

# Towards Longitudinal Mental Health Diagnosis in Rwanda: A Narrative Review of Global Models and Local Relevance

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## ABSTRACT

In Rwanda and many low-resource settings, mental health diagnosis often relies on one-time clinical assessments guided by global standards like DSM-5 and ICD. These tools, while useful, risk overlooking the complexity of lived experiences shaped by historical trauma, socioeconomic challenges, and cultural interpretations of distress.

We explored the limitations of single-time diagnosis in mental health care and assessed the relevance and applicability of longitudinal diagnostic models, such as Ecological Momentary Assessment (EMA) and Experience Sampling Method (ESM), within the Rwandan mental health context.

A narrative literature review was conducted, drawing from global research on longitudinal diagnostic approaches. In addition, contextual analysis was applied to synthesize data in Rwanda.

Findings indicate that longitudinal diagnostic models capture the fluctuating nature of psychological symptoms more effectively than one-time assessments. They reduce diagnostic errors, help differentiate between transient distress and chronic mental disorders, and enable more nuanced, culturally sensitive interventions. In Rwanda, such approaches resonate with the need for trauma-informed, community-based care.

Rwanda's mental health system would benefit from integrating longitudinal diagnostic practices that align with local realities. This requires investment in digital tools, community-based data collection, and clinician training. Longitudinal diagnosis offers a pathway to more ethical, accurate, and effective mental health care in culturally complex and historically burdened contexts.

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## INTRODUCTION

Longitudinal diagnostic models in psychiatry refer to diagnostic approaches that involve repeated assessments of a patient over time to observe the development, fluctuation, or resolution of symptoms. These models provide a dynamic

and context-rich understanding of mental health trajectories, reducing misdiagnosis that can occur from single-time-point evaluations [1, 2].

Psychiatric diagnosis is a fundamental component of mental health care, serving as the basis for treatment planning, clinical communication, and

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research standardization [3]. Globally, diagnostic systems such as the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the International Classification of Diseases (ICD) have shaped how mental health conditions are defined and identified, primarily through categorical models based on single-time assessments of symptoms [4].

This model has contributed to the standardization of psychiatric practice and facilitated research on mental disorders [5]. However, it presents significant challenges, particularly in capturing the complexity, variability, and progression of mental health conditions over time. Mental disorders are not always static entities with clearly defined boundaries but are often characterized by fluctuating symptoms influenced by biological, psychological, and environmental factors [6].

The reliance on single-time assessments poses several limitations. First, it increases the risk of misdiagnosis, particularly for disorders with overlapping symptomatology. For instance, mood instability in bipolar disorder may be mistaken for major depressive disorder, leading to inappropriate treatment strategies [7]. Second, the approach fails to account for symptom fluctuations, which are common in conditions such as schizophrenia, post-traumatic stress disorder (PTSD), and borderline personality disorder. Symptoms may worsen, improve, or present differently over time, necessitating an approach that considers longitudinal symptom trajectories rather than a one-time snapshot [8]. Third, the one-time diagnostic model contributes to premature medicalization, where natural emotional responses to stress, trauma, or grief may be classified as pathological conditions without sufficient longitudinal data to justify such diagnoses [9]. This issue is particularly relevant in cases of childhood and adolescent mental health, where transient developmental changes may be mistaken for psychiatric disorders [10].

Emerging longitudinal methodologies such as experience sampling, ecological momentary assessment (EMA), and digital phenotyping offer promising alternatives. These approaches allow for the real-time data collection of symptoms across various contexts and timeframes, improving diagnostic accuracy, treatment personalization, and our overall understanding of mental health trajectories [11].

Although these critiques and innovations are well documented in global literature, their relevance and application in Rwanda remains underexplored. The country continues to face a growing demand for culturally responsive and context-sensitive mental health services, yet current diagnostic practices largely mirror imported models with limited adaptation to local realities. This paper aims to bridge that gap by critically reviewing global models of psychiatric diagnosis and advocating for the integration of longitudinal assessment approaches in Rwanda. Doing so calls for a rethinking of mental health diagnosis in Rwanda—one that is both informed by global evidence and grounded in the country's unique sociocultural and healthcare context.

## THE FLUCTUATING NATURE OF MENTAL HEALTH SYMPTOMS

A major limitation of current psychiatric diagnostic models, particularly within the Rwandan mental health system, lies in their insufficient capacity to capture the fluctuating nature of mental health symptoms over time. Unlike many physical illnesses, psychiatric conditions, such as mood disorders, anxiety, and trauma-related disorders, often manifest episodically or change depending on social, psychological, and environmental influences [12,13]. Global scholars such as Insel argue that psychiatric symptoms frequently exhibit patterns of remission and relapse, which challenge the rigidity of fixed, one-time diagnostic criteria [14]. Similarly, van der Kolk emphasizes that trauma-related symptoms can be reactivated by emotional and environmental triggers, further highlighting their dynamic nature [15].

In Rwanda, where communities continue to grapple with the psychological aftermath of genocide against the Tutsi, poverty, and emerging mental health concerns, this fluctuating symptomatology is particularly significant. Individuals experiencing depression, for example, may oscillate between deep emotional pain and relatively stable functioning. Anxiety symptoms may spike during periods of social or economic stress and decline when conditions improve. Such patterns make it difficult to capture an accurate diagnostic picture through a single clinical assessment—yet most mental health evaluations in Rwanda still rely on brief, one-off encounters due to resource constraints.

Evidence from global conflict and trauma-affected populations—contexts that resonate with Rwanda’s history—demonstrates considerable variability in symptoms of PTSD, depression, and anxiety across time [16]. This underscores the need for context-sensitive, longitudinal diagnostic models that are better suited to local realities and more capable of capturing the evolving nature of mental distress.

Short-term assessments may result in overdiagnosis, underdiagnosis, or misdiagnosis, particularly when applied without considering the temporal dimension of symptoms. A longitudinal approach allows clinicians and researchers in Rwanda to observe psychological trends over weeks or months, improving diagnostic accuracy and informing more personalized care [17]. It also enables the inclusion of cultural, social, and environmental factors that are essential for understanding mental health in the Rwandan context—factors that are often overlooked in static, imported diagnostic models [18].

### **DIAGNOSTIC STABILITY AND THE NEED FOR TIME-BASED VALIDATION**

Diagnostic stability refers to the consistency of a psychiatric diagnosis over time, indicating whether a patient retains the same diagnosis during subsequent clinical evaluations. This concept is essential in mental health as it reflects both the reliability and validity of diagnostic procedures [19]. However, evidence from global studies suggests that diagnostic stability is often lacking, particularly in the early phases of psychiatric illness or when evaluations are based on single-point assessments.

A Study by Ruggeri et al. [20] showed that only around 50% of patients retained their initial diagnosis after one year, and Chang et al. [21] found significant shifts in diagnosis during the course of early psychosis. Baca-García et al. further reported a diagnostic stability range of just 35% to 80%, depending on the disorder and follow-up duration [22]. These inconsistencies expose the weaknesses of one-time assessments and emphasize the need for a longitudinal diagnostic approach.

In the Rwandan context, mental health services are still developing, and most clinical evaluations

are brief and inaccessible due to limited time, personnel, and gaps in infrastructure. This raises serious concerns about the reliability of psychiatric diagnoses issued in such conditions. Cultural idioms of distress, trauma-informed symptoms, and variations in symptom expression—especially among youth and genocide survivors—can be misclassified without sufficient longitudinal data to validate or adjust the diagnosis over time.

Contributing factors to diagnostic instability include the complex and heterogeneous presentation of psychiatric disorders, changes in symptom severity or expression, and the inherently subjective nature of clinical assessment. These are further compounded by variability in how clinicians interpret diagnostic criteria [22]. In Rwanda, where clinicians may use translated or adapted diagnostic manuals, interpretation differences could be even more pronounced, reinforcing the need for repeated assessments and diagnostic validation.

Longitudinal approaches, including follow-ups at 3-month or 6-month intervals, have demonstrated significant improvements in diagnostic accuracy. Regular re-evaluation allows for the monitoring of symptom patterns, response to treatment, and social functioning. As Fusar-Poli et al. have shown, structured follow-ups using standardized tools significantly enhance diagnostic stability and reduce misclassification, particularly in early intervention settings [19].

Adopting such time-based validation models in Rwanda could not only improve the precision of mental health diagnoses but also foster trust in mental health services, tailor interventions more effectively, and reduce stigma through more accurate labelling. Therefore, integrating longitudinal diagnostic strategies is not simply a theoretical recommendation but a practical necessity for strengthening Rwanda's mental health system.

### **SPONTANEOUS RECOVERY AND AVOIDING OVERMEDICALIZATION**

An important argument for longitudinal assessment is its role in distinguishing between conditions that require clinical intervention and those that may resolve without medical treatment. In Rwanda, where social and environmental stressors—

including trauma, poverty, and loss—are prevalent, many individuals experience emotional distress that may not meet clinical thresholds for psychiatric disorders. Spontaneous recovery, defined as the natural resolution of symptoms without formal intervention, is common in such contexts, particularly in mild to moderate cases of anxiety and depression [23].

When mental health assessments are conducted at a single time point, there is a significant risk of misclassifying adaptive human responses as psychiatric pathology. This can lead to unnecessary prescription of psychotropic medication, potentially exposing individuals to side effects, fostering dependency, and diverting attention from psychosocial interventions that might be more appropriate [24]. Furthermore, premature diagnoses may contribute to stigma, reduce resilience, and undermine trust in mental health systems—issues that are particularly salient in Rwanda’s post-genocide and culturally diverse context.

Longitudinal approaches provide an alternative by allowing clinicians to track the course of symptoms over time before reaching a conclusive diagnosis. This enables more tailored interventions, including non-pharmacological options such as watchful waiting, lifestyle adjustments, psychoeducation, and brief counseling [25]. These strategies are especially valuable in community-based mental health settings where access to psychiatric specialists is limited and culturally sensitive, low-intensity interventions are often preferred.

Empirical evidence suggests that for certain cases of anxiety and depression, less intensive interventions can be as effective as medication in the long term [26]. For example, in contexts like Rwanda, a child presenting with inattentiveness and irritability might be prematurely diagnosed with attention-deficit/hyperactivity disorder (ADHD) after a brief consultation. However, a more time-sensitive, longitudinal approach could reveal an underlying adjustment disorder linked to family or school stress, avoiding unnecessary medication and ensuring more appropriate care. This case underscores the importance of time-sensitive evaluation and cautious diagnostic practice, particularly in children and adolescents.

In the Rwandan context, adopting longitudinal

diagnostic frameworks not only improves accuracy but also aligns with public health priorities aimed at minimizing harm, optimizing resource use, and promoting culturally congruent, patient-centered care. Avoiding overdiagnosis through time-based clinical judgment is essential for building trust in mental health systems and ensuring that treatment is reserved for those who truly need it.

## **IMPLEMENTING LONGITUDINAL DIAGNOSIS IN RWANDA: BRIDGING THE GAP WITH A STRATEGIC CALL TO ACTION FOR MENTAL HEALTH CARE**

Advancing towards a more accurate and context-sensitive mental health diagnosis in Rwanda requires the integration of longitudinal assessment strategies into clinical practice. Longitudinal approaches offer dynamic, time-sensitive perspectives on symptom progression, treatment response, and patient well-being. This part reviews established global models, practical implementation strategies, and the potential role of digital innovation, while emphasizing their relevance for Rwanda’s evolving mental health system.

**Models of Longitudinal Approaches:** Globally, several longitudinal models have been developed to better understand psychiatric disorders over time. Techniques such as the Experience Sampling Method (ESM) and Ecological Momentary Assessment (EMA) involve collecting real-time data multiple times a day, capturing individuals’ emotions, thoughts, and behaviors as they occur in their everyday environments. These methods are particularly valuable in revealing moment-to-moment changes and situational influences on mental health [27]. Prospective cohort studies, often used in psychiatric epidemiology, follow large groups of people over extended periods, sometimes decades, to map the onset and progression of mental disorders and to identify risk or protective factors that might vary across cultural or environmental contexts [28]. Time-series analysis is a statistical method used on frequently collected data (e.g., daily mood logs or sleep metrics) to detect trends, recurring patterns, or abrupt changes in symptoms over time [29]. Repeated-measures designs, commonly used in clinical trials, involve evaluating the same individuals at multiple points during treatment or intervention. This approach helps clinicians track

changes, monitor treatment efficacy, and adjust strategies based on evolving patient needs [30]. In the Rwandan context, adapting longitudinal models like EMA and prospective cohort tracking can be greatly enhanced through the strategic involvement of community health workers (CHWs) and peer-support networks. These individuals can serve a dual role: identifying new cases of psychological distress through routine community engagement and supporting individuals already receiving care. To ensure effectiveness and safety, participants will undergo personalized, context-specific training in basic mental health literacy, psychosocial support, ethical boundaries, and structured observation. This approach not only reinforces the bridge between clinical systems and community-based support but also strengthens early detection and long-term follow-up within culturally grounded care frameworks. Table 1 shows comparison between traditional and longitudinal psychiatric diagnostic models.

**Practical Applications in Clinical Settings:** Integrating longitudinal assessment into Rwandan psychiatric services requires strategies that are both resource-sensitive and sustainable. Clinicians can introduce structured follow-up assessments at regular intervals (e.g., monthly or quarterly) using brief, validated tools adapted to local languages and cultural frameworks [31]. Such repeated monitoring supports more accurate diagnoses by tracking symptom persistence or resolution over time, which is critical for distinguishing between transient distress and chronic conditions.

However, while clinician-level changes are important, a system-level approach is essential to ensure equitable coverage across all regions. Relying solely on individual clinicians risks leaving out areas without access to such interventions. Therefore, this proposal emphasizes the need for nationwide integration of longitudinal methods into mental health policy, professional training curricula, and standard operating procedures. This approach would enable both public and private practitioners across Rwanda to adopt standardized tools and protocols, improving consistency in care delivery and enabling proper resource allocation [32].

In addition, the role of community-based actors—particularly community health workers (CHWs)

and peer-support networks—should not be overlooked. These individuals can help monitor mental health trajectories by supporting both new and existing cases within communities, thereby bridging the gap between clinical and non-clinical environments. To be effective, CHWs and peers would require personalized training tailored to their roles, going beyond basic interpersonal skills to include culturally appropriate monitoring techniques and reporting strategies [33].

**Leveraging Digital Tools and Artificial Intelligence (AI):** Emerging digital tools and AI technologies offer transformative opportunities for longitudinal psychiatric care, even in low-resource settings. Mobile health (mHealth) solutions, such as smartphone apps and SMS-based surveys, can collect self-reported data on mood, energy, or stress levels, while wearable devices can monitor physiological indicators like sleep, heart rate, or physical activity [34].

These tools enable Ecological Momentary Assessment (EMA) to be conducted efficiently in real time, reducing recall bias and providing clinicians with actionable data. For Rwanda, where mobile penetration is high and digital innovation is growing, such tools could be adapted for use in local languages and integrated into community mental health frameworks.

AI-powered analysis of longitudinal data can detect subtle symptom trends, predict potential relapses, and inform early interventions [35]. Moreover, Natural Language Processing (NLP) offers possibilities for analyzing linguistic patterns in local dialects (e.g., Kinyarwanda) from therapy transcripts or digital communication, with ethical safeguards, to monitor psychological states [36].

While challenges such as data privacy, digital literacy, and ethical considerations must be addressed, digital longitudinal assessment offers scalable solutions to strengthen Rwanda's mental health system. Partnerships between health professionals, data scientists, and community stakeholders will be essential to ensure culturally appropriate, ethical, and equitable deployment of these tools.

Figure 1 illustrates how psychiatric diagnoses, when made from a single time-point assessment,

**Table 1:** Comparison Between Traditional and Longitudinal Psychiatric Diagnostic Models

Feature	Traditional Diagnostic Model	Longitudinal Diagnostic Model
Time of Assessment	One-time (cross-sectional)	Multiple over time (weeks, months, years)
Diagnostic Stability	Often low	Higher through repeated evaluations
Cultural Sensitivity	Limited	Greater adaptability to local idioms and expressions
Risk of Misdiagnosis	Higher (due to static criteria)	Lower (due to dynamic observation)
Applicability in Rwanda	Based on imported models	Encourages integration of local context and CHWs
Overmedicalization Risk	High (labels stress responses as illness)	Lower (permits watchful waiting and psychosocial care)
Use of Technology	Minimal	Emphasizes mobile tools, EMA, digital tracking

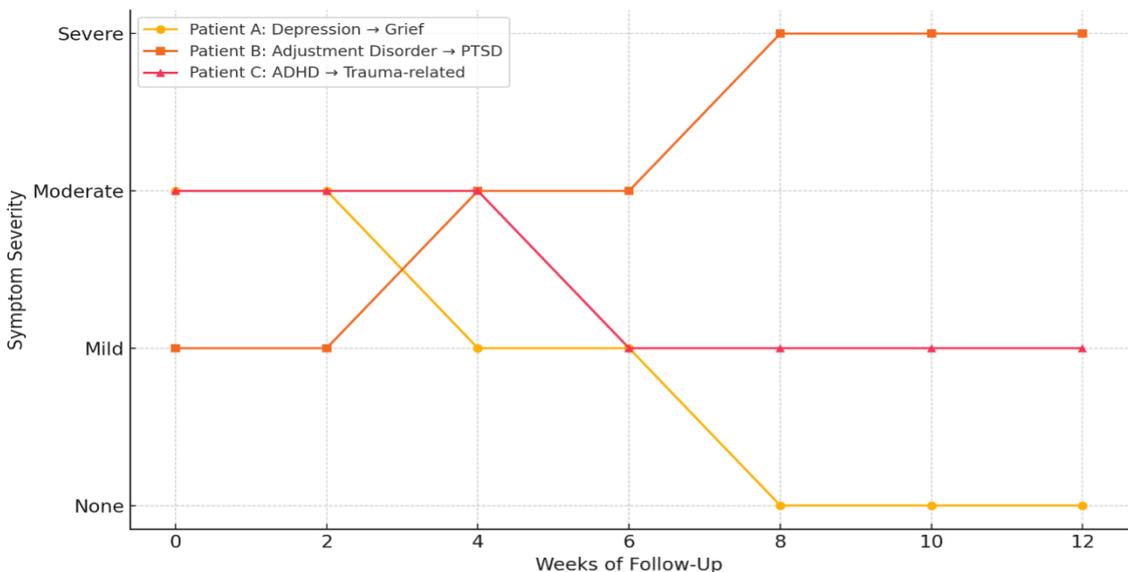
can lead to misclassification of mental health conditions. By tracking the clinical trajectories of three fictional patients (A, B, and C), the figure demonstrates how longitudinal follow-up enables diagnostic correction and prevents premature medicalization or misdiagnosis.

Patient A was initially diagnosed with Major Depressive Disorder based on symptoms of low mood, fatigue, and withdrawal. However, longitudinal observation revealed that these symptoms were part of an acute grief reaction following bereavement. The symptoms resolved naturally over time without clinical intervention, illustrating the phenomenon of spontaneous recovery, a recognized outcome in mild to moderate cases of emotional distress [23,24]. This case emphasizes the importance of caution

when assigning clinical labels to natural human experiences and supports calls for time-sensitive diagnostic frameworks, especially in culturally contextualized environments like Rwanda.

Patient B presented with mild anxiety and concentration difficulties that were initially diagnosed as an adjustment disorder. Over time, the emergence of trauma-specific symptoms such as nightmares, hypervigilance, and emotional numbing aligned more consistently with Post-Traumatic Stress Disorder (PTSD). This trajectory underscores how trauma-related disorders often exhibit delayed expression, requiring longitudinal assessment to capture the full clinical picture [15,16].

Patient C was prematurely diagnosed with



**Figure 1:** Misclassification Risk in Psychiatric Diagnosis Over Time

Attention-Deficit/Hyperactivity Disorder (ADHD) based on inattentiveness and restlessness. However, extended observation revealed that the symptoms were rooted in chronic exposure to domestic violence. This patient was later reclassified with a trauma and stressor-related disorder. Such cases highlight the diagnostic overlap between neurodevelopmental and trauma-related conditions, particularly in children [26]. Without longitudinal assessment, trauma can be misinterpreted through a biomedical lens, resulting in inappropriate pharmacological treatment and missed opportunities for psychosocial intervention.

The trajectories shown in Figure 2 emphasize that diagnostic stability is not static but evolves over time [19-22]. Misclassification risks are particularly high in early stages of illness or under resource-constrained settings, where brief evaluations dominate. In Rwanda's developing mental health system, longitudinal models offer a necessary alternative, accounting for sociocultural dynamics, idioms of distress, and symptom fluctuation [18].

Ultimately, integrating time-based diagnostic strategies enhances clinical accuracy, promotes ethical practice, and aligns with global calls for culturally sensitive and person-centered mental health care [11,32].

## CONCLUSION

Rwanda's current reliance on one-time, encounter-based diagnostic tools in mental health care—driven by limitations in resources, personnel, and funding—proves insufficient given the fluctuating and context-dependent nature of mental health disorders. Conditions such as PTSD vary in manifestation across time and location, underscoring the need for socially and culturally tailored diagnostic strategies. The current approach increases the risk of misdiagnosis, overdiagnosis, or underdiagnosis, potentially resulting in inappropriate treatment plans and exacerbation of patients' conditions.

A longitudinal approach offers a promising solution by enabling clinicians to track mental health symptoms over time, improving diagnostic accuracy and treatment personalization. This method enhances diagnostic stability, allows differentiation between transient psychological

distress and pathological conditions, and helps avoid unnecessary medication, side effects, and community stigma. It also mitigates issues related to language barriers and resource wastage. Models like Ecological Momentary Assessment (EMA) and Experience Sampling Method (ESM), especially through mobile technology, which is rapidly expanding in Rwanda, can support real-time, patient-centered monitoring outside clinical settings, thereby making longitudinal diagnostics more feasible.

However, implementing this approach raises critical challenges and areas for further research. It is essential to determine how to ethically and effectively manage care when immediate treatment is needed but a diagnosis is still pending. Studies should examine how stigma persists despite accurate diagnoses and explore strategies to minimize its harm. Particular attention must be given to patients who are psychotic or critically ill and may be lost to follow-up without inpatient care. Tools like EMA/ESM must also be adapted for individuals with sensory impairments or those in low-resource contexts without access to smartphones. Finally, ethical safeguards must be established to ensure that vulnerable patients undergoing prolonged diagnostic evaluation do not feel abandoned or neglected.

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