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Review of the Diagnosis and Monitoring of Depression

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Abstract
Depression is a prevalent mental disorder that affects millions of people worldwide. It is characterized by profound sadness, loss of interest in activities, and a range of significant emotional and physical symptoms. The objective of this article is to provide a detailed understanding of the diagnosis and monitoring of depression, highlighting the importance of early diagnosis and ongoing follow-up to optimize treatment, prevent complications, and improve patients' quality of life. The methodology used was a thematic review, the results of which highlight that both diagnosis and monitoring are essential elements to ensure effective mental health care tailored to each patient's individual needs. Constant monitoring is essential, as symptoms can vary over time, necessitating ongoing monitoring of treatment response, relapse prevention, and assessment of patient safety. Furthermore, the integration of clinical and digital tools allows for a more dynamic and personalized approach to depression management.

Keywords: *Depression, Diagnosis, Monitoring, Multidimensional Approach*

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I. INTRODUCCIÓN

Depression is one of the most prevalent mental disorders worldwide, affecting millions of people regardless of age, gender, or culture. According to the World Health Organization (WHO), it is estimated that more than 300 million people suffer from depression, making it one of the leading causes of disability globally. It is a very common disorder in general medical conditions and is associated with functional disability (Ormel et al., 1994). However, the vast majority of depressions are not attributable to medical causes. Other data (Gatz et al., 1992) suggest that genetic influences account for only 16% of the total variance in depression and that life-course problems are the most statistically significant influences on self-reported depressive symptoms. Among the professional groups most affected by anxiety-depression in their daily work are healthcare professionals, especially medical and nursing staff, due to the great responsibility they assume during working hours, the work overload, and the constant contact with critically ill patients. Rosa Más Pons, Vicenta Escriba Aguir. (1996), Morata Ramírez M. A, Ferrer Pérez V.A; (2004)

Depression is defined based on subjective symptoms; there is no biological test to verify the diagnosis. It is characterized by a set of symptoms that include persistent feelings of sadness, loss of interest or pleasure in daily activities, sleep and appetite disturbances, extreme fatigue, and thoughts of worthlessness or hopelessness. Depression not only engenders extraordinary personal and family suffering but also has significant social repercussions, such as increased use of social and medical services. (World Health Organization, 1992), (American Psychiatric Association, 2013), (Johnson, Weissman, & Klerman, 1992), enormous treatment costs (Conwell, 1996), and lost productivity due to absenteeism (Greenberg, Stiglin, Finkelstein, & Berdnt, 1993).

Several studies have addressed methods for diagnosing depression, noting that although well-established tools exist, such as self-report questionnaires (e.g., the Beck Depression Inventory) and structured clinical interviews, diagnostic accuracy depends largely on the clinician's experience and accurate interpretation of symptoms. Over the past few decades, it has been shown that an accurate diagnosis not only improves the prognosis of the illness but is also essential for developing effective treatment plans, which may include psychotherapy, pharmacotherapy, and, in some cases, more complex psychiatric interventions. Continuous follow-up is another crucial aspect in the treatment of depression. The scientific literature highlights that people who receive regular follow-up care have a significantly higher likelihood of achieving sustained remission. In fact, studies have shown that treating depression requires a long-term, multidisciplinary approach that includes both medical care and psychosocial support.

This essay will analyze the current methods used to diagnose depression, the clinical criteria that guide this diagnosis, and the importance of ongoing follow-up care throughout the treatment process. To this end, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology was used to conduct a systematic review of studies published between 1996 and 2025. The search was conducted in scientific

databases such as PubMed-Medline, the Institutional Repository of the Alexander von Humboldt Institute and the University of Tolima, as well as Google Scholar, using Boolean operators and keywords in English and Spanish.

II. DIAGNOSIS OF DEPRESSION

The diagnosis of depression is based on a detailed clinical assessment, which includes observation of the patient's symptoms and medical history. Mental health professionals use tools such as structured clinical interviews, self-report questionnaires, and rating scales to make an accurate diagnosis. The most commonly used classification for diagnosing mental disorders, including depression, is the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders). Depression is diagnosed when a person experiences five or more of the following symptoms for at least two weeks, and these symptoms must cause significant impairment in daily functioning:

1. Loss of interest or pleasure in almost all activities.
2. Significant weight loss or gain.
3. Insomnia or excessive sleeping.
4. Fatigue or loss of energy.
5. Feelings of worthlessness or excessive guilt.
6. Difficulty concentrating or making decisions.
7. Suicidal thoughts or ideation.

Furthermore, depression must be differentiated from other disorders, such as anxiety disorders, bipolar disorder, or substance abuse, to ensure appropriate treatment (APA, 2013). Unfortunately, the diagnosis of MDD still depends on the clinical judgment of each professional, with high levels of subjectivity and potential variability. Consequently, there is an urgent need for more objective diagnostic tools or modalities that can improve current psychiatric practice, which relies primarily on self-reported symptoms and clinical interviews. (Uher R, Payne JL, Pavlova B, Perlis RH. 2014)

III. TYPES OF DEPRESSION

According to authors: Wright, S.L., Persad, C. (2007), Kendler, K.S., Gardner, C.O. (1998). Jonathan García-Allen. (2015, June 3). The symptoms of depressive disorder can vary from person to person. Your doctor may add one or more specifiers to help identify the type of depression you have, such as:

• Anxious depression: Depression with unusual anxiety or worry about potential events or loss of control

• Combined features: Depression and mania occurring simultaneously, which includes high self-esteem, excessive talking, and increased energy

• Melancholic features: Severe depression with unresponsiveness to things that used to bring pleasure and is associated with early morning awakening, worsening mood during the morning, significant changes in appetite, and feelings of guilt, agitation, or sluggishness

• Atypical features: Depression that includes momentary joy at happy events, increased appetite, excessive need for sleep, sensitivity to rejection, and a feeling of heaviness in the arms or legs

• Psychotic features: Depression accompanied by delusions or hallucinations, which may involve limitations in completing tasks or other negative aspects

• Catatonia: Depression that includes motor activities related to movement Uncontrolled and aimless, or with a fixed and rigid posture

• Peripartum-onset: Depression that occurs during pregnancy or in the weeks or months after delivery (postpartum)

• Seasonal pattern: Depression related to changing seasons and decreased exposure to sunlight

IV. MONITORING

Monitoring and evaluation are necessary to determine whether an intervention is achieving the desired results. When done correctly, monitoring and evaluation use information to demonstrate the positive or negative, direct or indirect changes that have occurred and the objectives achieved or not, while providing lessons for future consideration. It is important that monitoring and evaluation information be shared in accessible and acceptable formats by staff. Monitoring and evaluation are part of good humanitarian practice and contribute to meeting the fundamental principles of the IASC Guidance on Mental Health and Psychosocial Support in Humanitarian Emergencies and Disasters.

"Monitoring" refers to the visits, observations, and questions we make while an intervention is being implemented to determine whether it is progressing as expected. Similarly, "evaluation" refers to the examination of a program at the beginning, during the middle, and after it has been completed to determine whether it has achieved the desired results.

V. DEPRESSION MONITORING

Monitoring depression is crucial to assess the effectiveness of treatment and make adjustments to interventions when necessary. Since depression can fluctuate in intensity and duration, ongoing monitoring of symptom progression and therapeutic response becomes essential. This process is not limited solely to the assessment of depressive symptoms but adopts a multidimensional approach, including observation of clinical signs, ongoing evaluation of treatment response, and monitoring of the patient's overall well-being. Key areas in this process include identifying changes in emotional, cognitive, and behavioral patterns, as well as analyzing any treatment side effects that may affect the patient's overall health.

The physician can determine a diagnosis of depression based on various tools and scales that healthcare professionals use to assess the severity of depression over time. Some of the most common include:
• Physical examination. The physician will likely perform a physical examination and ask you questions about your health. In some cases, depression may be related to an undiagnosed physical health problem.
• Laboratory tests. Your doctor may perform a blood test called a complete blood count or analyze your thyroid gland to ensure it is functioning properly.

• Psychiatric evaluation. Your mental health professional will ask you questions about your symptoms, thoughts, feelings, and behavior patterns. You may be asked to complete a questionnaire such as: -Hamilton Depression Rating Scale (HAM-D): This scale is one of the most widely used in clinical settings and measures the severity of depressive symptoms in patients with depressive disorders (Hamilton, 1960). -Beck Depression Inventory (BDI): A self-report questionnaire that helps measure the intensity of depressive symptoms (Beck et al., 1996). -Children's Depression Scale (CDI): In pediatric patients, this tool is useful for assessing depression in children and adolescents (Cuijpers et al., 2011).

• DSM-5. Mental health professionals can use the criteria described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), published by the American Psychiatric Association.

Monitoring should also include observing the response to pharmacological treatment (such as antidepressants) and psychotherapeutic interventions. Regular consultations, along with the use of these scales, allow health professionals to adjust treatment as needed, whether by increasing medication doses, changing medications, or recommending additional therapies (Meyer & Tarrant, 2020).

VI. THE IMPORTANCE OF DIAGNOSIS AND CONTINUOUS MONITORING

Early diagnosis and ongoing monitoring are key to preventing the worsening of depression and reducing the risk of suicide. Without proper follow-up, patients may experience relapses, and symptoms can become chronic, severely affecting their emotional and physical well-being (Kessing & Andersen, 2004).

Ongoing monitoring is also important because treatment for depression does not always follow a linear course. As patients progress through treatment, they may experience changes in symptom intensity, which may require adjustments in the therapeutic approach. Furthermore, medication side effects should be monitored to minimize any additional risks (Papakostas & Fava, 2009).

VII. DEPRESSION MONITORING: A MULTIDIMENSIONAL APPROACH

Depression monitoring is not limited to assessing depressive symptoms; it involves a multidimensional approach that encompasses various aspects, from observing clinical symptoms to monitoring treatment response and assessing the patient's overall well-being. Some key areas of depression monitoring are highlighted here.

1. Monitoring Clinical Symptoms

Continuous observation of depressive symptoms is critical for adjusting treatment. Symptoms of depression can vary in intensity and nature over time, and monitoring them allows professionals to identify patterns and changes in the patient's emotional and physical state. Assessment scales, such as the Hamilton Depression Rating Scale (HAM-D) or the Beck Depression Inventory (BDI), allow symptoms to be quantified, providing an objective measurement of the severity of depression.
Key elements to monitor:
• Mood: Whether the patient continues to experience constant sadness, irritability, or feelings of emptiness.

• Interest in activities: The persistent loss of interest or pleasure in previously enjoyed activities, known as anhedonia.
• Cognitions and thoughts: The presence of persistent negative thoughts about oneself, the future, or the world. The presence of suicidal thoughts is also assessed.
• Physical functioning: Changes in appetite, weight, sleep patterns (insomnia or hypersomnia), fatigue, and energy level.
• Ability to concentrate and make decisions: Difficulty concentrating, making decisions, or remembering things.
Regular monitoring of these symptoms helps determine whether the patient is improving, worsening, or if treatment adjustments are needed.

2. Treatment Response Assessment
One of the main aspects of depression monitoring is assessing how the patient responds to the prescribed treatment. Treatment response is not always immediate, and it may take weeks or even months for a significant improvement in symptoms to be observed.
Monitoring treatment response includes:
• Pharmacotherapy: Many patients with depression are treated with antidepressant medications. Monitoring the effects of these medications should include observing their efficacy (reduction of symptoms) and the presence of side effects. Some antidepressants can cause side effects such as nausea, insomnia, or changes in appetite, which may require medication adjustments.
• Psychotherapy: In patients undergoing psychotherapy (such as cognitive-behavioral therapy), it is important to assess whether the patient is developing new skills to manage negative thoughts and improve their emotional functioning. Monitoring includes observing the patient's engagement in therapy, the frequency of sessions, and their willingness to participate in the therapeutic process.
• Monitoring treatment response includes not only a clinical assessment but also the use of follow-up tools, such as structured interviews or self-administered questionnaires, to gain a clearer picture of symptom progression.

3. Relapse Prevention and Long-Term Management
Depression has a high recurrence rate. People who have experienced a depressive episode are at increased risk of developing additional episodes in the future. Therefore, monitoring should also focus on preventing relapse and ensuring that the patient receives continued treatment even when symptoms subside.
• Long-Term Monitoring: Although patients may experience improvement, continued follow-up is critical, as depressive episodes can recur. Monitoring should continue for at least 6–12 months after symptom remission to reduce the likelihood of relapse.
• Relapse Prevention: In some cases, mental health professionals recommend continuing medication for an extended period, even if the patient has no active symptoms. Similarly, maintenance psychotherapy can be helpful to strengthen coping skills and prevent symptoms from resurfacing.

4. Patient Safety Assessment
Consistent monitoring is also essential to assess patient safety, particularly in those with suicidal thoughts or ideation. Severe depression significantly increases the risk of suicide, so assessing suicidal intent is crucial. Specific questions should be part of the monitoring process to identify warning signs, such as:
• Recurrent thoughts about death.
• Active or passive suicide planning.
• Access to lethal means (medication, weapons, etc.).
If a patient shows signs of suicidal risk, immediate action should be taken, such as hospitalization or the implementation of a safety plan.

5. Contextual Factors and Comorbidities
Monitoring for depression should also take into account the patient's life context, including social, work, and family circumstances that may influence the severity and outcome of the illness. Furthermore, many patients with depression have comorbidities, such as anxiety, personality disorders, or substance abuse, which can complicate treatment and require additional monitoring.

6. Use of Technology in Monitoring
The process of developing novel concepts, procedures, goods, services, or solutions that are valuable and have a beneficial influence is known as innovation. When this idea is applied to healthcare innovation, the process is carried out with the intention of improving patient outcomes, healthcare delivery, and overall industry efficiency. Technology has opened new avenues for depression monitoring. Patients can document their symptoms and daily health status through wearable technology, web platforms, and mobile applications. This allows clinicians to access real-time data that can be used to better modify treatment. Furthermore, these technologies facilitate

continuous monitoring between visits, which improves treatment adherence and allows problems to be identified before they become emergencies. Innovative Technology (2025)

VIII. BIOMETRIC DATA: THE KEY TO DETECTING PATTERNS

Smartwatches have evolved from simple fitness tools to devices capable of monitoring complex metrics related to physical and mental health. These devices employ advanced sensors that capture data on:

-Heart rate: A key indicator of stress or calm. Irregular heart rhythms or low heart rate variability (HRV) are often recorded in states of anxiety or depression. Several studies have found a high prevalence of cardiovascular disease in patients with major depressive disorder (Correll et al., 2017; Penninx et al., 2017).

Heart rate is usually higher during physical activity and decreases during rest. Heart rate variability is defined as the fluctuations in the time between consecutive heartbeats, known as interbeat intervals (Shaffer and Ginsberg, 2017). Heart rate and heart rate variability are inversely related; the lower the heart rate, the higher the variability.

The findings of this study, combined with other factors, will allow for early detection of possible depressive episodes in the future and raise an alarm for preventive and personalized professional care. People with higher levels of depression tend to have a high heart rate at night and a lower resting heart rate variation throughout the day.

-Sleep quality: REM sleep and sleep interruptions are indicators of emotional imbalances. According to studies, more than 60% of people with depression in Europe report sleep problems. Sleep medicine has sought methods to enable automated sleep analysis since its inception, as the gold standard for diagnosis remains polysomnography (PSG), a laborious test that requires specialized personnel for its performance and interpretation and is not available to all centers. O. Mediano, N. González Mangado, J.M. Montserrat, M. Luz Alonso-Álvarez, I. Almendros, A. Alonso-Fernández, et al. (2022).

Diagnosis using PSG requires exhaustive manual analysis for coding, which is why AI-based systems have been developed for fairly accurate automated analysis. Bazoukis, S.C. Bollepalli, C.T. Chung, X. Li, G. Tse, B.L. Bartley, et al. (2023). They are currently used for sleep staging, respiratory event coding, insomnia characterization, circadian rhythm prediction from gene expression, and OSA phenotyping. E. Haus, M.H. Smolensky (2013). In fact, the Food and Drug Administration (FDA) has approved several automatic coding software programs in recent years, such as Somnolyzer® (Philips Respironics, Murrysville, PA, USA) or Noxturnal Software System® (Nox Medical Global, Reykjavik, Iceland).

One of the first studies using neural networks was described by Schaltenbrand et al. (1996). In this study, automatic scoring of 61,949 epochs from 60 subjects using a neural network model showed a level of agreement comparable to that of human experts, with 82.3% agreement between the model and experts, and 87.5% agreement among the experts themselves. This accuracy improved to 90% when expert supervision was introduced for unknown or ambiguous epochs.

Physical activity levels: Reduced activity can be a symptom of fatigue associated with depression. Depression is a common illness in the aging population, and the likelihood of suffering from this psychological disorder is two to three times higher in patients with chronic illnesses (Anderson RJ, Freedland KE, Clouse RE, Lustman PJ, Rudisch B., & Nemeroff CB. (2003). Rosemann, M., de Bruin, T., & Power, B. (2007). Many cross-sectional studies have shown that depressed patients are more sedentary (Weyerer, 1994). However, this association may be bidirectional: depression may lead to decreased physical activity due to the low motivation and energy these subjects exhibit; and decreased exercise may be a risk factor for depression.

Recently, the use of physical activity as a treatment and/or prevention of depression and depressive symptoms has been studied (Paluska & Schwenk, 2000). In this regard, countries such as the United Kingdom, the United States, and Australia have developed health-related physical activity guidelines, which generally recommend that all adults engage in at least 30 minutes of moderate physical activity, all or most days of the week (American College of Sports Medicine [ACSM], 2000; Chief Medical Officer's Report [CMOR], 2004). However, relatively little research has been done on the optimal amount of physical activity required to prevent depression or to alleviate its symptoms.

Previous studies have focused on analyzing the relationship between physical activity and depression (O'Neal, H., Dunn, A.L., & Martinsen, E.W., 2000; Brosse, A.L., Sheets, E.S., Lett, H.S., & Blumenthal, J.A., 2002; Paluska & Schwenk, 2000; Lawlor & Hopke, 2001; Craft & Perna, 2002). 2004; Teychenne, M., Ball, K., & Salmon, J., 2008). These studies, in general, conclude that physical activity is positively associated with mental health, serving as a preventative measure.

Studies conducted by Fedor, S., Lewis, R., Pedrelli, P., Mischoulon, D., Curtiss, J., & Picard, R. W. (2023). Shavi Rebecca (Published Jan 26, 2025) reveal that sleep and activity metrics collected by smartwatches correlated 87% with traditional diagnoses of moderate to severe depression. This level of accuracy marks a milestone in the use of biometrics applied to mental health.

In another clinical trial conducted in Morley, L., Pope, C., Alexiadou, N., Garaz, S., Taba, M., Padilla Carmona, M. T., & González Monteagudo, J. (2018) in patients with a history of depressive episodes used smartwatches with this technology for six months. The results showed that 70% of users who received early alerts managed to seek support before the condition worsened. This highlights the potential of these devices not only to improve the quality of life of users, but also to alleviate the burden on healthcare systems.

IX. BENEFITS AND LIMITATIONS

Although smartwatches present multiple advantages, there are also limitations and ethical challenges.
Advantages
• Continuous and non-intrusive monitoring: By collecting data automatically, users do not need to make additional efforts.
• Democratized access: These devices are already widely used, facilitating large-scale implementation.
• Early detection: By identifying symptoms before they become clinically evident, they allow for faster interventions.
Limitations
• Data privacy and security: Handling sensitive information requires strict protocols to protect user privacy. European legislation, such as the General Data Protection Regulation (GDPR), establishes clear standards, but trust in companies remains a critical issue.
• Unequal access: Although smartwatches have become popular, their cost can be prohibitive for some groups, especially in countries with economic inequalities.
• Not a substitute for medical diagnosis: These devices should be considered complementary tools, not replacements for healthcare professionals.

X. CONCLUSION

In conclusion, the diagnosis and monitoring of depression are essential components to ensuring effective mental health care tailored to each patient's individual needs. Through a detailed clinical assessment and the use of validated monitoring tools, professionals can ensure that treatment is appropriate and provides a significant improvement in the patient's quality of life. Given the complex and multifaceted nature of depression, ongoing monitoring becomes crucial, as symptoms can vary over time.

Monitoring is not limited to observing symptoms but includes monitoring treatment response, preventing relapse, and assessing patient safety. This comprehensive strategy allows for early and targeted intervention, which is essential to avoid serious complications, such as suicidal ideation or chronic illness. Furthermore, by incorporating both clinical and digital tools, healthcare professionals can offer a more dynamic and personalized approach to depression management.

Finally, it is essential that both patients and healthcare professionals recognize the importance of ongoing monitoring, not only during the acute phase of the illness but also over time, to ensure sustained recovery and reduce the risk of relapse. Only through a consistent and tailored treatment approach can people with depression be helped to lead healthier, more satisfying, and fulfilling lives.

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