4vin}\ X_{5vin}] \tag{4}$$

$$R_i = W_i \cdot C_i = (w_1, w_2, w_3, \ldots w_n) \cdot$$
$$[X_{1vi1}\ X_{2vi1}\ X_{3vi1}\ X_{4vi1}\ X_{5vi1}\ X_{1vi2}\ X_{2vi2}\ X_{3vi2}\ X_{4vi2}\ X_{5vi2}\ X_{1vi3}\ X_{2vi3}\ X_{3vi3}\ X_{4vi3}\ X_{5vi3}\ \cdots\ \cdots\ \cdots\ \cdots\ X_{1vin}\ X_{2vin}\ X_{3vin}\ X_{4vin}\ X_{5vin}] = \tag{5}$$
$$(r_{i1}, r_{i2}, r_{i3}, \ldots r_n)$$

Quantifying the importance indices of this study's components for prioritisation is the final stage of the FSE approach. Using Equation (6), the fuzzy evaluation matrix (Ri) and the grade rating scale (Vi) are multiplied to determine the factor's significance index.

$$Significant\ index = \sum_{i=n}^{n} (R_i X\ V_I) \tag{6}$$

4. Results of Analysis

4.1. Background Information of Respondents

The background data of this study's participants are displayed in Table 1. Responses were obtained from respondents in a number of Pakistani provinces and regions, including Azad Kashmir (9.0%), Federal Territory (12%), Punjab (48.4%), Balochistan (9.0%), KPK (9.8%), Gilgit Baltistan (7.0%), and Sindh (4.8%). The majority of responders (83.2%) were female, with only 16.8% being male. Ages 20 to 25 accounted for the majority of responders (63.4%), while 41 to 50 accounted for the smallest percentage (5.5%). Vocational credentials (1.5%), diplomas (0.5%), bachelor's degrees (54.6%), master's degrees (28.6%), doctoral degrees (7.5%), and other qualifications (7.3%) comprise the respondents' educational background. Of the respondents, 36.1% are unemployed, 16.3% are students, teachers (3.0%), lecturers (5.8%), junior staff (22.1%), senior staff (12.8%), main leads (3.8%), and housewives (0.3%), respectively.

Table 1. Background information of respondents.

Background Information	Categories	Frequency	Percentage
Region/Province	Azad Kashmir	36	9.0
	Federal Territory	48	12.0
	Punjab	193	48.4
	Balochistan	36	9.0
	KPK	39	9.8
	Gilgit Baltistan	28	7.0
	Sindh	19	4.8
Gender	Male	67	16.8
	Female	332	83.2
Age	Less than 20 years	33	8.3
	20–25 years	253	63.4
	26–30 years	40	10.0
	31–40 years	51	12.8
	41–50 years	22	5.5
Highest education	Vocational qualification	6	1.5
	Diploma	2	0.5
	Bachelor	218	54.6
	Master	114	28.6
	Doctoral	30	7.5
	Others	29	7.3
Currently studying	Yes	317	79.4
	No	82	20.6
Working experience	No working experience	210	52.6
	0–5 years	115	28.8
	6–10 years	30	7.5
	11–15 years	23	5.8
	16–20 years	11	2.8
	Above 20 years	10	2.5
Position	Unemployed	144	36.1
	Student	65	16.3
	Teacher	12	3.0
	Lecturer	23	5.8
	Junior staff	88	22.1
	Senior staff	51	12.8
	Senior Leadership Role	15	3.8
	Housewife	1	0.3

4.2. Prioritisation of Barriers to Transition from HE to Empowerment

With their respective weightings determined by Equations (1) and (2), Table 2 displays the mean score of the items that make up the factors and the variables. Except for 'I believe that females should not engage in HE because their role should focus on the family', which has a mean score of 2.65, the mean score values of all the hurdles that women face during the transition from education to empowerment are above 3.00. The total of all the mean values of the variables that make up the factors is the mean score. The value of family-related concerns (14.83), for instance, is calculated by adding the mean scores of the four variables that make up this category: 2.65, 4.29, 4.05, and 3.84.

Table 2. FSE of the barriers facing women during the transition from HE to empowerment in Pakistan.

Barriers	Overall Mean	Weighting	MFs (Level 2)					MFs (Level 1)				
Family-related issues	**14.83**	**0.158**						**0.073**	**0.075**	**0.141**	**0.406**	**0.314**
I believe that females should not engage in HE because their role should focus on the family	2.65	0.179	0.30	0.21	0.15	0.21	0.13					
Educated parents advocate HE and professional careers for their daughters	4.29	0.289	0.02	0.02	0.10	0.40	0.47					
Time constraints due to domestic responsibilities often lead to a double burden on females to prevent them from HE/ professional career	4.05	0.273	0.01	0.05	0.15	0.48	0.32					
Parents often have different professional and life aspirations for their daughters and sons	3.84	0.259	0.04	0.07	0.17	0.47	0.26					
Sociocultural values	**15.72**	**0.168**						**0.017**	**0.070**	**0.157**	**0.476**	**0.282**
A male-dominated power structure—whereby privilege is held and maintained by men in both society and social relationships—is the norm in my community	3.78	0.240	0.03	0.07	0.18	0.53	0.19					
Conservative cultural norms and political factors hinder the academic and professional journey of females	3.95	0.251	0.01	0.06	0.19	0.45	0.29					
Females often face a lack of access to education, health, and welfare	3.94	0.251	0.01	0.08	0.12	0.53	0.26					
Early/child/forced marriages lead to a lack of education for females	4.05	0.258	0.02	0.07	0.14	0.40	0.38					
Gendered Norms	**14.51**	**0.155**						**0.046**	**0.116**	**0.197**	**0.438**	**0.202**
Women often face gender differences in education, enrollment, and workplace settings	3.83	0.264	0.02	0.10	0.17	0.46	0.26					
In my community/ social/ professional workplace circle, female education is considered a low priority as it does not uplift the family economically	3.36	0.232	0.09	0.15	0.22	0.40	0.14					
There are fewer or less diverse job options available for women	3.72	0.256	0.03	0.09	0.20	0.47	0.20					
In my community/ social/ professional workplace circle, there is a gendered perception of leadership	3.60	0.248	0.05	0.13	0.20	0.42	0.20					
Economic factors	**14.71**	**0.157**						**0.037**	**0.099**	**0.218**	**0.434**	**0.214**
Poverty (financial barriers to affording education) is what restricts the advancement of education for women	3.92	0.266	0.02	0.06	0.17	0.49	0.27					
In my community/ social/ professional workplace circle, there is selective enforcement of policies in the context of women's education and professional career growth	3.60	0.245	0.03	0.10	0.25	0.47	0.15					
There is unequal pay among men and women	3.47	0.236	0.06	0.14	0.26	0.35	0.19					
There is a general lack of job security for women	3.72	0.253	0.04	0.10	0.20	0.42	0.24					
Freedom and mobility	**15.26**	**0.163**						**0.025**	**0.062**	**0.209**	**0.486**	**0.220**
Regular armed conflicts are what hinders women's mobility	3.77	0.247	0.02	0.06	0.24	0.49	0.19					
Cultural and religious restrictions are what hinders women's mobility	3.76	0.246	0.03	0.06	0.20	0.55	0.16					
There is an insufficient supply of educational institutes within accessible distance for women	3.69	0.242	0.03	0.08	0.24	0.48	0.17					
Work-life conflict (women are expected to construct a balance between family and profession, which leads to a double burden of household, work, and childbearing/rearing)	4.04	0.265	0.02	0.05	0.16	0.43	0.35					

Table 2. *Cont.*

Barriers	Overall Mean	Weighting	MFs (Level 2)					MFs (Level 1)				
Violence and harassment	**18.60**	**0.199**						**0.036**	**0.092**	**0.212**	**0.441**	**0.217**
In my community/ social/ professional workplace circle, there is often domestic violence against women	3.64	0.196	0.05	0.12	0.18	0.44	0.21					
In my community/ social/ professional workplace circle, there is often sexual harassment/ abuse against women.	3.70	0.199	0.05	0.09	0.20	0.43	0.23					
There is a lack of implementation of sexual harassment policies in education or professional workplace settings	3.87	0.208	0.02	0.06	0.20	0.46	0.26					
Women often face humiliation in the workplace from intimidating supervisors	3.64	0.196	0.03	0.09	0.27	0.43	0.18					
Marital status of women impacts the level of harassment they are likely to experience (single women face more harassment than married women)	3.75	0.202	0.03	0.10	0.21	0.44	0.20					

Note: M-W = Mann–Whitney test. Items in Bold are categories of the barriers.

Table 2 also displays the FSE of the variables pertaining to the obstacles women encounter as they go from education to empowerment and their contributing factors. For instance, 30.1%, 21.3%, 14.5%, 21.3%, and 12.8% of respondents rated the variable 'I believe that females should not engage in HE because their role should focus on the family', correspondingly. Equation (3) yielded the following MF (level 2): 0.30, 0.21, 0.15, 0.21, 0.13. Equations (4) and (5) were also used to calculate the MF (level 1) of the six variables of barriers that women face as they go from education to empowerment. The MF of family-related issues generated is (0.073, 0.073, 0.141, 0.406, 0.314), while the MF of sociocultural values is (0.017, 0.070, 0.157, 0.476, 0.282).

The calculation of the significant index and the rankings of the factors influencing women's hurdles along the transition from education to empowerment are shown in Equation (6). According to the computation, family-related concerns came in second with a significant index of 3.840, while sociocultural values came in first with a significant index of 3.942. Gendered norms, on the other hand, had the least significant index (3.631).

$$
\begin{aligned}
&\text{Sociocultural Values} \\
&= (0.017 \times 1) + (0.070 \times 2) + (0.157 \times 3) + (0.476 \times 4) + (0.282 \times 5) \\
&= 0.017 + 0.140 + 0.471 + 1.904 + 1.410 \\
&= 3.942
\end{aligned}
\tag{7}
$$

$$
\begin{aligned}
&\text{Family Related Issues} \\
&= (0.073 \times 1) + (0.075 \times 2) + (0.141 \times 3) + (0.406 \times 4) + (0.314 \times 5) \\
&= 0.073 + 0.150 + 0.423 + 1.624 + 1.570 \\
&= 3.840
\end{aligned}
\tag{8}
$$

$$
\begin{aligned}
&\text{Gendered Norms} \\
&= (0.046 \times 1) + (0.116 \times 2) + (0.197 \times 3) + (0.438 \times 4) + (0.202 \times 5) \\
&= 0.046 + 0.232 + 0.591 + 1.752 + 1.010 \\
&= 3.631
\end{aligned}
\tag{9}
$$

5. Discussion and Recommendations

This study investigates women's barriers during the transition from HE to empowerment in Pakistan, utilising Fuzzy Synthetic Evaluation (FSE) to prioritise the factors. The results highlight six significant barriers: sociocultural values, family-related issues, freedom and mobility, violence and harassment, economic factors, and gendered norms. This discussion section elaborates on each barrier in the context of the findings and offers policy recommendations to provide practical, actionable strategies. Each recommendation is designed to foster systemic change and promote gender equality.

5.1. Sociocultural Values

Sociocultural values emerged as the most significant barrier, with a substantial index of 3.942. This highlights the deep-rooted societal norms and cultural expectations that limit women's educational and professional advancement. The findings indicate that conservative cultural norms and a male-dominated power structure are prevalent, impeding women's progress (Table 2). For example, societal expectations often prioritise marriage and family roles over education and career for women, leading to early or forced marriages, which further hinder their academic and professional journeys. These findings align with previous researchers, e.g., (Bishu and Headley 2020; Galea et al. 2020; Raza et al. 2023).

Addressing these sociocultural barriers requires community-level interventions and policy changes that promote gender equality and challenge traditional norms. To address these deeply ingrained patriarchal norms and societal expectations that limit women's opportunities, we recommend the launch of nationwide awareness campaigns. These campaigns should challenge traditional gender roles, advocate for women's rights, and promote gender equality across all sectors. Incorporating gender sensitisation programs in schools and community centres can help to instil progressive values from an early age.

Such interventions have been effective in reshaping societal attitudes and fostering more equitable environments in similar contexts (Sharif et al. 2024a; Rana et al. 2024a).

5.2. Family-Related Issues

Family-related issues, with a significant index of 3.840, are identified as the second most critical barrier to women's empowerment. This barrier is primarily attributed to time constraints resulting from domestic responsibilities and parents' differing aspirations for their daughters compared to their sons (refer to Table 2 for more details). These domestic responsibilities create a double burden for women, hindering their ability to pursue HE and establish professional careers. This is consistent with previous research (Razzaz and Selwaness 2022). It is worth noting that educated parents are more likely to support their daughters' pursuit of HE and professional careers, suggesting that increasing parental education levels could potentially alleviate some of these barriers.

5.3. Freedom and Mobility

Freedom and mobility are crucial for women's overall well-being and development, and it is concerning that this was ranked third with a significant index of 3.820. Women face various restrictions on their mobility due to safety concerns, societal norms, and family control, which significantly hinder their access to education and career opportunities. These barriers are confirmed by the literature (Jordan and Gibson 2005; Harris and Wilson 2007; Stevenson 2016). They are further exacerbated by societal expectations that confine women to domestic spaces, limiting their ability to pursue HE and professional activities.

To address these challenges, it is essential to advocate for legislative changes and societal shifts that create safe and supportive environments for women, enabling them to participate in educational and professional pursuits fully. The development of safer public transportation options tailored specifically to women's needs is a necessity, such as female-only carriages, or flexible working hours. Furthermore, employers should be encouraged to provide transportation facilities for female employees, especially in areas where public transit is unsafe or unreliable. Such initiatives have proven successful in increasing women's workforce participation in other developing countries (Jordan and Gibson 2005; Hidayati 2023).

5.4. Violence and Harassment

The issue of violence and harassment, as indicated by a significant index of 3.705, presents formidable obstacles for women and is highlighted in the literature (Khan 2017). They frequently encounter instances of violence and harassment within educational institutions and in the workplace, creating deterrents to their pursuit of HE and professional careers. This finding emphasises the critical—and immediate—necessity for implementing strong policies and protective measures within academic and professional settings to guarantee women's safety and foster their active involvement in these spheres. Strengthening the implementation of workplace harassment laws is critical to creating safe environments where women can thrive without fear. In addition, establishing secure and anonymous reporting mechanisms, along with dedicated helplines, can encourage victims to come forward and seek justice. These steps align with global best practices for combating workplace harassment (Khan 2017; Cheema 2023).

5.5. Economic Factors

As indicated by a significant index of 3.695, the economic factors shed light on the financial barriers hindering women's access to education and professional opportunities. These barriers stem from issues such as poverty, which often leads to financial constraints that result in families prioritising the education of sons over daughters. Financial constraints and gender disparities notably affect female HE (Ali et al. 2021a; Mursaleen and Taimur 2023; Ullah and Skelton 2013; Saher et al. 2023). Moreover, there is substantial

evidence pointing to unequal pay and job insecurity for women, further exacerbating the disincentives for investing in women's education.

Economic challenges remain a significant impediment to women's empowerment. Addressing these economic barriers necessitates implementing targeted financial assistance programs for women, establishing equitable pay policies, and implementing job security measures. Specifically, targeted scholarships for women from low-income families should be introduced, ensuring that financial constraints do not hinder access to education. Moreover, implementing robust policies to guarantee equal pay and job security for women is essential. These measures can not only bridge the gender pay gap but also provide women with greater economic independence and stability, aligning with Sustainable Development Goal 5 (Ali et al. 2021b; Mubeen et al. 2022).

5.6. Gendered Norms

Gender norms remain a significant barrier despite scoring the lowest with an index of 3.631. These norms result in gender disparities in education enrolment and workplace settings, limit job options for women, and contribute to a gendered perception of leadership (see Table 2). The findings indicate that while these norms are widespread, they are more subtle and less openly acknowledged than other barriers. Addressing gender norms requires comprehensive gender sensitisation programs and policies that promote gender equality in all aspects of life. Mentorship programs that actively promote women into leadership roles are advocated. These programs can provide the guidance and support necessary to overcome societal biases and professional hurdles. Additionally, recognising and rewarding organisations that prioritise gender diversity and inclusion can create a competitive incentive for others to follow suit. Similar strategies have yielded positive results in addressing gender disparities in the workplace (Maheshwari and Nayak 2022; Sharif et al. 2024b).

6. Conclusions

This study thoroughly examines the obstacles hindering women's transition from HE to empowerment in Pakistan. Utilising Fuzzy Synthetic Evaluation (FSE), this research identifies and ranks six key barriers: sociocultural values, family-related issues, freedom and mobility, violence and harassment, economic factors, and gendered norms. This study finds that sociocultural values and family-related issues are the most significant barriers, deeply entrenched in Pakistan's traditional and patriarchal society.

This study highlights the complexity of these barriers and underscores the need for a comprehensive, targeted approach to address them. It calls for policy reforms, societal changes, and interventions specifically designed to tackle the unique challenges faced by Pakistani women, enabling them to transform their educational achievements into genuine empowerment. This research offers crucial insights for policymakers, educators, and advocates, providing a basis for practical solutions. These findings should serve as a cornerstone for future policy and advocacy efforts, guiding the creation of strategies that not only promote gender equality but also advance the broader goal of women's empowerment in Pakistan.

However, this study has limitations, including its focus on a specific cultural and geographical context, which may not fully capture the diverse experiences of women across different regions of Pakistan. While FSE is a robust tool for prioritising complex and qualitative barriers, the authors acknowledge that it involves some degree of subjectivity, particularly in defining linguistic variables and selecting membership functions. To mitigate this, expert consultations were utilised, and a rigorous validation process was followed. Despite these measures, the influence of subjective judgment on the final rankings cannot be entirely eliminated. FSE may not also account for all nuances and interrelations between these factors. Future research should explore these barriers in varying contexts, particularly in rural settings to gain a more comprehensive understanding. Further studies should also

assess the effectiveness of specific interventions designed to overcome these barriers and consider longitudinal approaches to evaluate the long-term impact of these measures.

It is also acknowledged, that while this study provides valuable insights, the use of a volunteer-based sample limits its generalisability. This sample may not fully represent the population of women transitioning from higher education to employment in Pakistan. Future studies could utilise stratified or random sampling techniques to enhance representativeness.

The path to women's empowerment in Pakistan is complex, requiring sustained effort and collaboration across all sectors of society. By addressing the identified barriers, Pakistan can progress toward achieving true gender equality, where women are not only educated but also empowered to contribute fully to the nation's development. The work of policymakers, educators, advocates, and researchers is crucial to this process, and their contributions are greatly valued.

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