

## INVISIBLE STRUGGLES: PSYCHOLOGICAL DISTRESS AND GENDERED EXPERIENCES OF WOMEN ENGINEERS IN PAKISTAN

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### Abstract

Engineering remains a male-dominated profession globally, and in Pakistan women engineers work within sociocultural and institutional contexts that influence their professional life. Although existing research has excessively examined structure barriers and gendered experiences, comparatively little attention has been given to the psychological distress experienced by women engineers in their personal and professional lives. This research paper examines the nature and sources of psychological distress among women engineers, who work in academic and corporate sectors in Pakistan.

The qualitative research design was used, and the data was gathered through focus group discussions with women engineers and analyzed using thematic analysis. The findings revealed several interrelated aspects of psychological distress, such as emotional exhaustion, isolation and self-doubt, emotionally unsafe workplace, work-family conflicts, and limited institutional support. The participants were also described various coping and survival strategies used to manage these challenges within male-dominated professional environment.

The research highlights psychological distress as a major yet underexplored aspect of women engineers' professional lives in Pakistan. By foregrounding lived experiences of women engineers, the findings highlighted the need to establish psychologically safe, accommodating and gender-sensitive engineering work environments that promote well-being and long-term engagement in the profession.

### Introduction

Engineering is known as a male-dominated profession globally, and the same pattern is evident in Pakistan, where women have been significantly underrepresented in both the educational and corporate setting (UNESCO, 2017). Although women have made a significant advance in pursuing engineering education and the professional field, women's participation is still influenced by gender-based stereotypes, sociocultural expectations, and structural inequalities (Whitcomb et al., 2020; Smith & Gayles, 2018). International evidence suggests that

gendered STEM environments limit women's participation and shape their everyday professional experiences (UNESCO, 2017).

Beyond questions of representation and access, women engineers are often confronted with a constant emotional and psychological anguish in relation to working in a male-dominated environment in academia and corporate sectors. Studies have found that women do often experience emotional exhaustion, isolation and self-doubt especially when 'masculine norms pertaining to competence, professionalism and belonging' are the defining traits are replicated in

the workplace. These experiences are often normalized within the culture of engineering practices and remain highly invisible in institutional policies and organization reforms despite having tremendous effects on women's mental health (Fouad et al., 2017; Smith & Gayles, 2018).

Psychological distress for women engineers does not happen due to a mitigating event, but accumulates over years of being subjugated to gendered expectations, emotionally unsafe working conditions, and being constantly in the cross-hairs of being seen as competent. Research suggests that experiences such as imposter syndrome, stereotyping and constant need to prove one's worth are highly linked with chronic stress and emotional fatigue among women working a male dominated profession (Whitcomb et al, 2020; Smith & Gayles, 2018). In a conservative sociocultural environment such as Pakistan, the challenges in these areas even become more accentuated by the provision of marriage, caregiving, and family expectations in the society leading to a situation in which women face a competition between emotional and professional responsibilities (Addati & Cattaneo, 2022; Haar et al., 2014).

Institutional and policy related shortcomings also are critical in determining women engineers' psychological experiences. The lack of gender-sensitive infrastructure, limited access to mentorship, lack of supporting workplace policies has been identified as a significant source of emotional strain for women in engineering fields (Addati & Cattaneo, 2022; Smith & Gayles, 2018). Global evidence further suggests that workplaces that fail to address care responsibilities and mental health needs contribute to long term psychological distress amongst working women (Addati, & Cattaneo, 2022; WHO, 2022). Such environments perpetuate women's feelings of being undervalued and excluded, increasing the risk of emotional exhaustion and disengagement. Although, international literature has shown increasing awareness of gender inequality in engineering and professions with a STEM focus, there has been very little attention paid to the

psychological distress of women engineers in Pakistan. Existing research has generally concentrated on participation rates, as well as structural barriers and career outcomes, while disregarding the emotional and mental health effects of chronic exposure to gendered professional settings (Whitcomb et al., 2020; Peng et al., 2022). Addressing this gap, the present study examines the issue of the psychological distress of women working as engineers in academic and corporate settings in Pakistan. Using qualitative methods of focus group discussions, this research foregrounds women lived experiences in the forefront to explore the ways that psychological distress is produced, experienced and managed in the gendered settings of engineering.

### **Literature Review**

Existing studies show that women still lack the representation in the field of engineering on educational and corporate level across the world (UNESCO, 2017). This underrepresentation goes beyond the quantitative imbalance and is a manifestation of deeply-rooted gendered expectations, exclusionary practices and unequal access to opportunities within engineering cultures (Whitcomb et al., 2020; Smith & Gayles, 2018). Such conditions have been found to impact upon women's experiences in their education and employment as well as present psychological strain and disengagement.

Research indicates that gender gaps in engineering start early to persist during the educational and professional career. Female engineering students are likely to report experiencing subtle discouragement, exclusion and lowered expectations within learning environments which contribute to feelings of isolation and self-doubt (Whitcomb et al., 2020). Even if women are good students, one tends to accept negative stereotypes about her technical ability, and has more stress and emotional pressure. Such experiences can lead to a weakened confidence and to psychological distress in the long term.

Within the corporate environment, women engineers very often encounter hostile or hostile working conditions. Studies have reported on

some experience of gender-based harassment, the isolation of professional networks and the constant question of women's competence in male-dominated context in engineering (Fouad et al., 2017; Smith & Gayles, 2018). These experiences are normalized as a part of the culture of the workplace, but tend to have very serious emotional consequences such as anxiety, exhaustion and feelings of isolation. In Pakistan, whose mechanisms for dealing with instances of harassment may not be strong or even less consistently enforced, such experiences may not be reported as well, again heightening psychological distress.

Work-family conflict is also one of the biggest sources of stress for women engineers, particularly in a conservative sociocultural context. Societal expectations of marriage, care giving and domestic responsibilities frequently leave women in a state of conflicting normative needs, and it is necessary for women to maintain balance between work and traditional gendered obligations. Research from similar cultural contexts suggests that it is such dual expectations that can cause people to experience chronic stress, emotional guilt and in most cases withdrawal from engineering careers (Haar et al., 2014). For the women engineers in Pakistan there is less organizational support for them such as flexible work arrangements or providing facilities for day cares which puts more pressure on them.

In addition to the inter-personal/familial pressures, lack of institutional adeptness increases in the psychological distress experienced by women engineers. Research shows that lack of access to basic facilities, mentorship programs, and organizational policies for gender equality send a signal to the implicit message of being out and undervalued. Such is the environment that is not only the source of professional ossification, but also of emotional exhaustion, frustration and disengagement. When women experience repeated experiences in spaces that have not been designed with their presence in mind, the cumulative effects of psychological stress, as well as lower well-being, may be happening (Smith & Gayles, 2018).

Although the gender inequality in engineering has taken its place in the international literature since then, little importance has been assigned to the psychological distress of women engineers in Pakistan. Existing research has been limited to looking at levels of participation, as well as structural barriers or career outcomes, often ignoring the emotional and mental health consequences of repeated exposure of gendered environment (Whitcomb et al, 2020; Peng et al, 2022). Further, it was suggested that sociocultural expectations, lack of institutional support can increase a lot of emotional burden in working women (Haar et al., 2014). Addressing such a gap, the present study takes forward the lived experiences of the women engineers working as the employees in Pakistan with a particular focus on the sources and manifestations of psychological distress both in the academic and the corporate settings.

### **Research Questions**

1. What forms of psychological distress are experienced by women engineers working in academic and corporate settings?
2. How do women engineers cope with and manage psychological distress in their professional lives?

### **Methodology**

#### **Research Design**

This study adopted qualitative research design to explore the psychological distress faced by the women engineers in Pakistan. A qualitative approach was deemed suitable as it enables in-depth understanding of participants' personal experiences, emotions and perceptions, which cannot be adequately captured through numerical data. Qualitative methods are especially helpful for exploring experiences and emotions in gendered work contexts (Braun & Clarke, 2006). The objective of study was to explore women engineers lived experiences within the academic and corporate sectors.

## Participants

The participants of this research were women engineers working in academia and corporate sector in Pakistan ( $n=15$ ). Participants were identified through purposive sampling who had direct experience of working within engineering fields. Data was collected by including women from different engineering disciplines with their demographic information.

## Inclusion criteria

- Women engineers currently working or previously employed in engineering-related positions
- Willingness to share personal and professional experiences

## Exclusion criteria

- Engineering students
- Individuals unwilling to discuss personal or emotional challenges

## Data Collection and Analysis

Data were collected through focus group discussions, as this method allows participants to share experiences in a supportive and interactive setting and encourages the expression of shared concerns and collective meanings (Krueger & Casey, 2015). Focus group discussions are particularly useful when exploring sensitive issues, as participants often feel more comfortable discussing personal experiences in the presence of others with similar backgrounds (Morgan, 1997). The discussions were conducted in Urdu and/or English, depending on the comfort of the participants. An open-ended questionnaire was used to encourage participants to speak freely about their experiences.

The discussions focused on topics such as: Experiences in academic and workplace environments, gender-related challenges, psychological stress and emotional difficulties, work-family conflicts, social and family pressures. Each discussion lasted between 45 and 90 minutes and was audio-recorded with the participants' consent. To protect confidentiality, all personal identifiers were removed during transcription.

The audio recordings were transcribed verbatim and analyzed using thematic analysis. This involved carefully reading the transcripts multiple times to identify recurring patterns and common experiences across participants. Similar responses were grouped together to form themes that reflected key sources of psychological distress. This helped organize participants' experiences into meaningful themes while staying close to their original narratives.

Ethical approval for the study was granted by the relevant and appropriate university authority. The purpose of the study and their right to withdraw at any stage of the study was explained to participants and without penalty. Consent was secured before taking part in the study and confidentiality was ensured throughout research activities.

## Results

Analysis of the focus group discussions identified six themes, which inter-relate and reflect the psychological distress and gendered experiences of women engineers who work in academia and corporate settings in Pakistan. These themes are capturing lived experiences relating to the emotional consequence of navigating in male dominated engineering environments.

### Theme 1: Emotional Exhaustion and Psychological Distress

Participants always reported that emotional exhaustion was a characteristic of their professional lives. Many women said that they were mentally exhausted from being under pressure to constantly fit in, with heightened expectations on them and having to constantly be on look out in their working places. This exhaustion was not linked to isolated events but was a process of getting exhausted and developing in time with repeated exposure to stressors.

Several participants reported feeling constant stress and fatigue and being emotionally overwhelmed which typically was not confined to the workplace and carried over to their personal lives. Some women complained of problems sleeping, being irritable and feeling "mentally tired all the time." The pressure to bottle up the feelings

and continue with work in spite of any anguish added further to their psychological burden.

"کبھی کبھی ایسا لگتا ہے کہ دن شروع ہونے سے پہلے ہی تھکن ہو چکی ہوتی ہے، کیونکہ معلوم ہوتا ہے کہ پورا دن اپنے آپ کو سنبھال کر اور دباؤ میں کام کرنا ہے۔"

### Theme 2: Isolation, Self-Doubt, and Imposter Experiences

Feelings of isolation were a common experience for the participants, especially women engineers who were remained present in their departments or teams. Many participants described a sense of not belonging and feeling excluded from informal discussions and professional networks and processes of decision-making. This isolation often contributed to feelings of self-doubt and imposters. Participants shared feeling they questioned their abilities and had to prove their competence to their colleagues all the time. Even highly qualified women expressed uncertainty of their professional identity, especially in settings in which male dominance was a normalized fact.

"جب آپ ڈیپارٹمنٹ میں اکیلی خاتون ہوتی ہیں، تو ہر چیز پر یہ شک ہوتا ہے کہ کہیں لوگ یہ نہ سمجھ لیں کہ میں اس کام کے قابل نہیں ہوں۔"

### Theme 3: Emotionally Unsafe Work Environments

Participants reported numerous workplaces in engineering as emotionally unsafe environments, especially industrial and field-based engineering work environments. Women reported experiences of unwanted attention, inappropriate comments, to stare and to over-monitor their appearance and behavior. These experiences caused constant anxiety and fear for the participants that made it difficult for them to feel comfortable at work.

Concerns regarding dress, mobility and interaction with male colleagues were mentioned quite regularly. Several women explained that they tried to change their clothing or behavior to not attract attention, pointing out the emotional labour that just to feel safe in professional spaces.

"میں خود دوپٹہ صرف اس لیے لیتی ہوں تاکہ کوئی گھور کر بھی نہ دیکھے۔"

### Theme 4: Work-Family Conflict and Emotional Guilt

Balancing professional duties with the expectations of the family came out front and center as a significant source of emotional distress. Participants described feeling a great deal of pressure around marriage, caregiving, and responsibilities in the household - pressures that were often in conflict with the job of a professional. Many women experienced guilt while prioritizing work over family or the other way around.

For the group with children, juggling work schedules with the demands of raising children was especially difficult. The absence of flexibility in work systems exacerbated the stress and some women rethought their career choice. Family issues such as safety, mobility and the work environment were also reasons for women to choose their profession.

گھر والے اکثر کہتے ہیں کہ نوکری تو ٹھیک ہے، لیکن "بچوں اور گھر کو بھی سنبھالنا ہوتا ہے۔"

### Theme 5: Psychological Impact of Inadequate Institutional Support

Participants mentioned the lack of institutional support as an important factor in psychological distress. Issues like the lack of transportation facilities, lack of adequate infrastructure, lack of good maternity support, and unequal pay were commonly suggested. In these cases, women found the organization systems did not have their needs in mind. Several participants expressed frustration and disappointment because of perceived unfair treatment, especially in terms of promotions, distribution of workload and salary differentials. These institutional gaps contributed to feelings of invisibility and lower motivation which contributed to emotional disengagement from work.

"جب سہولیات نہ ہوں تو انسان خود کو اہم محسوس ہی نہیں کرتا، یوں لگتا ہے جیسے نظام میں ہماری کوئی جگہ ہی نہیں ہے۔"

**Theme 6: Coping, Resilience, and Survival Strategies**

Despite the difficulties they experienced, participants reported different coping strategies in order to deal with psychological distress. These included emotional suppression, finding informal support of friends and family members, adapting behavior to manage conflict or, in some cases, changing jobs or work environments.

Many women referred to resilience as a need for survival, as a strategy rather than a choice. While participants displayed strength and flexibility, some recognized that a relentless compromise took an emotional toll and for some resulted in withdrawal from intensive lines of engineering work.

ہم مضبوط بننا سیکھ لیتے ہیں، لیکن اس مضبوط بننے کی "بھی ایک قیمت ہوتی ہے"

**Table 1**  
**Summary of Key Themes and Reported Emotional Experiences**

Theme	Common Experiences Reported	Emotional Experiences
Emotional Exhaustion	Continuous pressure, emotional control	Mental fatigue, stress
Isolation & Self-Doubt	Being the only woman, exclusion	Self-doubt, anxiety
Unsafe Work Environments	Harassment, monitoring	Fear, discomfort
Work-Family Conflict	Dual roles, family pressure	Guilt, stress
Institutional Gaps	Lack of facilities, unequal support	Frustration, demotivation
Coping Strategies	Silence, adaptation, job change	Emotional suppression

**Discussion**

The results of the present study suggested the continued psychological distress of females working in academic and corporate environments in Pakistan as engineers. Psychological distress in the workplace environment is commonly associated with the prolonged exposure to stressors over time, rather than specific incidents (WHO, 2022; Lazarus & Folkman, 1984). Emotional exhaustion became a key element in the professional lives of participants due to ongoing pressure, gendered roles and emotionally demanding workplaces. These findings are in line with other research that suggests women within male-dominated professions tend to experience higher levels of stress and mental fatigue as a result of having to endure work inequalities and scrutiny for an extended period (Smith & Gayles, 2018; Fouad et al., 2017). Feelings of isolation and self-doubt were also common complaints to have, particularly between females who were the only female engineers in their department or team.

Such experiences are similar to broader patterns found in engineering and STEM pivotal literature to which exclusion from informal networks and the decision making spaces contribute to uncertainty, decreased confidence and psychological strain (Whitcomb et al., 2020).

In Pakistan, these challenges seem to be compounded by the lack of female representation and the tolerance for male superiority in technical fields. The results also show that work environments that are not emotionally safe are an important factor in determining the psychological experience of women engineers. Participants' descriptions of harassment, inappropriate attention and constant monitoring of appearance and behavior are consistent with the evidence from around the world showing that unsafe and unsupportive workplaces contribute to fear, anxiety and emotional withdrawal among women professionals (Addati, & Cattaneo, 2022; WHO, 2022). For women engineers in Pakistan, the safety and mobility issues and social perception add

further emotional burdens, especially in industrial and field base environments.

The issue of work-family conflict became another major source of psychological distress. Participants explained the emotional burden of balancing work obligations and strong societal expectations about marriage, care giving and domestic roles. Exemplar with the research studies of South Asian and similar sociocultural contexts, these competing demands were linked with feelings of guilt, chronic stress and, in some cases, reconsideration of career choices (Addati, & Cattaneo, 2022). The lack of flexible working arrangements and institutional support also contributed to these challenges.

Institutional shortcomings such as lack of gender sensitive facility, little or no mentorship and unequal access to opportunities among others were found to be among the factors that contribute significantly to the emotional distress among women engineers. These results mimic those of previous research encouraging that organizational systems that fail to support women's needs support the feelings of invisibility and marginalization, which ultimately affect motivation and psychological well-being (Peng et al., 2022; Smith & Gayles, 2018). In the Pakistani context therefore, such institutional gaps have continued to be a serious hindrance in providing emotional supportable work environment for the women engineers.

Despite such challenges, participants demonstrated strength in their dealing with issues through different coping and surviving methods through emotional repressed behavior, behavioral adaptation and informal support networks. While these strategies did help women to carry on with functioning in demanding environments, they usually carried a psychological price. This further highlights the importance of going beyond the individual level of resilience and towards structural and institutional interventions with a focus on psychological safety and well-being.

Overall, the result showed the importance of the psychology distress on an important aspect in women engineers of Pakistan in their workplace. Creating emotionally safe, supportive, and

inclusive engineering environments involves not just changing policies in the institutional level, but rather, changing women lived realities in terms of cultural and organizational changes. Given the context of the study, through foregrounding women's voices this study contributes to context specific knowledge that can be used to provide information to guide gender sensitive practices and mental health informed interventions in the engineering education and workplaces.

### **Conclusion**

This study was conducted to explore the psychological distress of women engineers working in academics and corporate sectors in Pakistan. The findings show that emotional difficulties women engineers experience continue in the form of male dominated work environments, gendered expectations, emotionally unsafe workplaces, work-family conflict, and lack of institutional support. These factors all combine to causes emotional exhaustion, stress, self-doubt and feelings of marginalization. By bringing the lived experience of women to the foreground, this study brings into the spotlight psychological distress as an important, and often neglected, facet of women's participation in engineering professions. The results imply that improving the representation of women is not sufficient if this is not accompanied by an improvement of the terms of emotional and mental health associated to the exercise of their work in gendered professional environment. Creating psychologically safe and supportive workplaces requires examining operations at the organizational level of a system as well as operations at the larger sociocultural level. The research highlights the importance of gender-sensitive institutional policies, supportive work place cultures and mental health informed interventions to support the health and retention of women engineers in Pakistan. Working on these issues can be a part of more inclusive and sustainable engineering environments and help with women's ongoing engagement in the technical areas.

### Limitations and Future Research

While this research has given some useful information on the psychological distress that women engineers face in Pakistan, there are some limitations that should be noted. The research has been conducted using a relatively small sample that was taken from selected academic and corporate engineering situations, and may limit the results to other situations. As is often true in qualitative research study, the findings are meant to offer depth of understanding and not broad generalization. Data were gathered using focus group discussions, that offered for the depth and interaction of discussions but could have had an influence on the participants to tell their most highly personal experiences in a group setting. In addition, the research is based on self-reporting which is a reflection of the perception of the participants which may be influenced by individual experiences and environmental circumstances.

Future research could build on this work by recruiting from a larger set of engineering institutions and organizational situations from different parts of Pakistan. Longitudinal and mixed-methods studies may additionally provide a more in-depth understanding of the changes in psychological distress over time and how institutional practices may be designed to address the psychological well-being of women both in the engineering professions.

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