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Medicine

Development of a Smartphone Application for Diagnostic Support and Therapeutic Management of Psychiatric Emergencies

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I dedicate this humble work, the fruit of many years of effort and perseverance...

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List of Abbreviations

ABG: Arterial Blood Gas

AVH: Auditory Verbal Hallucinations

BP: Blood Pressure

CBC: Complete Blood Count

CPK: Creatine Phosphokinase

CT: Computed Tomography

DSM-5: Diagnostic and Statistical Manual of Mental Disorders, 5th Edition

ECG: Electrocardiogram

ECT: Electroconvulsive Therapy

ESR: Erythrocyte Sedimentation Rate

HR: Heart Rate

IM: Intramuscular

IV: Intravenous

NMS: Neuroleptic Malignant Syndrome

PO: Oral administration

PTSD: Post-Traumatic Stress Disorder

RR: Respiratory Rate

SpO₂: Peripheral Oxygen Saturation

SLE: Systemic Lupus Erythematosus

UX: User Experience

SAMSHA: Substance Abuse and Mental Health Services Administration

INTRODUCTION

Psychiatric emergencies represent a significant and increasing proportion of consultations in emergency departments, constituting a major challenge for healthcare systems due to their frequency, potential severity, and the considerable impact they exert on patients, their relatives, and the healthcare system(1). They encompass acute clinical situations characterized by a rapid alteration of the patient 'mental state, which may compromise functional, social or even vital prognosis, and require immediate assessment followed by appropriate management in order to prevent somatic, psychiatric, and social complications(2).

Despite the existence of validated clinical guidelines and assessment scales, their application in daily practice remains heterogeneous, particularly in contexts where access to a psychiatrist is limited. This variability in practice may lead to diagnostic delays, inappropriate management, or sub-optimal patient orientation, with no-negligible clinical and medico-legal consequences(3). Furthermore, organizational constraints within emergency departments increase the need for reliable, rapid, and easily accessible decision-support tools.

In this context, the development of digital health technologies, and more specifically medical mobile applications, appears to be a promising opportunity to support healthcare professionals in the management of psychiatric emergencies(4). These digital tools may play a decisive role by facilitating clinical assessment, offering decision, making algorithms based on international recommendations, and assisting in patient orientation and follow-up.

Considering the challenges posed by the diagnostic complexity of psychiatric emergencies and the heterogeneity of clinical practices, the question arises as to the extent to which a dedicated smartphone application could improve the quality of diagnosis and management in real life care settings. In this context , the use of a mobile application designed to support the diagnosis and management of psychiatric emergencies may contribute to improving the speed and quality of clinical assessment, enhancing adherence to clinical guidelines, and optimizing patient orientation(4).

OBJECTIVES

General objective

- To develop and evaluate a mobile application designed to assist medical practitioners and medical students in diagnosis and management of psychiatric emergencies, with the aim of enhancing the speed, accuracy, and quality of clinical decision-making.

Secondary objectives

- To facilitate clinical assessment, diagnostic orientation, and rapid management of patients presenting with acute psychiatric disorders in order to improve the quality of the initial evaluation and appropriateness of therapeutic orientation.
- To improve adherence to clinical recommendations and standardized protocols for the management of psychiatric emergencies, in order to optimize care quality and patient safety.
- To provide an accessible educational tool for healthcare professionals and medical students, contributing to the enrichment of psychiatric education and the strengthening of clinical reasoning.
- To integrate medical informatics techniques into psychiatric practice in order to improve diagnostic efficiency, promote multidisciplinary collaboration, and evaluate the usability, effectiveness, and clinical relevance of the developed application.

I. Methodology

This work consists of developing a smartphone application created through collaboration between the intelligent systems and applications laboratory of the Faculty of Computer Science and Faculty of Medicine, University of Laghouat.

A. Identification of Clinical Needs

The first step of this project entailed a comprehensive analysis of the clinical challenges that medical professionals encounter when managing mental health emergencies. This exploratory step aimed to uncover practical, diagnostic, and decision-making issues in acute care settings in order to develop a digital tool that is appropriate for actual clinical demands.

1. Analysis of Clinical Challenges

1.1. Heterogeneity of Clinical Presentations

The presentation of symptoms in psychiatric emergencies is extremely heterogeneous. Similar signs such as agitation, mutism, chaotic behavior, and altered consciousness may indicate a variety of underlying illnesses. This heterogeneity complicates rapid diagnostic direction, particularly for non-psychiatric specialists working in emergency departments(5).

1.2. Difficulty in Assessing Suicide Risk

Assessing suicide risk remains one of the most crucial and challenging aspects of psychiatric emergency care. It requires a thorough evaluation of:

- Suicidal ideation (passive or active)
- Intent and planning
- Access to means
- Previous attempts
- Psychiatric comorbidities
- Psychosocial stressors
- Protective factors

In clinical practice, however, suicide risk assessment is frequently subjective and

heavily reliant on physician experience, resulting in inconsistent decision-making(6).

1.3. Risk of Misattributing Organic Causes

Several psychiatric presentations may be secondary to underlying medical conditions, including:

- Metabolic disorders
- Infections
- Neurological causes
- Intoxication
- Drug side effects

Inappropriate management and a delayed diagnosis could arise from a failure to systematically rule out organic causes.

1.4. Lack of Structured Decision-Support Tools

Accessible and easy-to-use digital technologies that assist doctors in conducting structured mental emergency assessments are conspicuously lacking(4). The majority of clinical decisions are based on individual expertise rather than standardized algorithms, which contributes to practitioner variability.

2. Identification of the Most Frequent Psychiatric Emergencies

To ensure that the application covers the most clinically relevant scenarios, frequent psychiatric emergencies were identified through a review of the literature and clinical observation. Priority targets for the decision-support system's integration were determined to be the following conditions:

- Delirium
- Acute Psychomotor Agitation
- Suicide Attempt
- Addictive Emergencies
- Panic attack
- Neuroleptic Malignant Syndrome (NMS)
- Psychomotor Inhibition (Stupor)
- Puerperal Psychosis

- Psychiatric disorders secondary to organic pathologies

B. Collection and Validation of Clinical Data

Once the clinical needs were identified, the second phase of the project involved the collection, analysis, and validation of scientific data that is necessary for the development of the medical content of the application.

This stage aimed to ensure the reliability, validity, and currency of the information integrated into the digital tool in accordance with the principles of evidence-based medicine.

1. Data Preparation :

1.1. Psychiatric Emergencies

1.1.1 Definition

A psychiatric emergency is a complex concept encompassing a wide range of clinical situations, characterized by a need for care that cannot be delayed.

According to the circular of 30 July 1992, a psychiatric emergency is defined as " a request that cannot be postponed (...) an emergency arises from the moment the question is raised, whether by the patient, their relatives, or the physician: it requires a rapid and appropriate response from the healthcare team in order to alleviate the acute psychological distress "(7).

Thus, a psychiatric emergency is recognized as soon as immediate intervention appears necessary, reflecting either the intensity of the psychological distress or the severity of the clinical condition(5). It is closely related not only to the patient's condition particularly where there is a risk of harm to themselves or to others, but also to the context and the perceptions of those around them, who may identify the need for urgent care.

Clinically, it may manifest in various ways, such as profound hopelessness, self-harm or aggressive behavior, psychomotor agitation, delusions or hallucinations, or severe anxiety and psychological distress.

In this context, any request for urgent psychiatric evaluation should be considered an

emergency until proven otherwise, requiring immediate and comprehensive assessment(5).

1.2 Delirium

1.2.1 Definition

Delirium is an acute, transient and reversible clinical syndrome characterized by a generalized and fluctuating impairment of consciousness and cognitive functions(8).

1.2.2 Clinical presentation:

It has a sudden onset with fluctuating symptoms, often worsening at night(8). Clinical features include:

- Disorientation in time and place
- Impairment of memory and attention (distractibility, difficulty retaining recently provided information)
- Disorganized thinking (incoherent speech, inappropriate remarks)
- Altered level of alertness (episodes of daytime drowsiness, disruption of the sleep-wake cycle).
- Visual or auditory hallucinations and delusions
- Behavioral disturbances (agitation, wandering or aggressive behavior with possible acting out)

Note:

- Symptoms must not be attributed to a pre-existing neurocognitive disorder.
- Consciousness is impaired but does not progress to coma.

1.2.3 Etiologies:

❖ Drug-induced Acute Confusion

- An overdose or withdrawal
- Drug interactions or hypersensitivity reactions
- Ingestion of toxic substances: plants, drugs, intentional intoxication.

Although any medication may be involved, the most commonly implicated include: benzodiazepines, anticholinergics, antipsychotics, and opioids(8).

❖ **Organic Causes:**

Metabolic and Endocrine Disorders:

- Fluid and electrolyte imbalances
- Acid-base disorders
- Hypoglycemia or hyperglycemia
- Hypoxia
- Hepatic encephalopathy (hyperammonemia)
- Renal encephalopathy (hyperazotaemia)
- Respiratory failure (hypercapnia).
- Acute alcohol intoxication and withdrawal
- Wernicke's encephalopathy
- Hashimoto's encephalopathy
- Acute adrenal insufficiency

Infections:

- Urinary tract infection (pyelonephritis) or pulmonary infection (pneumonia).
- Meningitis (should always be considered in febrile confusion without an identified cause)

Neurological:

- Epilepsy
- Head trauma
- Stroke.
- Central nervous system infections (brain abscess, meningitis, encephalitis)
- Brain tumors

❖ **Psychiatric causes:**

Psychoses:

- Schizophrenia
- Puerperal psychosis (postpartum psychosis)

Acute stress reaction

Sensory deprivation or, conversely, prolonged over stimulation.

1.2.4 Management:

In the presence of an acute confusional state, urgent admission to a general hospital is required.

Environmental measures:

- Place the patient in a quiet, dimly lit room
- Ensure a safe environment by removing all potentially dangerous objects
- Avoid physical restraint, as it may exacerbate agitation
- Ensure continuous supervision

Assessment and management of somatic conditions:

Assessment:

- Comprehensive clinical examination
- Laboratory investigations, including:
 - Blood glucose, serum electrolytes, creatinine, calcium, hematocrit and total protein levels, complete blood count, erythrocyte sedimentation rate (ESR)
- Additional investigations as indicated: Electrocardiogram (ECG), Urinalysis

Management:

- Rehydration and correction of fluid and electrolyte imbalances
- Identification and treatment of the underlying cause
- Discontinuation of potentially causative medications, such as:

Corticosteroids, strong analgesics, atropine-like drugs medications used to treat extra pyramidal side effects, psychotropic drugs and, in particular, tricyclic antidepressants

Investigate and treat the cause of mental confusion

Management of agitation:

- When anxiety predominates: benzodiazepine may be used
- When productive symptoms are present (hallucinations, delirium): appropriate antipsychotic medication should be administered.

1.3. Psychomotor agitation:

1.3.1 Definition:

Psychomotor agitation is a behavioral disorder characterized by hyperactivity (9)

- ❖ **Motor:** restlessness; irritability, episodes of rage.
- ❖ **Mental:** heightened psychic excitation, logorrhea (excessive speech), verbal hostility or insults.
- ❖ **Interpersonal:** aggressive behavior directed toward objects or other individuals.

1.3.2 Clinical presentation of agitation:

❖ **Motor signs:**

Pacing, abrupt and excessive movements, aggression directed toward self or others, destructive behavior.

❖ **Verbal signs:**

Elevated tone of voice, pressure of speech, excessive talking, shouting.

1.3.3. Assessment of agitation:

Two clinical scenarios:

❖ **Controllable agitation :**

- Medical history
- Use of physical restraint if necessary
- Clinical examination

❖ **Uncontrollable agitation :**

- Sedation

If agitation is manageable

❖ **Medical history:**

- Circumstances of onset.
- Personal history:

Psychiatric history (e.g. schizophrenia, depression)

Medical history (e.g., epilepsy, diabetes, asthma)

- Family history.
- Lifestyle factors: substance use (alcohol, drugs), ongoing treatments (regular

medications)

❖ **Physical examination:**

- General clinical examination to exclude an underlying organic cause.
- Vital signs: heart rate, blood pressure, temperature, weight, hydration status.
- Neurological examination : level of consciousness, spatial and temporal orientation
- Signs of acute alcohol intoxication or substance abuse (including chronic use)

❖ **Psychiatric examination:**

- Severity of agitation
- Level of consciousness
- Appearance and quality of contact (rapport)
- Mood (e.g., euphoria, depression)
- Presence of psychotic features: delusions, hallucinations (especially auditory verbal hallucinations – AVH)

❖ **Management:**

Moderate agitation responsive to reassurance

- A relational approach: should be adopted, focusing on reassuring the patient.
- Oral medication may be considered:

In the absence of delirium, a benzodiazepine is preferred (e.g. Diazepam 5–10 mg orally)

Moderate agitation that is difficult to control

(Insufficient response to relational approach):

Isolation measures are essential

Pharmacological treatment becomes essential:

- In cases of predominant anxiety or frustration: a benzodiazepine is indicated.
- In the presence of delirium or hallucinations: a neuroleptic is recommended.

Oral formulations should be preferred, such as:

- Loxapine (50–100 drops)
- Alternatively: risperidone oral solution (1–4 mg), or haloperidol drops (5–10 mg)

- A combination of a neuroleptic and a benzodiazepine may be used, as it can reduce adverse effects.

Severe agitation:

- Relational approach is impossible
- Clinical features may include uncontrolled wandering and incoherent speech
- In such cases, the intramuscular route is preferred, often in combination with physical restraint and close monitoring.
- Appropriate medications include:
 - ❖ **Benzodiazepines:** e.g., diazepam 10 mg (injectable)
 - ❖ **Neuroleptics:**

Loxapine (Loxapac®) 50 mg (injectable)

Haloperidol 5 mg (injectable)

Levomepromazine (Nozinan®) 25 mg (injectable)

1.4. Suicide attempts:

1.4.1 Definition:

An act in which an individual deliberately engages in behavior intended to end their life by exposing themselves to danger(10).

1.4.2 Management Approach

Clinical Interview

The assessment should be conducted:

- In a calm, safe place, and confidential environment
- Initially, allow the person to freely express their emotions (sadness, fear, anger, etc.)(11)

Principal point to explore

- thoughts or plans of self-harm during the past month and self-harming behavior over the past year

Additionally, it is important to assess for:

- Underlying mental health disorders or substance use disorders
- Chronic pain.

- Acute emotional distress.

The presence of suicidal ideation, plans, or self-harming behaviors should be:

- Evaluated during the initial assessment
- Reassessed regularly throughout follow-up

❖ **Assessment of Suicide risk**

When the person presents with any of the following:

- Despair, extreme emotional distress.
- Current or past self-harming or suicidal thoughts, plans or behavior.
- Signs of intentional poisoning/intoxication
- Injuries associated with deliberate self-harm (e.g., bleeding wounds)
- Altered level of consciousness and/or extreme lethargy.
- Mental health disorder or substance use disorder
- Chronic pain.

❖ **Assessment of Medical Severity**

It is essential to determine whether the individual has engaged in a medically serious act of self-harm.

✓ Signs of poisoning or intoxication

✓ Signs/symptoms requiring urgent medical treatment such as: bleeding, injury, loss of consciousness, extreme lethargy

If urgent medical care is required:

- Provide medical treatment for an injury or poisoning.
- If hospitalization is necessary, continue to monitor the person closely to prevent suicide.

If no immediate medical emergency is identified:

A comprehensive evaluation of the risk of imminent self-harm or suicidal behavior should be conducted

❖ **Assessment of Imminent Risk of Self-Harm or Suicide**

The clinician should determine whether there is an imminent risk of self-harm or

suicidal behavior.

If there is:

- current thoughts or a plan to commit suicide or self-harm or
- any indication of such thoughts or plans during the past month
- or acts of this nature during the past year in a person who is now extremely agitated, violent, in great distress or unresponsive

There is an imminent risk of self-harm or suicidal behavior

❖ **Management in Case of Imminent Risk**

When an imminent risk is identified, the following measures should be implemented:

- Remove anything that could be used for self-harm.
- Create a protective and comforting environment;
- If possible, provide a separate, quiet room where the person can wait and do not leave them unattended.
- Supervise and designate a member of staff or family to ensure their safety.
- Address the person's mental state and emotional distress.
- Initiate psychosocial support.
- Consult a mental health specialist whenever available.
- Ensure close monitoring, with regular contact and follow-up.

If there is no imminent risk of self-harm or suicide, but there is evidence of thoughts or plans regarding a self-harming act

During the previous month and such acts during the past year:

- Initiate psychosocial support.
- Consult a mental health specialist if available.
- Ensure regular follow-up and ongoing clinical monitoring

❖ **Management of Associated Conditions**

If the person has a concurrent mental or neurological disorder or substance use disorder that requires priority treatment:

Depression // Alcohol or drug use disorders // Bipolar disorders

Psychosis // Epilepsy // Behavioral disorders

✓ Manage the co-occurring conditions

If the person has chronic pain:

✓ Manage the pain

If the person has emotional symptoms

Serious enough to warrant clinical management:

- Difficulty carrying out their usual work, study, domestic or social activities
- Marked psychological distress or repeated help-seeking behavior
- Recurrent self-medication for an emotional disorder or unexplained somatic symptoms:

In such cases, appropriate management of these emotional disturbances should be undertaken, including both psychological and, when indicated, pharmacological interventions.

1.5. Addiction emergency:

1.5.1. Definition:

An addiction emergency is an acute situation that poses an immediate threat to life or functional capacity, directly linked to the use of one or more psychoactive substances (alcohol, drugs, medication) or to addictive behaviors (e.g. „pathological gambling)(11).

1.5.2. Assessment of urgent cases:

❖ Suspected Sedative Overdose:

Consider this if the patient presents with:

- Slow breathing
- Drowsiness
- Impaired consciousness
- Constricted pupils

❖ Suspected sedative withdrawal syndrome:

Consider this if the patient appears overexcited, anxious, or agitated, with possible symptoms including:

- Hand tremors
- Sweating
- Vomiting
- Elevated pulse and blood pressure
- Agitation
- Headaches
- Nausea
- Convulsions
- Elevated heart rate

❖ **Suspect acute stimulant intoxication:**

Consider this if the patient presents with:

- Anxiety
- Dilated pupils
- Agitation
- Hyper-excitability
- Racing thoughts
- Elevated blood pressure and heart rate

❖ **Suspected Acute Opioid Withdrawal Syndrome:**

Consider if the patient presents with:

- Dilated pupils
- Muscle pain
- Abdominal cramps
- Headaches
- Nausea
- Vomiting
- Diarrhea
- Runny nose
- Watery eyes
- Anxiety

- Agitation

Rule out other possible medical causes and conditions

If confusion is present, consider excluding:

- Head injury
- Hypoglycemia
- Pneumonia or other infections
- Hepatic encephalopathy
- Stroke

Medical history:

- Substance(s) used: type, quantity, route of administration (orale, intravenous, intranasal, inhalation), and time of last dose.
- Context: intentional or accidental use, chronic use, poly substance use.
- Past medical history: epilepsy, cardiovascular disease, psychiatric disorders.
- Current medications (risk of drug interactions).
- Factors influencing severity: suicidal ideation, social isolation, lack of support.

Clinical examination:

Objective: to assess immediate severity.

- Vital signs: blood pressure (BP), heart rate (HR), respiratory rate (RR), oxygen saturation (SpO₂), temperature, capillary blood glucose.
- Level of consciousness: Glasgow Coma Scale, agitation, confusion, coma.
- Respiratory assessment: bradypnea (suggestive of opioid intoxication), signs of respiratory distress.
- Neurological assessment: seizures, withdrawal symptoms (tremors, agitation).
- Cardiovascular assessment: arrhythmia, shock, signs of hypo perfusion.
- Skin examination: mydriasis or miosis, venipuncture marks, signs of associated trauma.

Additional investigation

In the emergency department:

- Complete blood count (CBC)

- Electrocardiogram (ECG)
- Arterial blood gas (ABG) analysis
- Toxicology screening (urine and blood)
- Head computed tomography (CT) scan in case of head trauma or unexplained coma

1.5.3. Management:

1) Assess severity

2) General measures:

- Close monitoring in the emergency care setting. .
- Stabilization: establish intravenous access and initiate cardio-respiratory monitoring.
- Oxygen therapy if $SpO_2 < 94\%$.
- Fluid resuscitation if hypo tension.
- Prevention of aspiration (recovery position, endotracheal intubation in cases of deep coma).

3) Specific antidotes:

- If indicated IV/IM naloxone in cases of opioid-induced respiratory depression.
- IV flumazenil in cases of severe benzodiazepine intoxication (risk of seizures → limited indication).

4) Symptomatic treatment

- Benzodiazepines (e.g. Diazepam) for agitation, seizures, alcohol withdrawal syndrome.
- Anti-psychotics if toxic delirious agitation (e.g., Haloperidol).
- Correction of fluid and electrolyte imbalances.

5) Specific complications

- Alcohol: prevention of delirium tremens → IV thiamine prior to any glucose administration.
- Opioid withdrawal: symptomatic treatment, substitution therapy may be initiated (methadone/buprenorphine in a specialist setting).

6) Psychiatric management :

- Suicide risk assessment
- Hospitalization if there is a risk of harm to self or others.

Therapeutic approaches in addiction medicine:

❖ Pharmacological treatments

Pharmacological treatments involve two strategies:

1. Withdrawal and post-withdrawal strategy:

This approach is based on complete cessation of substance use, followed by post-withdrawal management. Treatment is essentially symptomatic, combining anxiolytics and analgesics with caution regarding benzodiazepines due to the risk of dependence.(11)

In the context of inpatient opioid withdrawal, clonidine is recommended under blood pressure monitoring.

The duration of post-withdrawal treatment is six months to one year.

For alcohol use disorder, the medications approved for use include acamprosate, naltrexone, and disulfiram, which should be prescribed with caution. They may be used in combination(11).

For opioids use disorder, naltrexone, a long-acting opioid antagonist, is a treatment option.

Second-generation antipsychotics may help reduce cravings, particularly in patients with dual diagnosis.

2. Substitution strategy :

Substitution medications are characterized by their long duration of action, which helps to:

- Reduce euphoria associated with the substances
- Alleviate withdrawal symptoms,
- And most importantly, reduce the risk of overdose (a life-threatening complication).

These include:

Full agonists (Methadone)

Partial agonists (Buprenorphine)

❖ **Psycho therapeutic approaches:**

- Cognitive-behavioral and motivational therapies
- Psycho-dynamic (analytically oriented) therapies
- Systemic approaches
- Institutional approaches
- Socio-educational support

❖ **Psychosocial support:**

- Support from family, friends and the community.
- Access to housing and employment services
- Planned addiction support and treatment programs, where available.
- Rehabilitation services

❖ **Follow-up**

- Referral to specialized care facilities (e.g., intermediate addiction care centers such as CISA)
- Scheduling of regular follow-up appointments.
- Reassessment of substance use and its impact on the person's life.
- Evaluation of the patient's motivation to change substance use behavior
- Continuation of brief interventions

1.6. Panic attack:

1.6.1. Definition:

A Panic attack, is an intense and sudden fear that occurs abruptly and unpredictably, and is associated with a range of somatic and psychological symptoms(12).

1.6.2. Clinical presentation:

❖ **Somatic symptoms:**

Cardiovascular: tachycardia, palpitations, precordial pain.

Respiratory: dyspnea, chest tightness, laryngeal constriction, feeling of suffocation.

Gastrointestinal: abdominal cramps, nausea, vomiting, diarrhea.

Other: sweating, pallor, dizziness, hot flushes, tremors, blurred vision, and polyuria.

❖ **Psychological and psycho-sensory manifestations:**

- A feeling of panic or intense fear
- Fear of losing control of oneself or of ‘going mad’
- Fear of dying
- Perception of changes in light or sound intensity and paresthesia.
- Sensation of faintness or instability
- Depersonalization

❖ **Behavioral manifestations:**

- Psycho-motor agitation
- Inhibition, which may progress to stupor
- Avoidance behavior
- Self-harming behavior

The panic attack typically resolves spontaneously after a variable duration, usually a few minutes. It ends gradually or abruptly, and is usually followed by a phase of marked fatigue and relief, sometimes accompanied by increased urination (polyuria)(12,13).

1.6.3. Management of Panic Attack

❖ **Initial Assessment**

The first step consists of excluding any underlying medical or surgical emergency. This requires a thorough clinical examination, supplemented by additional investigations guided by the patient’s presenting symptoms(5).

❖ **Environmental and Supportive Measures**

- Transfer the patient to a quiet, well-lit environment.
- Limit exposure to surrounding individuals, as external anxiety may aggravate the patient’s condition.
- Reassure the patient that there is no danger and.
- Offer clear and appropriate information regarding panic attacks

❖ Pharmacological Management

Anxiolytics (Benzodiazepines)

Benzodiazepines are the first-line pharmacological treatment.

The oral route is preferable is preferred due to its reliable bioavailability and rapid onset of action

Commonly used agents include:

- Diazepam (e.g., Valium®) 10–20 mg
- Clorazepate (e.g., Tranxene®) 10 mg
- Bromazepam (e.g., Lexomil®) 3 mg

Doses may be repeated if necessary.

The intramuscular (IM) route is slower than the PO route (due to binding to muscle proteins). However, it offers the advantage of a significant additional placebo effect:

Example dosages:

- Diazepam 10–20 mg IM
- Clorazepate 20–50 mg IM

In severe cases, a sedative neuroleptic may be used.

1.7. **Neuroleptic malignant syndrome:**

1.7.1. **Definition:**

Neuroleptic malignant syndrome (NMS) is a rare, but potentially life-threatening complication associated with anti-psychotic treatment. It constitutes a medical emergency requiring prompt recognition and appropriate management(14).

1.7.2. **Risk Factors**

- Male sex (men are twice as likely to be affected as women)
- The presence of underlying organic brain disorders
- Par-enteral administration of anti-psychotic agents
- The combination of multiple psychotropic medications
- Initiation or recent increase in anti-psychotic treatment

1.7.3. **Clinical Presentation**

- Mental confusion

- Generalized muscle rigidity with rhabdomyolysis
- Hyperthermia at 40–41°C, acute dehydration
- Autonomic dysfunction: tachycardia, blood pressure instability, sweating, hyper-salivation

The clinical course may be rapidly progressive and can be fatal if not promptly treated(14).

1.7.4. Biological Findings

- Elevated Creatine phosphokinase (CPK) levels
- Leukocytosis
- Myoglobinuria: risk of acute renal failure
- Electrolyte disturbances and fluid imbalances

1.7.5. Management of Neuroleptic Malignant Syndrome (NMS)

❖ General measures:

- Discontinuation of the causative anti-psychotic medication
- Hospitalization and close clinical monitoring
- Transfer to intensive care unit if the patient presents with autonomic nervous system disturbances, dehydration, hyperthermia (>38.5 °C), and altered level of consciousness
- Oxygen therapy; mechanical ventilation may be required in severe cases.

❖ Symptomatic treatment:

- Administration of Antipyretic
- Physical cooling measures
- Re-hydration and correction of electrolyte imbalances

❖ Specific Pharmacological Treatment

Dopaminergic Agonists: to restore dopaminergic tone

Bromocriptine: 2.5–10 mg orally or via nasogastric tube every 6–8 hours

Amantadine may be considered as an alternative

Muscle relaxants with specific action:

Dantrolene 1–2.5 mg/kg IV intravenously every 6 hours, max 10 mg/kg/day

❖ **Complications to Monitor:**

- Acute renal failure secondary to rhabdomyolysis
- Cardiac arrhythmia
- Aspiration pneumonia
- Severe fluid and electrolyte disturbances

1.8. State of stupor:

1.8.1. Definition:

Stupor is characterized by a marked slowing of motor and cognitive processes, particularly those related to expressive activity, including facial expressions, gestures, speech, and posture. It constitutes a medical emergency that can be life-threatening and requires immediate evaluation to identify and treat underlying causes(9,15).

1.8.2. Clinical presentation:

❖ **Motor Manifestations**

- immobility, and unresponsiveness to external stimuli
- withdrawn or rigid posture
- Possible akinesia

❖ **Verbal Manifestations**

- Possible akinesia
- rare, brief responses
- soft voice
- possible mutism

❖ **Cognitive Manifestations**

- Possible akinesia
- slowness of thought
- difficulty concentrating
- poverty of thought content

❖ **Impact on Daily Life**

- loss of initiative,
- high level of dependency for basic activities refusal to eat

- urinary and fecal retention
- Risk of self-harm and aggression towards others

1.8.3. Main Clinical Forms of Stupor

1. Severe Depressive Episode with Melancholic Features

Stupor sets in gradually, characterized by:

- Psycho-motor slowing affecting gait, movements, facial expressions, speech and concentration(16).
- The patient may suffer from insomnia and refuse food.
- Stupors melancholia: the expression of intense emotional distress with a melancholic undertone(16)

2. Catatonic Episodes in Schizophrenia

Stupor may transform into a state of excitement, with a disorder of muscle tone known as waxy flexibility(17).

3. Mental Confusion

Alternating episodes of stupor and agitation(8).

4. Dissociative Stupor

Patients display the characteristics of stupor, while remaining aware of their surroundings being mute but remaining aware of their surroundings theatricality and paradoxical suggestibility may facilitate diagnosis(9,15).

5. Certain Forms of Dementia

Stupor may occur as part of the cognitive and behavioral decline(9)

6. Acute Reaction to a Stressor

Stupor is a reaction to significant stress, associated with anxiety, emotional breakdown and obsessive daytime rumination(18).

1.8.4. Management of Stupor

❖ Medical history:

✓ Patient's age

✓past medical and psychiatric history

- ✓ Circumstances surrounding the onset of stupor
- ✓ Date of onset
- ✓ Course and evolution of the condition
- ❖ **Assessment of physical condition:**
 - ✓ Dehydration (thirst, skin turgor, oliguria, hyperthermia)
 - ✓ Degree of weight loss and cachexia
 - ✓ Cardiovascular assessment (pulse, blood pressure)
 - ✓ Neurological assessment: identification of focal neurological signs, meningeal syndrome, cranial nerve deficits
 - ✓ Complementary investigations to identify medical conditions that may be causing catatonic symptoms and to evaluate systemic impact
 - ✓ Complication screening: infectious; tendon-related and decubitus-related complications (e.g., phlebitis, pulmonary embolism).

1.8.5. Therapeutic Measures for Stupor

1. General measures

- Rehydration
- Re-nutrition if necessary
- Monitoring: Pulse, blood pressure, and temperature
- Level of alertness
- Neurological examination
- Electrolyte balance and urine output.

2. Specific measures

Melancholic stupor

- ✓ Electroconvulsive therapy (ECT) indicated, following a therapeutic assessment (provided there are no contraindications to anesthesia or neuromuscular blockade)(19).
- ✓ Clinical improvement is often marked after 6 to 7 sessions.
- ✓ Consolidation of improvement may be achieved with 3 to 4 additional sessions.

✓ Intravenous tricyclic antidepressants may be considered after excluding any contraindications

✓ Continued pharmacological treatment follows the standard protocols of a typical melancholic episode.

Catatonic stupor

✓ Electroconvulsive therapy is the treatment of choice

✓ Neuroleptics may be prescribed at low doses

Acute reaction to a stressor with stupor

✓ Isolate the patient in a reassuring environment.

✓ Psychological support is essential.

✓ Manage associated anxiety with benzodiazepines.

Organic/iatrogenic origin: Identify and treat the cause

3. Complementary approaches:

✓ Psychological support

✓ Appropriate psychotherapy once the condition has improved

✓ Psychosocial rehabilitation in cases of chronic evolution

1.9. Postpartum psychosis:

1.9.1. Definition:

Postpartum psychosis is an acute and severe psychiatric disorder, occurring in the postpartum period, typically within days to the first weeks following childbirth. It is characterized by a sudden onset and the severity of its clinical presentation

It is an acute psychotic episode with a significant affective component, often accompanied by confusional features(20,21).

1.9.2. Risk factors:

- Postpartum blues
- Personal or family history of depression
- Bipolar disorder

- Primiparity
- Advanced maternal age: pregnancy after 35 years
- Obstetric complications or a traumatic delivery
- Stressful environment or lack of family or social support

1.9.3. Clinical presentation:

The condition usually occurs within two to four weeks after childbirth and may include:

- 1) Mental confusion: temporospatial disorientation, difficulty maintaining coherent thought processes and impaired concentration
- 2) Delusions: beliefs disconnected from reality concerning their role as a mother, their baby or those around them.
- 3) Auditory and visual hallucinations
- 4) Disorganized behavior including possible psychomotor agitation
- 5) Mood disturbances: the coexistence of depressive symptoms (despair, sadness) and manic symptoms (euphoria, grandiosity, etc.).
- 6) Sleep disturbances: severe insomnia or reversal of the sleep-wake cycle.

1.9.4. Diagnosis:

Anamnesis

- 1) Primiparity, considered as a significant risk factor.
- 2) Severe sleep deprivation in the early postpartum period.
- 3) Obstetric context, including delivery related complications or traumatic childbirth
- 4) Personal or family psychiatric history
- 5) Symptoms reported by relatives:
 - Delusional, incoherent or paranoid speech.
 - Unexplained agitation or a sudden social withdrawal.
 - Suicidal ideation or violent thoughts suggesting a risk of infanticide.
 - Refusal to care for the newborn or conversely adopts overly protective behavior.
 - Before confirming the diagnosis of postpartum psychosis, other medical and psychiatric causes must be excluded

1.9.5. Management:

- 1) Immediate hospitalization in a psychiatric unit, preferably in a mother and baby unit if available(22).
- 2) Temporary separation of mother and child to ensure safety.
- 3) Close Monitoring: high risk of suicide and infanticide.
- 4) Pharmacological treatment depends on the severity of symptoms and psychiatric history:

Antipsychotics: to manage delusions, hallucinations and behavioral disorganization.

Mood stabilizers: such as lithium or lamotrigine may be necessary, particularly in patients with a personal or family history of bipolar disorder to prevent future manic or depressive episodes(22).

Antidepressants: may also be prescribed, particularly if depressive symptoms are present.

It should be noted that breastfeeding may be temporarily suspended to avoid any risk to the infant.

- 5) Psychotherapy including supportive therapy, participating in group therapy sessions, with the involvement of family members when appropriate
- 6) Family support: ensuring the involvement of relatives to provide a stable and reassuring environment for the patient

1.10. Psychiatric disorders secondary to organic pathologies :

1.10.1. Definition:

Psychiatric disorders secondary to organic pathologies refer to mental disorders caused by cerebral dysfunction or somatic medical condition affecting brain function.

1.10.2. Clinical features:

A mental disorder in the context of a somatic illness is diagnosed when the medical condition is considered a probable cause of psycho-pathological symptoms or syndromes(9,15).

The diagnostic criteria for mental disorders due to somatic diseases include(15):

- the presence of a brain disorder or a general medical condition
- a probable temporal and causal relationship between the onset or worsening of psychiatric symptoms and the medical condition ;
- Improvement of the mental state following treatment or resolution of the underlying somatic cause;
- Absence of evidence supporting another cause of the mental disorder (hereditary factors, stressors).

1.10.3. Main organic conditions involved:

Neurological disorders

Epilepsy:

Psychiatric symptoms may include:

- ✓ prodromal phase: irritability, dysphoric mood, agitation, attention disturbance(23)
- ✓ per-ictal phase: hallucinations, intense fear or euphoria, agitation, automatisms (repetitive movements, incoherent speech), transient mutism(23)
- ✓ postictal phase: primarily confusion, amnesia, agitation, depression, postictal psychosis(23)

Parkinson's disease:

Common psychiatric manifestations include: Depressive episodes, delusions and hallucination, Cognitive impairment: bradypsychia, attention deficit, executive dysfunction(24).

Multiple sclerosis: is frequently associated with major depressive episode, paradoxical euphoria and emotional lability(25).

Stroke (Cerebrovascular Accident):

- ✓ During the acute phase : delirium, sometimes a true demential syndrome(26).
- ✓ Post-stroke: the most common psychiatric complication is a major depressive episode(26).
- ✓ Anxiety disorders are also common

- ✓ Less commonly: manic episodes.
- ✓ Rarely: de novo psychotic symptoms.

Brain tumors:

May initially present solely with psychiatric or neuropsychological symptoms, depending on tumor location and size(27).

More rarely, psychiatric symptoms may occur as part of a paraneoplastic syndrome(27).

Cancer (General):

- ✓ Depression is common among cancer patients(28);
- ✓ Trauma-related stress reactions may occur following a life-threatening diagnosis(29).

Traumatic brain injury:

Traumatic brain injury is frequently associated with psychiatric and neurocognitive sequelae including post-traumatic stress disorder (PTSD), depression, sleep disorders, lacunar amnesia, confusion and impaired level of consciousness(30,31).

Endocrine disorders:

Thyroid disorders:

- ✓ Hyperthyroidism is characterized by depressive symptoms and anxiety. Sleep disturbance it may also present with tremors, agitation, and logorrhea, sometimes progressing to manic-like states(32,33).
- ✓ Hypothyroidism is associated with psychomotor slowing and bradypsychia, which may progress to a depressive syndrome(32,34).

Myxedema psychosis presents as a psychotic state characterized by confusion, delusions and hallucinations, or as a melancholic episode(35).

Parathyroid disorders:

- ✓ Hyperparathyroidism: may present with emotional lability, apathy and fatigue, or even depression(36).
- ✓ Hypoparathyroidism: is associated with Irritability, anxiety, cognitive impairment(37).

Tetany attacks may be misinterpreted as conversion disorder (functional neurological disorder).

Adrenal disorders:

- ✓ Hypercortisolism (Cushing syndrome) may mimic depression, an anxiety disorder, personality disorders, or present with delusional syndrome with illusions or hallucinations(38,39).
- ✓ Adrenal insufficiency: typically presents with a depressive syndrome associated with anxiety. A psychotic or delirium, may be observed during acute phases(40)
- ✓ Pheochromocytoma: acute anxiety attacks(41)
- ✓ Hyperprolactinemia: can induce mood disturbances resembling depression, along with anxiety and irritability(42).
- ✓ Growth hormone deficiency: may be associated with emotional lability(43)

Metabolic disorders:

Diabetes:

- ✓ Hypoglycemia: may cause irritability, anxiety, confusion(44)
- ✓ Hyperglycemia: is associated with asthenic and depressive symptoms(45)

Systemic diseases

Systemic lupus erythematosus (SLE): may be associated with anxiety and depressive symptoms, sometimes progressing to melancholic episodes and suicide; pseudo-psychotic episodes may also occur(46).

Antiphospholipid syndrome: psychotic disorders have been reported(47).

Goujerot-Sjögren syndrome is associated with mood disorders (50%), acute anxiety and personality disorders (33%) often with hysteria-like features(48).

Scleroderma: depressive symptoms should prompt investigation for hypothyroidism, secondary to thyroid fibrosis(49).

Rheumatoid arthritis: frequently associated with anxious and depressive reactions(50).

Infectious diseases:

Syphilis: may lead to dementia syndrome, manic and depressive episodes and psychotic disorders(51).

Human immunodeficiency virus infection: is associated with Psychotic disorders and major depression(52,53).

Cerebral malaria: may present with confusion and rarely associated with psychiatric manifestations such as behavioral changes or psychosis(54).

Herpetic encephalitis: may present with agitation, emotional lability, delusions, hallucinations, confusion(55)

Cardiovascular diseases:

Arrhythmia: may cause acute anxiety, panic attacks, agitation, sleep disturbances(56),

Coronary artery disease: may present with anxiety, panic attack, exercise phobia, depression, Stupor(56).

Heart failure: is frequently associated with depression, anxiety disorders, irritability, anxiety, delirium in the acute phase(56).

2. Data Selection Criteria

In order to ensure clinical utility and scientific rigor, the extracted data was critically evaluated and selected in accordance with predetermined methodological standards.

The criteria for selecting the data included the following:

- Scientific validity and methodological reliability
- Consistency with evidence-based recommendations
- Clinical relevance in emergency settings
- Applicability within the local hospital context and available resources
- Clarity, precision, and reproducibility of diagnostic criteria

The sources used for the analysis were not outdated, non-peer-reviewed, nor methodologically unsound.

C. Clinical Decision-Support System Structure

The design of the clinical decision support system is based on the transformation of medical knowledge derived from the literature into a structured decision-making model, integrated within a mobile application. This approach aims to replicate clinical reasoning in a digital format that can be utilized effectively in emergency settings.

The modeling process relied on the identification and formalization of relevant decision-making criteria, including clinical signs, indicators of severity and risk factors. These elements were organized using conditional logic and implemented into progressive clinical pathways, enabling structured and intuitive navigation throughout the decision-making process.

Each psychiatric emergency is thus structured according to a logical clinical progression, beginning with the identification of key clinical features, followed by a structured assessment incorporating symptoms analysis, severity evaluation and risk assessment, and culminating in the proposal of an appropriate management strategy.

This organization ensures a coherent guidance of the user, from clinical recognition to the implementation of initial therapeutic measures.

Overall, this approach results in a coherent, reproducible and operational system, supporting rapid, structured clinical decision-making process adapted to the constraints of emergency situations.

D. Technical Construction of the Application

This step corresponds to the technical development phase of the mobile application. It consisted of transforming the clinical data and decision-making algorithms developed in the previous stages into a functional digital tool designed to assist healthcare professionals in the management of psychiatric emergencies.

4.1 Development Environment

The application was developed on the Android platform through collaboration with the Intelligent Systems and Applications Laboratory of the Faculty of Computer Science.

The development process included several technical stages, notably:

- the design of the user interface,
- the integration of validated clinical data and medical content,
- the programming of decision-support algorithms,
- The implementation of initial technical tests to ensure the proper functioning of the application.

4.2 Structuring of Functional Modules

The application was organized around four main sections, allowing rapid and structured access to the information required for the management of psychiatric emergencies.

- Psychiatric Emergencies Section
- Therapeutic Section
- Additional Information Section
- Support Section

All these modules are interconnected to ensure a logical continuity of clinical reasoning and to facilitate diagnostic and therapeutic orientation.

4.3 Ergonomic Design of the Interface

Particular attention was given to the ergonomic design of the application in order to ensure simple and efficient use in clinical settings.

The main design objectives were:

- Visual clarity of the interface,
- Simplicity of navigation,
- Rapid access to priority information,
- Adaptation to emergency clinical contexts.

The interface was designed to reduce the user's cognitive load, particularly in stressful clinical situations, while facilitating medical decision-making.

E. Revision and Internal Validation of the Prototype

This step consisted of a revision and optimization phase of the prototype to ensure its consistency and reliability. As part of this process, a clinical validation was carried out by a team of psychiatrists, focusing on the coherence of decision pathways, adherence to clinical guidelines, the relevance of the proposed management strategies, and the logic of clinical reasoning.

In addition, functional testing was conducted to verify the proper operation of the application, the absence of logical errors, system stability, and ease of navigation.

Furthermore, to assess the overall quality of the application, an evaluation form was developed and distributed to interns and externs students at the Faculty of Medicine of Laghouat, as well as to general practitioners. This approach made it possible to collect relevant user feedback.

F. Ethical and Professional Considerations

This application was created in accordance with the core principles of medical ethics and professional responsibility. The proposed tool is only intended to serve as a clinical decision support system; it cannot replace healthcare professionals, who make the final decisions in diagnostic and therapeutic processes.

In the context of this project, no actual patient data was employed. The medical information used within the application is based only on reliable scientific sources, clinical guidelines, and established best practice recommendations in psychiatry. Ensuring respect for the principles of confidentiality and data protection.

This application's main objective is to support clinical evaluation and diagnostic orientation in psychiatric emergency situations respecting ethical, scientific, and medico-legal standards controlling the use of digital tools in healthcare.

II. Results

A. General Presentation of the Application

1. Description of the Developed Application

The developed application is a medical mobile application designed to assist in management of psychiatric emergencies. It was created to be a decision-support tool for healthcare professionals to enable them to rapidly recognize a psychiatric emergency, assess its severity, and make appropriate patient orientation.

The application integrates various medical functionalities within a single, easily navigable tool, including: decision-making algorithms, clinical practical guidelines, rapid assessment tools and management protocols for emergency situations.

The purpose of the application is therefore twofold:

- a medical purpose (improving the quality of care),
- And a pedagogical purpose (strengthening clinical knowledge in emergency psychiatry).

The application has been developed with consideration for the actual needs of physicians working in emergency departments where time is limited and clinical decision-making must to be quick and effective. It is intended for both active clinical practitioners and healthcare professionals in training, particularly: general practitioners, emergency physicians, medical residents, medical students, and healthcare professionals working in emergency departments.

It can be used in: hospital emergency departments, general medical services, and medical services that are not specialized in psychiatry.

2. User Guide for the PsyLagh Application

The PsyLagh application was created to assist medical professionals and students in identifying and managing psychiatric emergencies in a quick, simple, and organized way.

The home screen serves as the application's primary user interface, giving users access to all of its sections through easily navigable icons.

1. Application Home

On the home page, the user can access four main sections:

- Psychiatric Emergencies
- Support
- Therapeutics
- More Information

All the sections have been provided with icons for easy access.

2. “Psychiatric Emergencies” Section

This section provides access to the different psychiatric emergencies that the application covers.

By selecting one of the psychiatric emergencies, the user can consult:

- A concise description of the emergency, highlighting the main clinical signs
- Patient evaluation components
- Management guidelines for emergency situations

This section is the application's main feature because it allows for quick access to critical information in a clinical setting.

3. “Support” Section

The “Support” section functions as an educational component of the application.. It gives the user access to a simplified review of the main psychiatric emergencies, in the form of well-organized fact sheets.

This section is also used as a learning tool, allowing the user to gain a deeper understanding of each clinical scenario, independently of how the emergency situation is managed.

In each emergency situation, the user can consult:

- A simplified explanation of the clinical situation
- Key characteristics of the psychiatric emergency
- Important points to remember

4. “Therapeutics” Section

The Therapeutics section is dedicated to the main medications used in the

management of psychiatric emergencies.

This section allows users to quickly access clear and well-structured therapeutic information on each drug.

For each drug, the application's users can consult:

- The recommended dosage depending on the age and clinical context
- The pharmaceutical forms available
- The most common adverse effects
- Contraindications that must be considered prior to administration

This structured approach ensures quick and safe access to drug-related information while facilitating therapeutic decision-making in psychiatric emergency situations.

5. “More Information” Section

The “More Information” section is designed to offer the user a variety of complementary tools that can help in the assessment and understanding of psychiatric emergencies. It is a resourceful way of presenting clinical and diagnostic information in a structured manner.

In this section, the user can access:

- DSM-5 diagnostic criteria, to support the diagnostic orientation in emergency situations
- Rapid management algorithms, to facilitate the decision-making in urgent situations
- Glasgow Coma Scale, to evaluate the level of consciousness and any alteration in the mental status, especially in cases of confusion

3. Different user interfaces

Upon launching the application, a splash screen displaying the logo appears.



Figure 1: Psylagh Application logo

The home page loads and provides access to Psychiatric Emergencies, Support, Therapeutics, and More Information.

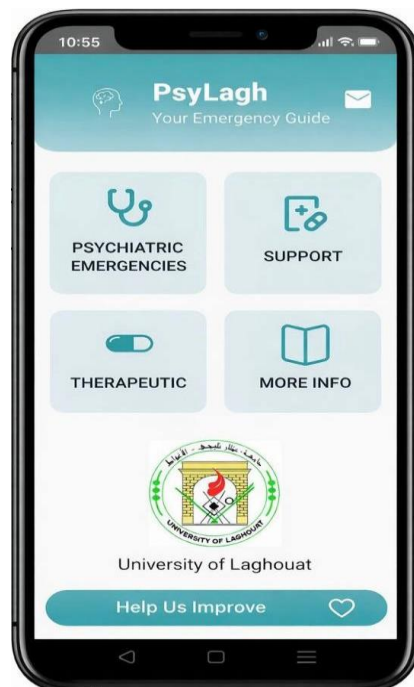


Figure 2: Home screen of the PsyLagh application

Psychiatric Emergencies

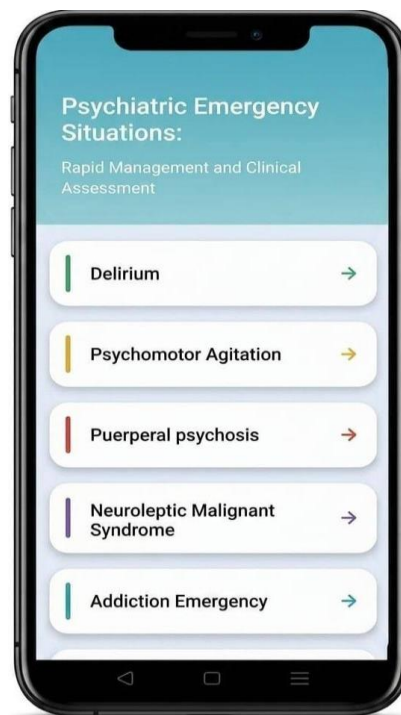


Figure 3: Psychiatric Emergencies Interface

Selecting any psychiatric emergency grants access to: description, evaluation, and management

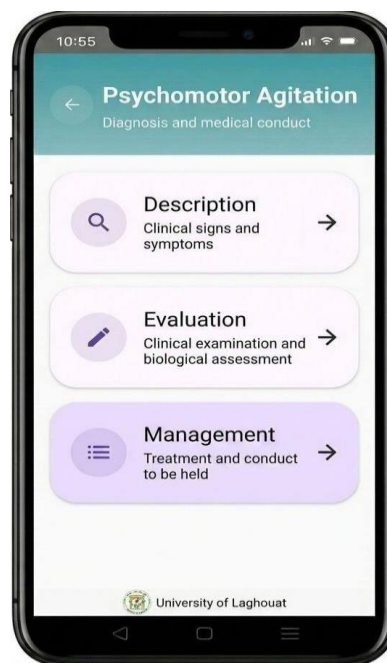


Figure 4: Psychomotor Agitation Interface

Support :

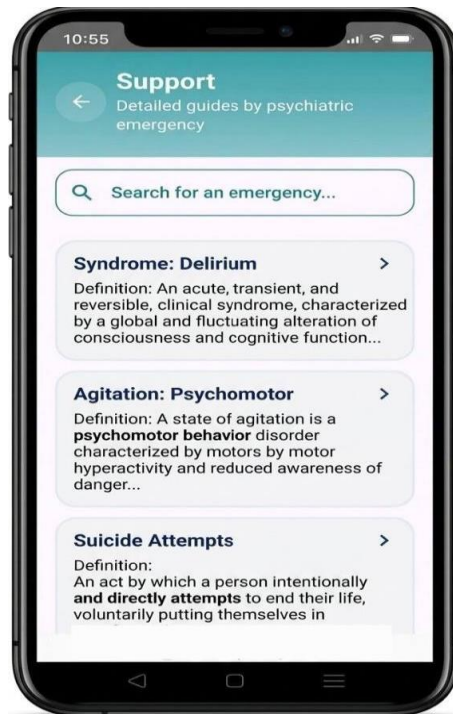


Figure 5: Clinical Support Interface

Therapeutics

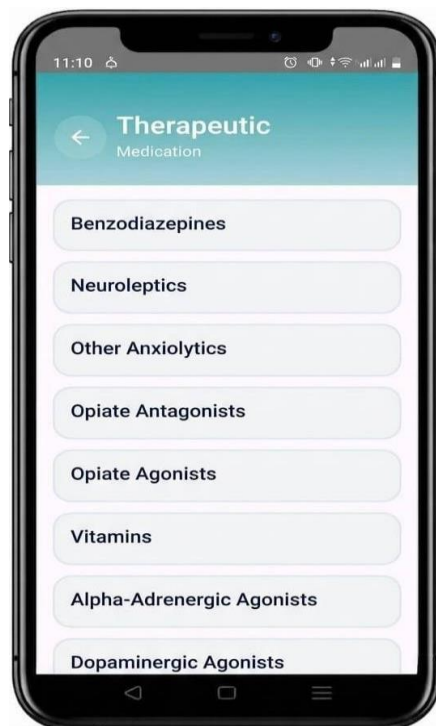


Figure 6: Therapeutic Management Interface

Clicking on any medication provides details on its dosage, adverse effects, and contraindications

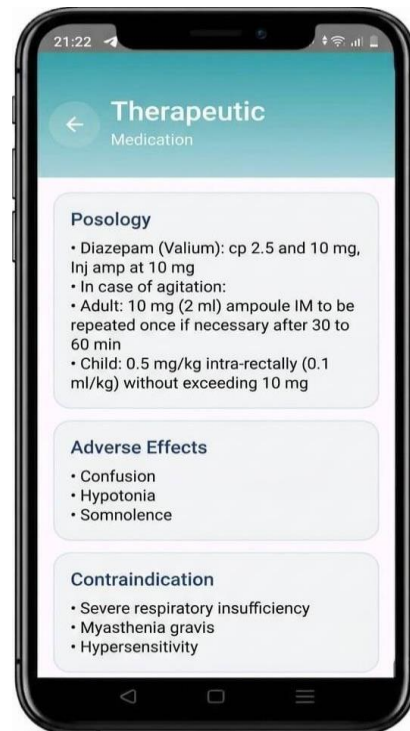


Figure 7: Benzodiazepines Drug Information Interface

More Information

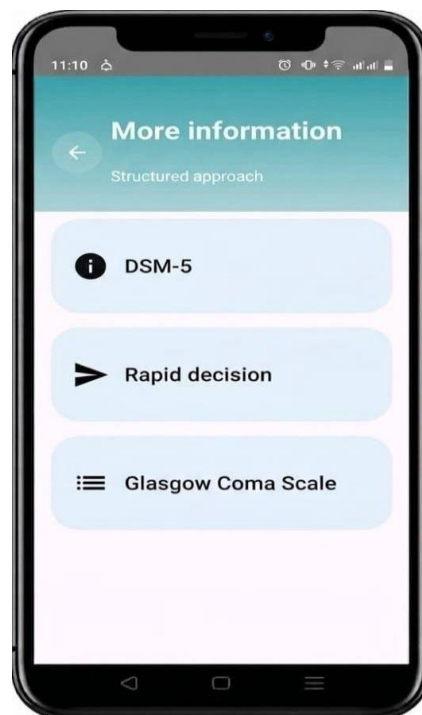


Figure 8: More Information Interface

Presentation of Use Scenarios:

To illustrate the application's functionality, a representative psychiatric emergency **Psychomotor Agitation** is used as an example. The clinical scenario simulates a patient presenting with sudden agitation in an emergency setting.

The user selects “Psychomotor Agitation” from the Psychiatric Emergencies section.

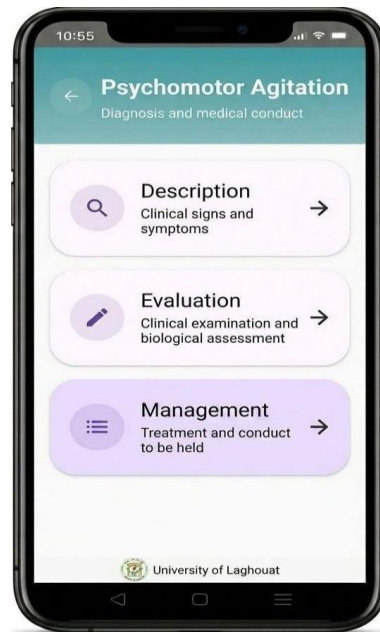


Figure 9: Psychomotor Agitation Interface

Clicking on Description provides the definition of Acute Agitation and its main symptoms,

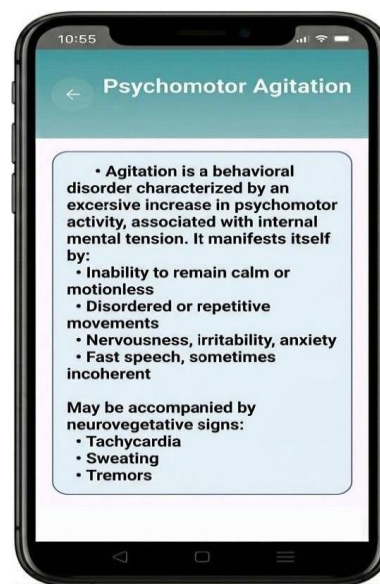


Figure 10: Psychomotor Agitation Description Interface

Clicking on Assessment presents key steps for evaluating Acute Agitation,

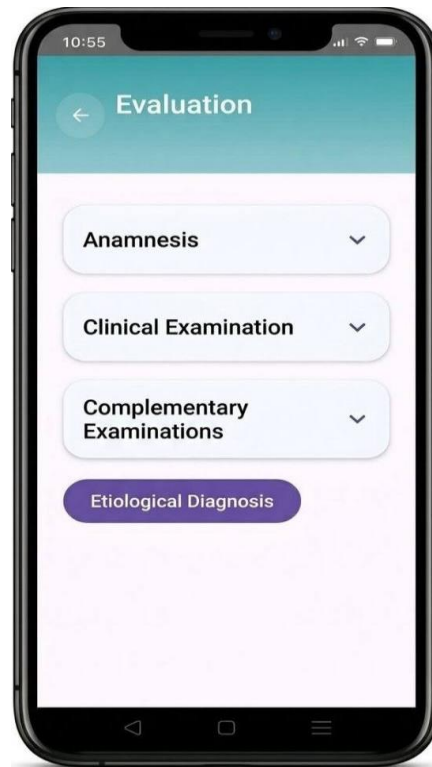


Figure 11: Psychomotor Agitation Evaluation Interface

Clicking on Etiological Diagnosis opens a checklist of symptoms that may be associated with Acute Agitation

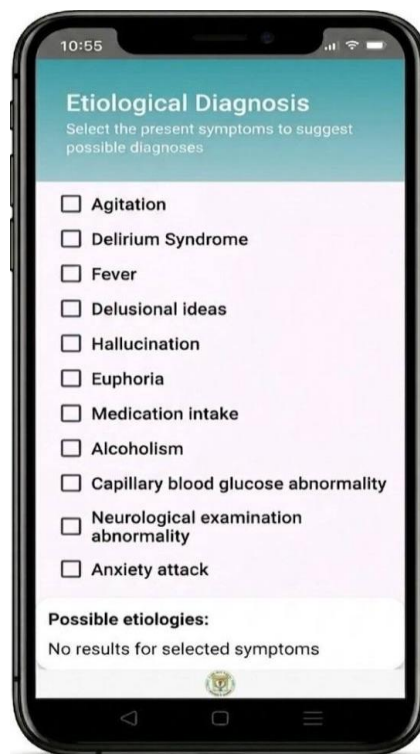


Figure 12: Etiological Diagnosis Interface

For example, a combination of agitation, fever, and confusion may indicate possible

underlying etiologies.



Figure 13: Example of Symptom Combination for Etiological Diagnosis Interface
Clicking “Management” provides two options: controllable agitation and uncontrollable agitation.



Figure 14: Psychomotor Agitation Management Interface

By clicking “Next”

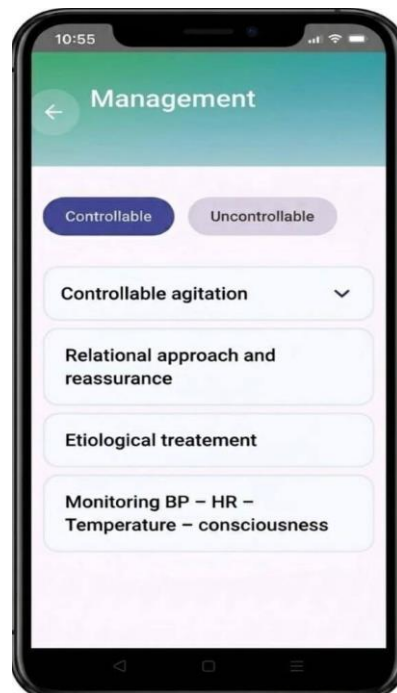


Figure 15: Psychomotor Agitation Management Interface

For uncontrollable agitation, three management options are proposed based on the level of severity as an example, when moderate agitation responsive to reassurance is selected,

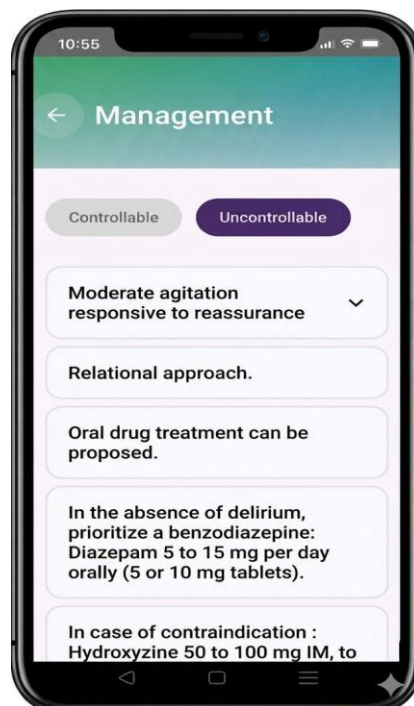


Figure 16: Psychomotor Agitation Management Interface

B. Results of the application evaluation

- ❖ Among the 100 respondents, the majority were externs (47%), followed by interns (29%) and general practitioners (24%). This indicates that the sample is predominantly composed of medical trainees, with externs and interns representing a total of 76% of participants. This distribution suggests that the questionnaire results mainly reflect the perspectives of future practitioners, who constitute a relevant target population for a clinical decision-support application in psychiatric emergencies, particularly in a learning and supervised practice context. However, the inclusion of general practitioners (nearly one quarter of the sample) also provides insights from experienced clinicians, thereby enhancing the clinical relevance of the findings.

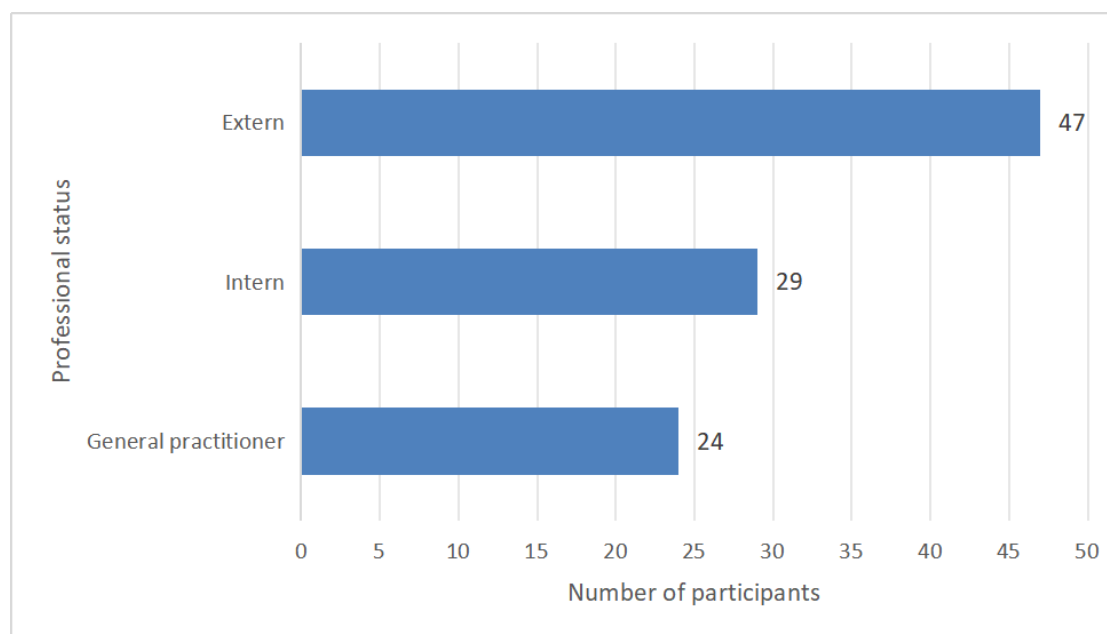


Figure 17: Distribution of participants who responded to the application evaluation form by professional status

- ❖ Most respondents use smartphones regularly during work: 48% report frequent use (scores 4 and 5), while 29% report moderate use (score 3), Rare use remains limited (23%). These findings indicate that smartphones are well integrated into daily practice, supporting the relevance of a mobile clinical decision-support application.

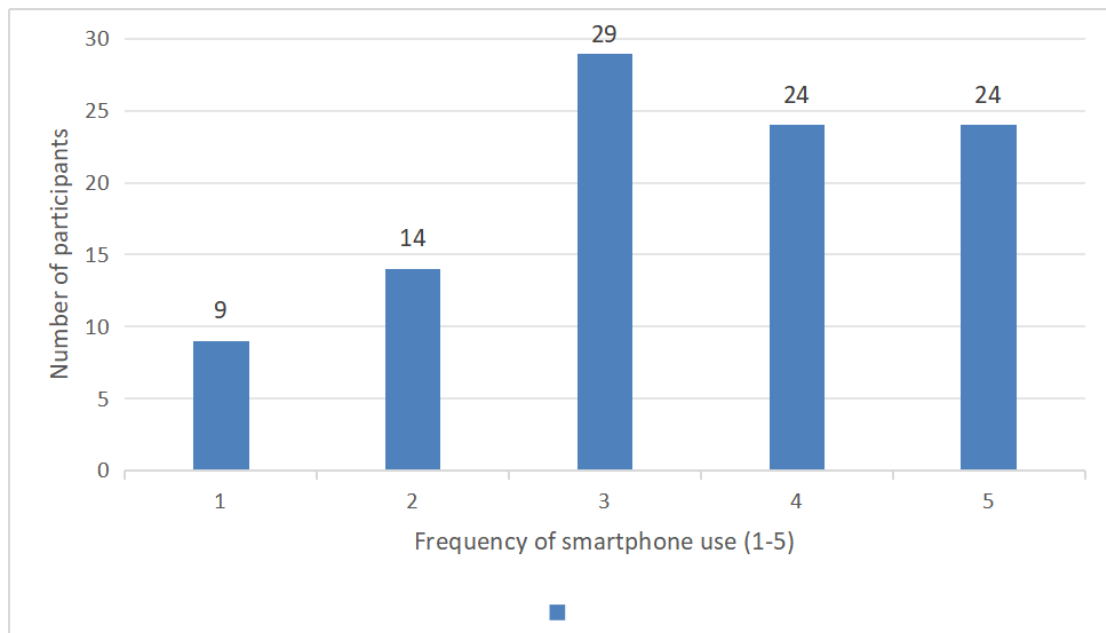


Figure 18: Self-reported frequency of smartphone use during work (Likert scale 1-5)

- ❖ The majority of respondents use Android devices (72%), compared to 28% using iOS. This distribution demonstrates a clear predominance of Android, which is consistent with the decision to develop the application exclusively for this platform, thereby ensuring optimal accessibility for the majority of the target users.

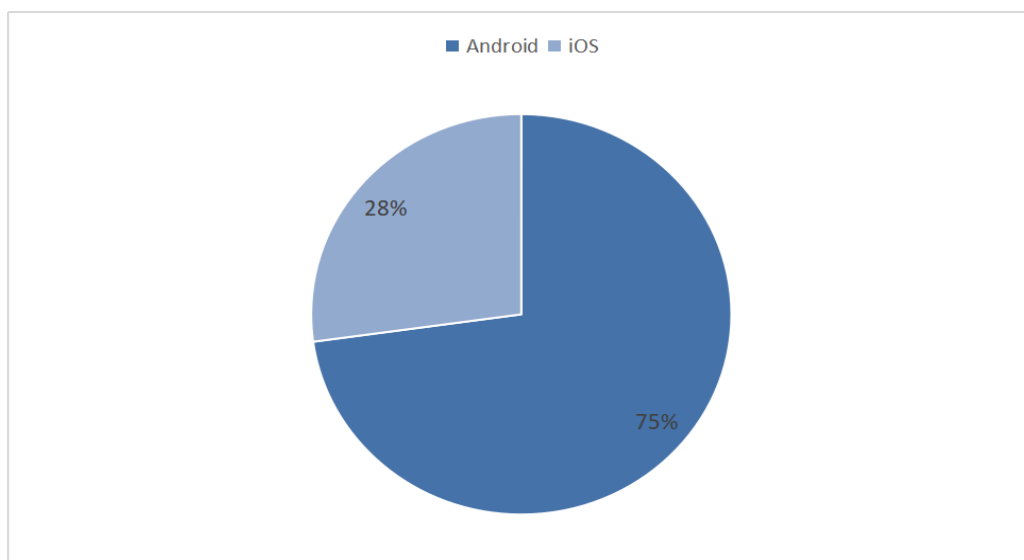


Figure 19: Platform usage among participants

- ❖ The management of psychiatric emergencies is generally perceived as challenging by respondents. Indeed, 48% consider it difficult to very difficult, while 37% rate

it as moderately difficult. In contrast, only 15% perceive it as slightly or not difficult at all. These findings highlight the significant complexity of managing psychiatric emergencies in emergency department, underscoring the need for decision-support tools to facilitate their management.

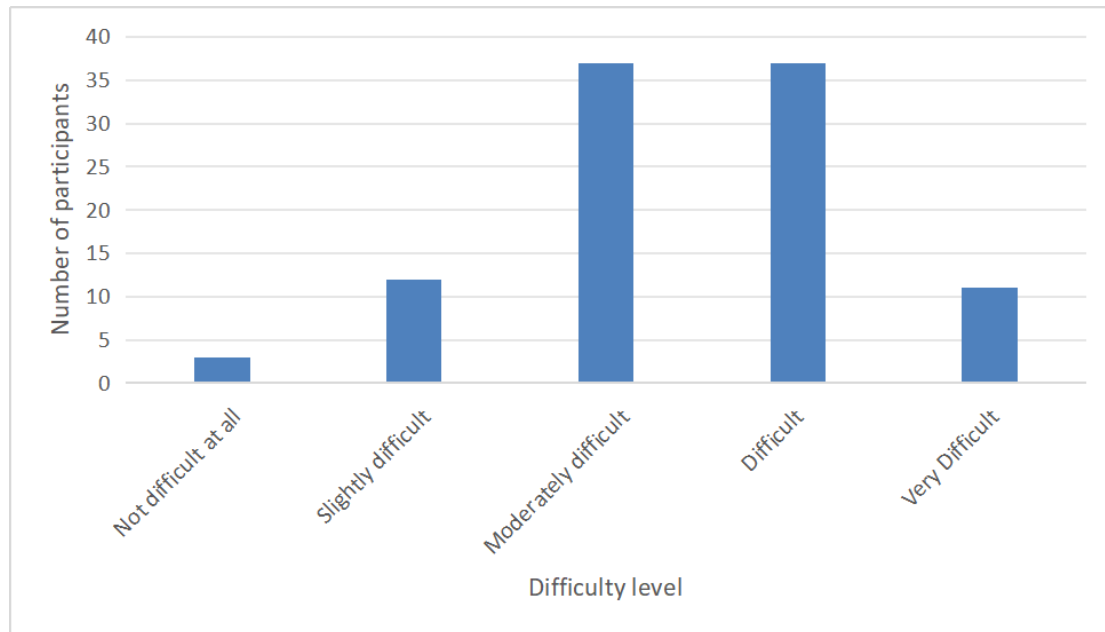


Figure 20: Perceived difficulty of managing psychiatric emergencies in the emergency department

- ❖ The results show that access to the application is considered easy by the majority of users (80%), while 18% find it moderate and only 2% consider it difficult. Overall, this indicates good accessibility of the application, with a generally intuitive and user-friendly interface.

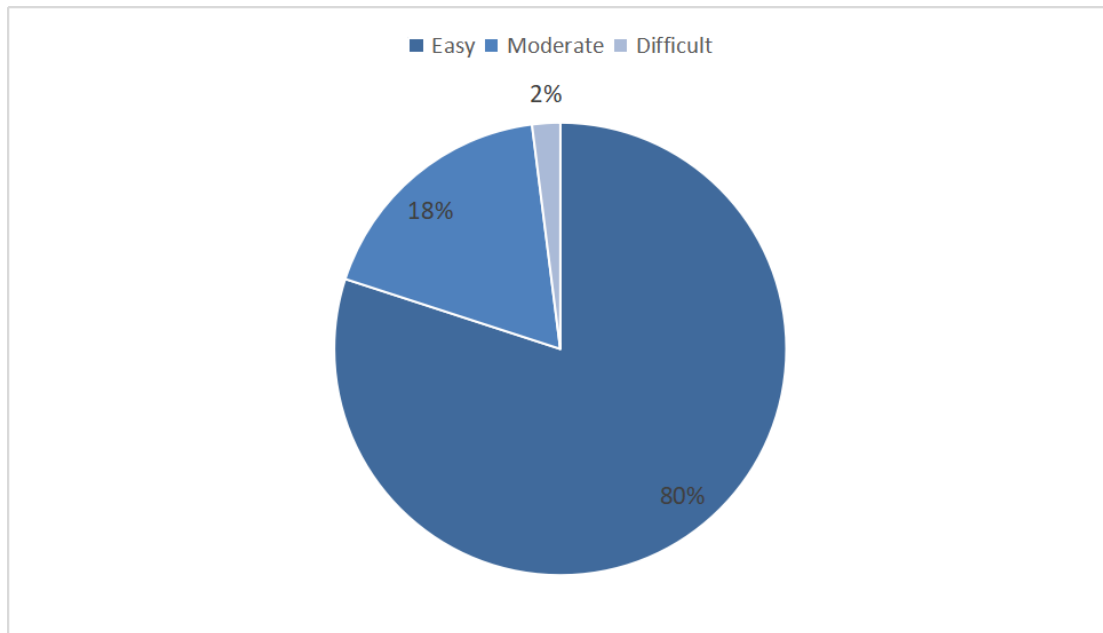


Figure 21: Perceived ease of access to the application

- ❖ The results show that downloading the application is considered easy by the majority of users (83%), while 14% find it moderate and only 3% consider it difficult. Overall, this reflects good level of accessibility and a simple download process, indicating that the application is generally easy to obtain and install.

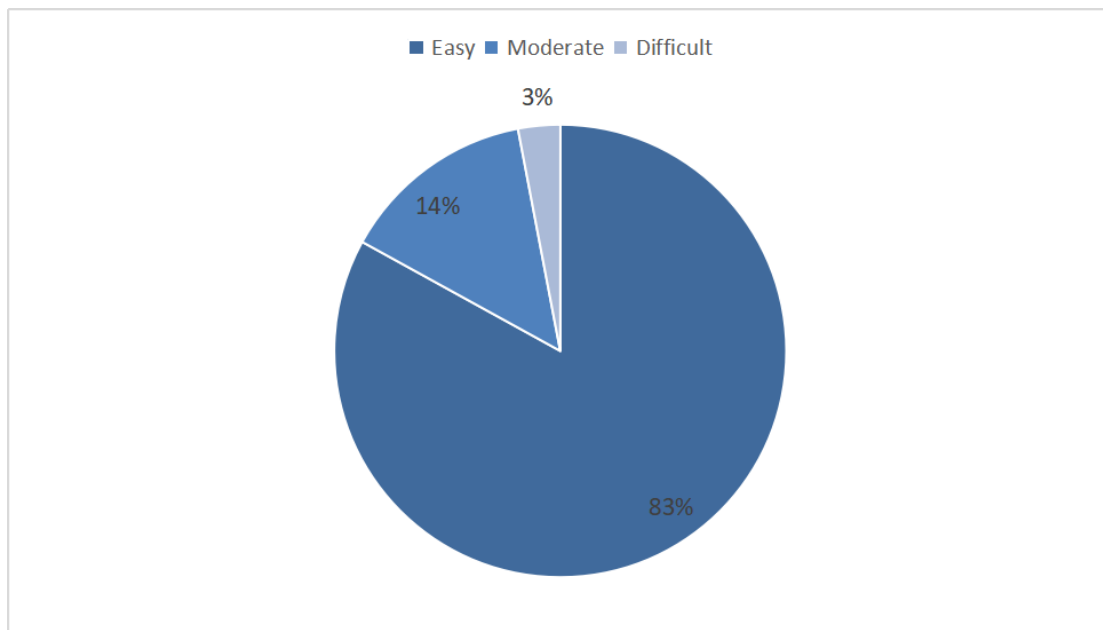


Figure 22: Perceived ease of application download

- ❖ The results show that the ease of finding information within the application is rated positively, with 79% of users considering it easy. In addition, 21% find it moderate, while no users (0%) consider it difficult. This indicates good organization of content and an overall effective interface for information retrieval.

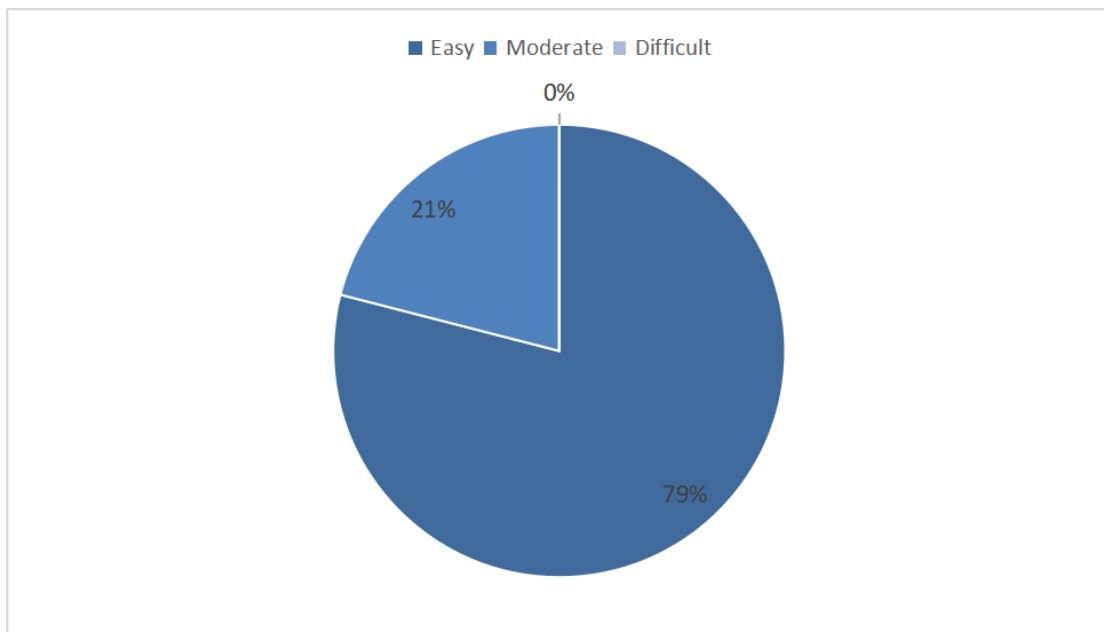


Figure 23: Perceived ease of finding information within the application

- ❖ The results show that the richness of the information is rated as good by the majority of users (72%). Additionally, 28% consider it moderate, whilst no users (0%) rate it as poor. This indicates that the application content is generally relevant and sufficiently detailed.

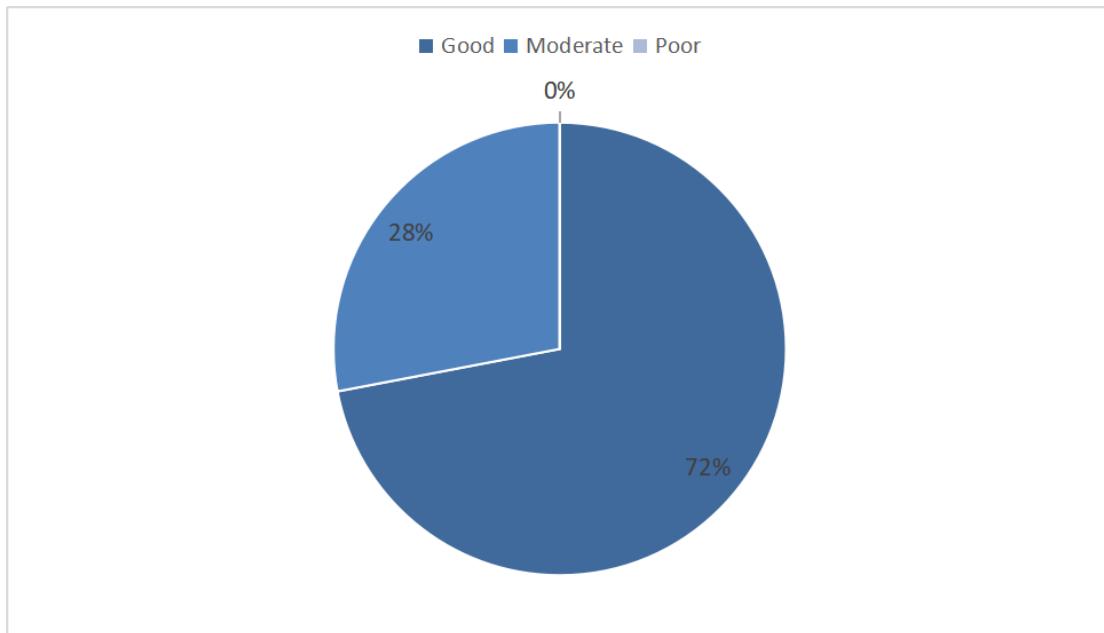


Figure 24: Perceived richness of information provided by the application

- ❖ The results show that the application structure is rated as good by the majority of users (74%). Furthermore, 26% consider it moderate, while no users (0%) rate it as poor. This indicates that the overall organization of the application is generally clear and well-structured.

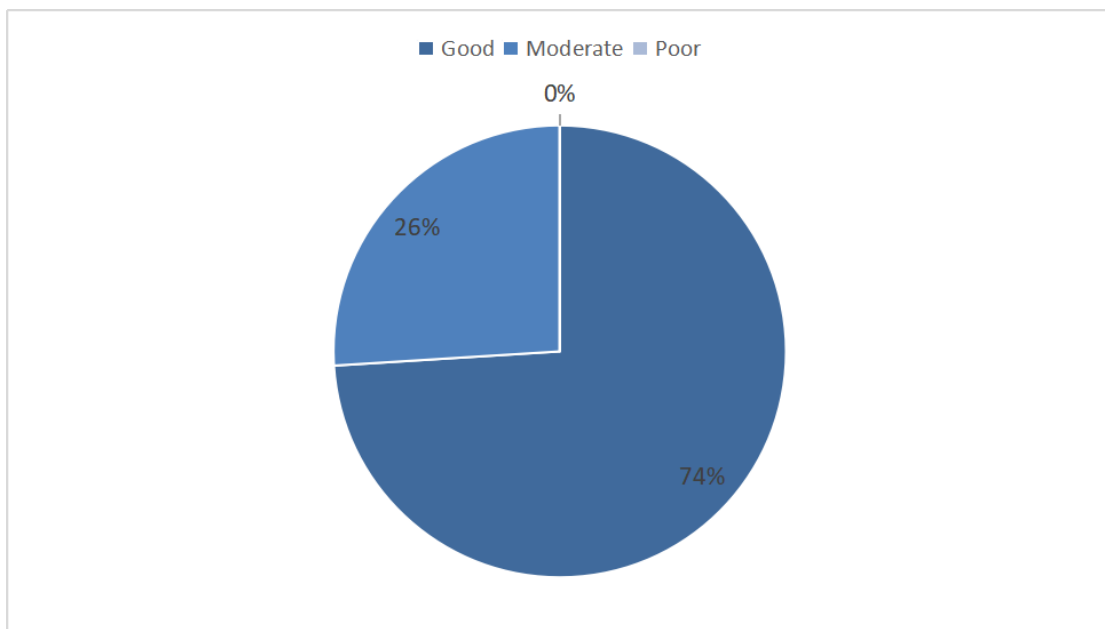


Figure 25: Perceived quality of the application structure

III. Discussion

A. Needs assessment

The management of psychiatric emergencies represents a major challenge in clinical practice, owing to the diversity of clinical presentations and the complexity of the situations encountered. The frequent overlap between somatic and psychiatric symptoms exposes clinicians to a significant risk of diagnostic error, particularly during the initial assessment, which nonetheless constitutes a critical step in guiding subsequent management.

In light of these constraints, it is essential to strengthen the tools available to support practitioners in their decision-making, particularly in contexts where access to specialist expertise may be limited. The needs assessment therefor highlights an increasing demand for practical, reliable resources that are readily accessible at the patient's bedside.

Within this context, our mobile application has been developed as a clinical decision-support tool designed to facilitate the identification of the main psychiatric emergency situations and to propose appropriate management strategies. It is based on a structured organization of information, enabling a stepwise approach to medical reasoning, while promoting the standardization of practice.

B. Analysis of the results obtained

The developed smartphone application is a structured and comprehensive tool designed to assist healthcare professionals in the management of psychiatric emergencies. Its functionalities are organized to reflect the different steps of clinical reasoning, from initial assessment to therapeutic decision-making.

Firstly, the application facilitates diagnostic orientation through the use of decision-making algorithms. By systematically guiding the user through key symptoms and clinical signs, it helps to identify possible potential psychiatric conditions associated

with emergency presentations, such as agitation, confusion or suicidal risk. This structured approach helps to reduce the subjectivity of clinical reasoning and limit the risk of overlooking critical diagnostic elements.

Secondly, the application offers a standardized clinical evaluation by integrating symptom-based assessments. This feature allow clinicians to quantify the severity of the patient's condition and to better characterize the clinical presentation. As a result, the evaluation process becomes more objective, reproducible, and aligned with current clinical standards.

In addition, the application provides clear and practical management recommendations tailored to the identified clinical scenario. These include:

- Immediate measures
- Orientation decisions (such as hospitalization our outpatient care)
- Initial therapeutic interventions

This is particularly useful in emergency situations where rapid and appropriate decision-making is essential.

Regarding its strengths, several key aspects can be highlighted. The application demonstrates a high level of simplicity and ease of use, making it accessible even for non-specialized healthcare providers. Its intuitive interface allows users to navigate efficiently without requiring extensive training.

Furthermore, one significant benefit is the rapid accessibility of information. In contrast to traditional resources, which may be time-consuming to consult, the application provides instant access to pertinent clinical advice at the point of care.

Finally, the logical organization of information improves both clinical relevance and usability. The content is structured in a coherent and methodical way that mirrors actual clinical workflows. This organization enhances the overall user experience

and supports effective decision-making.

Overall, these results imply that the application is a useful and effective tool that can assist clinicians provide timely, organized, and superior care in psychiatric emergency situations.

C. Contribution of the application compared to current practice

1. Comparison with conventional practice

The management of psychiatric emergencies has traditionally relied on a clinical approach largely dependent on the practitioner's experience. Diagnostic reasoning is often based on clinical intuition, knowledge acquired during training and prior exposure to similar situations. While this approach maybe effective for experienced clinicians, it presents certain limitations, particularly in emergency situations where time pressure and stress can negatively impact the quality of decision-making.

In contrast, the proposed application adopts a structured and standardized approach. It is based on a guided pathways to progressively guide the clinician towards a probable diagnosis. This method promotes a more systematic evaluation and reduces inter-individual variability related to differences in experience.

Therefore, unlike conventional practice, which can be heterogeneous, the application provides a consistent framework that enhances the reproducibility and reliability of clinical decisions.

2. Main Contributions of the Application

2.1.Reduction of Diagnostic errors

One of the major contributions of the application is the reduction of diagnostic errors. In psychiatric emergencies, certain clinical signs may be overlooked or misinterpreted, particularly when they are atypical or associated with underlying

somatic conditions.

The use of structured checklists ensures that essential elements of the clinical examination are not missed. Furthermore, the inclusion of symptom combinations (for example: agitation associated with fever and a confusional) helps guide the clinician points towards specific etiological diagnoses, particularly organic ones, which are often under-recognized.

This systematic approach helps to ensure the reliability of the diagnostic process and to limit cognitive biases.

2.2.Support for non-specialized Physicians

In many emergency departments, the initial management of psychiatric disorders is carried out by general practitioners, residents or non-specialists. These professionals may face difficulties when dealing with complex situations, especially in the absence of specialized training.

In this context, the application serves as an effective clinical decision-support tool. It guides the user step by step, offering diagnostic guidance and appropriate management strategies.

Additionally, it has a pedagogical value by reinforcing the skills of non-specialist practitioners, thereby improving the quality of care provided.

2.3.Improvement in the speed of patient management

Timely intervention is crucial in psychiatric emergencies, particularly in cases involving a risk of suicide, severe agitation or behavioral disturbances.

The application contributes to a significant amount of time by facilitating access to relevant information and structuring the diagnostic process. Instead of searching for the information in fragmented manner, clinicians are intuitively guided towards key essential elements.

This optimization of decision-making time contributes to faster and more effective patient management.

2.4. Relevance in emergency situations (stress and time constraints)

Emergency situations are characterized by high levels of stress, heavy workload, time constraints, and limited resources.

Under such conditions, clinician's cognitive performance may be impaired, increasing the risk of errors or omissions. The application acts as an external cognitive support system, helping to structure clinical reasoning and secure decision-making.

By reducing mental workload and providing clear guidance, it is particularly valuable in critical situations where accuracy and efficiency are essential.

D. Comparison with the literature

Advances in digital technology have led to the emergence of numerous mobile applications used in medicine, particularly to support diagnosis and patient management. Platforms such as Google Play now offer a wide range of applications in the fields of mental health and psychiatry.

As part of our study, we conducted a search on this platform using keywords such as "Psychiatric Emergencies", "Psychiatry" and "Urgences psychiatriques". Although many applications are dedicated to mental health, psychological assessment and well-being, we did not identify any application specifically designed for the comprehensive management of psychiatric emergencies

At the international level, certain applications, such as Suicide Safe, Suicide Safety Plan and the SAMHSA Disaster App provide tools to assist in the management of specific situations, including suicide risk and psychological crises. However, these applications remain limited to specific aspects and do not offer a comprehensive

approach encompassing all psychiatric emergencies within a structured clinical framework.

At the local level, particularly in Algeria and the Maghreb region, applications in the field of psychiatry remain underdeveloped. Some academic work has addressed areas such as liaison psychiatry, the teaching of psychiatric semiology, and diagnostic support, however, these studies are primarily oriented toward educational purposes and do not specifically focus on emergency situations. To our knowledge, our application is the first application developed in Algeria specifically dedicated to psychiatric emergencies, which gives it an innovative character and particular relevance in the national context.

Our application therefore provided added value by positioning itself as a tool adapted to the Algerian context, where access to specialists may be limited in emergency situations. It is distinguished by its structured approach, based on decision-making pathways that simulate clinical reasoning, thereby facilitating both diagnosis and the immediate management of the main psychiatric emergencies.

The application was evaluated by a group consisting of medical students and general practitioners. Although the sample size was limited due to organizational constraints (on-call duties, holidays and availability), the feedback obtained made it possible to better assess its usefulness in clinical practice and medical training. Users' suggestions, particularly regarding improvements in usability and the expansion of content through the inclusion of additional psychiatric emergencies, will be considered in future updates.

In conclusion, our application represents a local innovation in Algeria, complementing existing tools with a dual objective: improving the management of psychiatric emergencies and to strengthening the training of health professionals.

E. Strengths and limitations of the study

1. Strengths

Our work presents several strengths, both in terms of innovation and practical applicability.

- To our knowledge, this is the first application developed in Algeria specifically designed to support with the diagnosis and management of psychiatric emergencies. This initiative is part of an innovative approach to the digitalization of medical practice
- It addresses a genuine need in clinical settings, particularly in contexts where access to a psychiatric specialist is limited
- It provides rapid access to decision support tools in emergency situations,
- Adapted to real-world clinical constraints.
- It is based on a structured clinical reasoning framework, guiding users through assessment and management steps.
- In terms of content, the application covers a broad and relevant spectrum of psychiatric emergencies commonly encountered in clinical practice.
- It has the potential to enhance the autonomy of non-specialist practitioners and to contribute to safer initial patient management.
- It also serves as a complementary educational tool in psychiatry, helping to strengthen the clinical reasoning skills of medical students and junior practitioners.
- Its mobile format enables simple, flexible use, well-suited to everyday clinical practice

2. Limitations

Despite the value of our application, several limitations should be acknowledged. The main limitations include:

- Technical constraints may have affected certain functionalities as well as the overall usability of the application
- The application does not cover all psychiatric emergencies, as some specific clinical situations have not been included.
- The evaluation was conducted on a limited sample size; therefore, which means further studies are required to confirm its effectiveness and impact in clinical practice.
- The application is currently available on a single platform, which limits its accessibility.

F. Future Perspectives and Improvements

Despite the value of this application in supporting the diagnosis and management of psychiatric emergencies, several areas for improvement can be considered.

First, the integration of artificial intelligence could represent a significant advancement. It would allow a more refined analysis of clinical data and improve diagnostic orientation, particularly in complex situations. This could provide more personalized and accurate decision support.

In addition, regular updates of the application' content are essential. Psychiatric knowledge is constantly evolving, and incorporating the latest recommendations and classifications, is essential to ensure the reliability and validity of the tool over time.

Furthermore, before large-scale implementation, clinical studies would be valuable to assess the real impact of the application in practice. Such evaluations could measure its effectiveness in term of reducing diagnostic errors, improving response

time, and enhancing the overall quality of care.

The implementation of the application in hospital settings is another important step. Its integration in emergency departments could facilitate adoption by healthcare professionals and improve patient management in real-life conditions.

Finally, the development of a multilingual version would increase accessibility, particularly in diverse healthcare environments and allow broader use of the application.

IV. Economic Evaluation of the Application

A. Introduction

In a global context marked by rapid digital transformation, the healthcare sector is undergoing a major evaluation through the integration of digital technologies. Digital health, particularly through mobile applications, has become a key lever for improving access to care, optimizing medical practices and enhancing the overall efficiency of healthcare systems.

Medical applications, particularly those designed to support diagnosis and patient management, offer significant economic value. They contribute to reducing costs associated with medical errors, optimizing the time required for patient management, and limiting the overuse of hospital resources. Furthermore, they serve as a valuable support tool for healthcare professionals, particularly in emergency settings where speed and accuracy are crucial.

In this context, the development of a smartphone application dedicated to psychiatric emergencies fits within a framework of both medical and economic innovation. Such a solution can contribute to better patient orientation, faster management, and more efficient use of available resources.

The objective of this section is therefore to evaluate the economic feasibility of the project by analyzing the costs of development and implementation, as well as the expected short- and long-term benefits. This analysis aims to determine the project's viability and its potential integration into the healthcare system.

B. Project Business Model

1. Nature of the project

The proposed project consists of the development of a medical mobile application in the field of e-health. It is designed as a digital decision-support tool intended to assist healthcare professionals in the diagnosis and management of psychiatric

emergencies. By integrating evidence-based recommendations and structured decision-making algorithms, the app aims to improve the quality and reliability of clinical decisions.

2. Value proposition

The application provides significant added value in clinical practice. It enables rapid diagnostic orientation through structured and intuitive interfaces, facilitating the identification of critical psychiatric situations. It also contributes to the reduction of medical errors by standardizing clinical assessment and limiting subjectivity in decision-making.

Furthermore, it enhances accessibility to care in emergency contexts or in resources limited settings, particularly for non-specialist physicians. As such, it represents a practical and scalable solution to reduce inequalities in access to healthcare services.

3. Revenue Streams

Several revenue streams can be considered to ensure the financial sustainability of the project. A subscription-based model targeting healthcare professionals represents a primary source of income, providing access to the full range of application features.

In addition, partnerships with hospitals, universities and other healthcare institutions can support the deployment of the application while contributing to its funding. Public subsidies and grants may also be mobilized, given the public health importance of psychiatric emergencies care.

Finally, the implementation of a premium version offering advanced features, could constitute an additional source of revenue, while maintaining a basic version accessible to broader use base.

C. Market Analysis (relevant economic overview)

1. Target Market

The target market for this application primarily consists of healthcare professionals involved in emergency care. These include general practitioners, emergency physicians, as well as medical interns and students, who are often confronted with complex clinical situations requiring rapid decision-making.

2. Economic Need

The development of this application addresses a real economic need, particularly marked by a shortage of psychiatrists in certain regions. This situation leads to an increased burden on specialized services and highlights the necessity for decision-support tools to optimize patient management.

Thus, the integration of a digital solution represents a relevant approach to improving the efficiency of care while ensuring better management of available resources.

3. Competition

The medical application market already includes several international solutions offering decision-support tools. However, these applications are often not well adapted to local specificities, particularly in terms of clinical practices, language and healthcare system organization.

In this context, the absence of a locally adapted solution specifically designed to meet field needs represents a significant opportunity for the development of this application.

D. Cost Analysis

1. Initial Investment Costs

Initial investment costs include all expenditures required for the development and deployment of the application. These primarily consist of software development, including programming and implementation of the various functionalities, as well as the design and user experience (UX) development to ensure an intuitive and user-friendly interface.

Additional costs include initial hosting services, the establishment and structuring of the medical database, and the testing and validation phase, which is essential to ensure the reliability, safety and quality of the application prior to its deployment.

2. Operational costs

Operational costs refer to the recurring expenses necessary to maintain and ensure the long-term viability of the application. These include technical maintenance, regular updates to the medical content to remain consistent with current clinical guidelines and cloud hosting services to ensure data availability and security.

They also include user support services, aimed at assisting healthcare professionals in case of technical or functional issues, as well as communication and dissemination activities, designed to promote the application and encourage its adoption among target users.

E. Sources of funding

The project's funding partly relies on the support of the university incubator, from which it currently benefits, providing guidance in its development and structuring. The start-up framework, particularly under Decree 1275, also represents opportunity for funding and project valorization.

In addition, public grants may be mobilized due to the project's public health

relevance. Partnerships with hospital institutions may also contribute to both funding and deployment of the application. Finally, external funding may be considered as a supplement resource, depending on the project's needs.

F. Economic impact of the project

1. Impact on the healthcare system

The project may have a positive impact on the healthcare system by contributing to the reduction of hospital costs, particularly through a decrease in diagnostic errors and avoidable hospital admissions. It also supports better optimization of human and material resources by enabling faster and more appropriate patient management in emergency situations.

2. Professional impact

At the professional level, the application serves as a decision-support tool that allows significant time savings in clinical practice. It also improves the quality of medical decisions by providing a structured and standardized approach, thereby enhancing patient safety and the relevance of clinical management.

3. National impact

At the national level, this project is part of an e-health innovation dynamic. It may contribute to the development of the digital health sector, promote job creation in both technological and medical fields, and support enhancement of scientific research and local innovation.

G. Conclusion

The economic analysis demonstrates the viability of the project, supported by a diversified funding model and progressive development potential. The project shows strong growth prospects and represents a strategic interest for the healthcare system by improving care efficiency while optimizing available resources.

CONCLUSION

Psychiatric emergencies are common situations in general medical practice that require rapid assessment and immediate decision-making, sometimes involving urgent therapeutic intervention.

In light of significant advances in the field of digital technology, we developed a smartphone application dedicated to psychiatric emergencies, using the widely accessible Android platform.

In its current form, this application represents an initial step toward providing structured support for the management of psychiatric emergencies. It offers both general practitioners and medical students a practical tool to guide diagnostic reasoning and clinical decision-making in frequently encountered situations.

Although still in an early stage, this work highlights the potential value of digital tools improving clinical practice.

Future developments, including regular updates and the integration of additional resources, will be essential to enhance the application's performance, expand its content and ensure its long-term relevance.

ABSTRACT

Abstract

A psychiatric emergency is defined as a clinical situation requiring an immediate response, as soon as acute psychological distress is identified by the patient, their relatives, or a physician.

It necessitates rapid and appropriate management in order to prevent any worsening of the condition and to ensure the patient's safety.

Our thesis work consisted in the development of a mobile application dedicated to psychiatric emergencies, designed in collaboration with the Faculty of Computer Science. This project is part of an innovative approach to digital health in Algeria. The application is intended for medical students as well as healthcare professionals, serving both as a pedagogical tool and as a clinical decision-support system in the management of the most common psychiatric emergencies.

The methodology adopted is based on:

- An extensive literature review to select reliable and up-to-date medical data.
- The organization and structuring of these data into clear decision-making pathways adapted to emergency settings.
- The development of a functional application on the Android platform.

The application covers the main psychiatric emergencies encountered in clinical practice, including delirium, psychomotor agitation, suicide attempts, panic attacks, psychomotor inhibition (stupor state), postpartum psychosis, neuroleptic malignant syndrome, addictive emergencies and psychiatric disorders secondary to organic conditions.

Furthermore, this application aims to improve the diagnostic reasoning and the initial management of psychiatric emergencies, particularly in contexts where access to a psychiatric specialist is limited.

It also serves as a complementary educational resource for teaching of psychiatry in hospital and academic settings.

This work represents an initial contribution to the field of medical applications dedicated to psychiatric emergencies in Algeria, opening perspectives for continuous improvement and further development of its functionalities.

Résumé

L'urgence en psychiatrie se définit comme une situation clinique nécessitant une réponse immédiate, dès lors qu'une souffrance psychique aiguë est identifiée par le patient, son entourage ou le médecin.

Elle impose une prise en charge rapide et adaptée afin de prévenir toute aggravation et d'assurer la sécurité du patient.

Notre travail de thèse a consisté sur la création d'une application mobile dédiée aux urgences psychiatriques, élaborée en collaboration avec la faculté d'informatique. Ce projet s'inscrit dans une démarche d'innovation en santé numérique en Algérie.

Cette application est destinée aux étudiants en médecine ainsi qu'aux professionnels de santé, en tant qu'outil d'aide pédagogique et de support à la décision clinique dans la prise en charge des urgences psychiatriques les plus fréquentes.

La méthodologie adoptée est basé sur:

- Une recherche bibliographique approfondie afin de sélectionner des données médicales fiables et actualisées.
- l'organisation et la structuration de ces données sous forme de parcours décisionnels clairs et adapté au contexte des urgences.
- le développement d'une application fonctionnelle sur la plateforme Android.

L'application couvre les principales urgences psychiatriques rencontrées en pratique, notamment le syndrome confusionnel, l'agitation psychomotrice, les tentatives de suicide, la crise d'angoisse, l'inhibition psychomotrice (état de stupeur), la psychose puerpérale, le syndrome malin des neuroleptiques, les urgences addictifs et les troubles psychiatriques due aux affections organiques.

Par ailleurs, cette application vise à améliorer la démarche diagnostique et la gestion initiale des urgences psychiatriques, en particulier dans les contextes où l'accès à un spécialiste en psychiatrie est limité.

Elle sert aussi comme un support pédagogique complémentaire pour l'enseignement de

la psychiatrie dans les établissements hospitaliers et universitaires.

Ce travail représente une première contribution dans le domaine des applications médicales dédiées aux urgences psychiatriques en Algérie, ouvrant des perspectives d'amélioration continue et d'élargissement de ses fonctionnalités.

ملخص

تُعرّف الحالة الطارئة في الطب النفسي بأنها حالة سريرية تتطلب استجابة فورية، وذلك عند ظهور معاناة نفسية حادة يدركها المريض أو محيطه أو الطبيب وهي تستلزم تدخلاً سريعاً ومناسباً لمنع أي تفاقم ولضمان سلامة المريض.

تتمثل أطروحتنا في إنشاء تطبيق جوال مخصص لحالات الطوارئ النفسية، تم إنجازه بالتعاون مع كلية الإعلام الآلي. ويندرج هذا المشروع في إطار نهج الابتكار في مجال الصحة الرقمية في الجزائر. هذا التطبيق مخصص لطلاب الطب وكذلك للمهنيين الصحيين، كأداة تعليمية ودعم لاتخاذ القرار السريري في التعامل مع حالات الطوارئ النفسية الأكثر شيوعاً. وتستند المنهجية المتبعة إلى :

- بحث مرجعي متعمق لاختيار بيانات

- طبية موثوقة ومحدثة

- تنظيم وهيكلية هذه البيانات في شكل مسارات قرار واضحة ومناسبة لسياق حالات الطوارئ

- تطوير تطبيق وظيفي على نظام أندرويد

يغطي التطبيق حالات الطوارئ النفسية الرئيسية التي تصادف في الممارسة العملية، ولا سيما متلازمة الارتباك، والتهيج الحركي النفسي، ومحاولات الانتحار، ونوبات القلق، والتنشيط الحركي النفسي (حالة الذهول)، والذهان النفاسي، ومتلازمة الأدوية المضادة للذهان الخبيثة، وحالات الطوارئ المتعلقة بالإدمان، والاضطرابات النفسية الناتجة عن أمراض عضوية.

علاوة على ذلك، يهدف هذا التطبيق إلى تحسين عملية التشخيص والإدارة الأولية لحالات الطوارئ النفسية، لا سيما في السياقات التي يكون فيها الوصول إلى أخصائي في الطب النفسي محدوداً.

كما أنه يُستخدم كوسيلة تعليمية تكميلية لتدريس الطب النفسي في المستشفيات والمؤسسات الجامعية. يمثل هذا العمل مساهمة أولى في مجال التطبيقات الطبية المخصصة لحالات الطوارئ النفسية في الجزائر، مما يفتح آفاقاً للتحسين المستمر وتوسيع وظائفه مستقبلاً.

APPENDIX

Appendix 1: User evaluation questionnaire

User Evaluation Questionnaire

What is your current professional status? :

Extern ☐ Intern ☐ General practitioner ☐

Do you use a smartphone during your work?

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

I do not use it during work always

Which platform do you use?

iOS Apple ☐ Android ☐

Based on your experience, how difficult is it to manage a psychiatric emergency in the emergency department?

Not difficult at all ☐ Slightly difficult ☐ Moderately difficult ☐ Difficult ☐

Very difficult ☐

How easy is it to access the application?

Easy ☐ Moderate ☐ Difficult ☐

Download process:

Easy ☐ Moderate ☐ Difficult ☐

Ease of finding information:

Easy ☐ Moderate ☐ Difficult ☐

Richness of information

Good ☐ Moderate ☐ Poor ☐

Application structure

Good ☐

Moderate ☐

Poor ☐

Appendix 2: Certificate of Domiciliation



حاضنة الأعمال بجامعة الأغواط
Incubateur Universitaire de Laghouat

الجمهورية الجزائرية الديمقراطية الشعبية
وزارة التعليم العالي والبحث العلمي
جامعة عمار ثليجي بالأغواط
حاضنة الاعمال الجامعية



رقم 004.ش.ت/الحاضنة /2025

**شهادة توطين " مشروع مؤسسة إقتصادية ضمن القرار 008 المعدل
والمتمم للقرار 1275"**

أنا الممضي اسفله، السيد(ة): كراش شاكور عبد العزيز
مسير (ة) حاضنة الأعمال: حاضنة أعمال جامعة الأغواط
المقر الاجتماعي /العنوان: القطب الجامعي 2، جامعة عمار ثليجي بالأغواط
رقم علامة الحاضنة : 0911223047
تاريخ تسليم العلامة: 2022/11/09
أشهد أن الطالب / الطالبة التالية أسمائهم:

الاسم واللقب	تاريخ ومكان الازدياد	رقم تسجيل الطالب	الطور الدراسي	التخصص	الكلية
بن سعيد سناء حريري سلمى	19/12/2001 بروية الجزائر 11/06/2001 بالجلفة	201939020222 201939020191	سنة سابعة سنة سابعة	طب طب	كلية الطب كلية الطب

قد قبل مشروعهم للاحتضان على مستوى حاضنة الاعمال لجامعة الأغواط تحت اسم:

PsyLagh

تحت اشراف البروفيسور بركاتي اسمهان خلال السنة الجامعية 2025/2026.
سلمت هذه الشهادة بطلب من المعني(ة) للإدلاء بها في حضور ما يسمح به القانون.

09/03/2026 الأغواط بتاريخ

مدير الحاضنة

حاضنة أعمال مفوض حاضنة الأعمال الجامعية
جامعة الأغواط
جامعة عمار ثليجي بالأغواط
كراش شاكور عبد العزيز

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