

From Tears to Care: Developing a Dialect-Aware AI Platform for Early Detection of Postpartum Depression in Bangladeshi Mothers

Abstract

Postpartum Depression (PPD) is a critical yet overlooked maternal mental health disease that affects women in the first year after childbirth. Recent research in Bangladesh indicates that between approximately 20% and 39% of new mothers experience clinically significant depression symptoms in the postpartum period. Women in rural regions, informal settlements, and low-income households are more probable to be affected, owing to financial stress, social isolation, limited access to healthcare facilities, and widespread stigma around mental health.

Untreated PPD can cause long-term emotional, behavioral, and cognitive issues in children, reduced mother-infant attachment, strained family connections, and an increased risk of chronic depression in women. Therefore, early detection and immediate support are critical for enhancing mother and infant wellness. Despite the significance of early detection, Bangladesh presently lacks a widely established, culturally suitable, and linguistically adaptable screening tool for PPD that represents the standard spoken language and Bangladeshi dialectal expressions of Bengali-speaking women. Existing methods frequently fail to capture regional linguistic variations, emotional idioms, or socio-cultural manifestations of pain, even when translated. As a result, lots of mothers are not properly screened, resulting in underdiagnosis and delayed treatment. This disparity underlines the critical need for a screening tool that women from all areas of Bangladesh can comprehend and respond to. The objective of the research is to construct, linguistically adapt, and validate a PPD screening tool in Bengali with an emphasis on reliability, cultural relevance, and accessibility across different Bangladeshi dialect groups. Professionals in clinical psychology, linguistics, public health, and computer science will collaborate together to guarantee that the screening tool is scientifically sound and effective. To ensure wide representativeness, data will be collected from Bangladeshi mothers who frequent community clinics and maternity health facilities in various regions. The adapted measure will be psychometrically validated, including reliability testing, sensitivity and specificity assessments, and field-based pilot testing with new mothers. Clear referral procedures will be incorporated into the screening workflow to guarantee that mothers identified as at risk receive connections to proper counseling, telehealth assistance, or clinical care specialists. To optimize accessibility, two versions of the final tool will be constructed:

- A paper-based version for use in clinics and community health awareness programs
- A mobile-friendly digital version to aid screening in e-health and community-based maternity care services.

The project directly supports the Government of Bangladesh's National Health Policy (2011), the National Mental Health Strategy, and global commitments under SDG 3 (Good Health and Well-being) and SDG 5 (Gender Equality). These initiatives focus on maternal health and improving access to mental wellness care services. Additionally, this research effort will boost the university's academic capabilities by involving students in research, encouraging knowledge sharing between disciplines, fostering faculty collaboration, and creating an institutional research output that meets a significant social need. The project's findings will provide a basis for future scaling, integration into digital health platforms, and further studies on maternal mental health in Bangladesh.