



# Depression in Diabetic Foot Amputated Patients in the Medical Department of the University Hospital Center Hôpital du Mali

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## Abstract

Depression is a common mental disorder, it is characterized by the presence of a mood or a lasting loss of the ability to experience pleasure or interest in the person himself or in life. Diabetes is a chronic hyperglycemia linked to a deficiency in insulin secretion, and/or insulin action. It can lead to complications that can lead to amputation, we thought that this physical-psychological ordeal, without psychological support, can lead to depression. This study aimed to study depression in diabetic foot amputated patients in the medicine and endocrinology department of the Mali Hospital. This was a cross-sectional study from June 2022 to July 2023. Based on the observation of the onset of depression in patients. We included 45 patients who agreed to participate in the study. Women and men were equal in onset with a sex ratio = 1. The average age was  $60.83 \pm 11.88$  years, with extremes of 35 years and 80 years. The non-schooled represented 50%. General practitioners provided psychological preparation for 92.5% of the patients. More than 70% of the patients were depressed. The type of amputation had a statistically significant relationship on depression ( $p = 0.015$ ). This work highlighted that limb amputation leads to permanent depression during hospitalization. It is, therefore, necessary and imperative to increase the psychological preparation of patients in this service.

## Subject Areas

Psychiatry & Psychology

## Keywords

Amputation, Hôpital du Mali, Depression, Patient, Diabetic Feet

## 1. Introduction

Depression is a common mental disorder, it is characterized by the presence of a mood or lasting loss of the ability to experience pleasure or interest in the person themselves or in life.

Diabetes is a chronic hyperglycemia, linked to a deficiency in insulin secretion and/or insulin action [1].

On a global scale, according to the WHO, an estimated 422 million adults were living with diabetes in 2014, compared to 108 million in 1980. The global prevalence of diabetes (age-standardized) has almost doubled since 1980, from 4.7 to 8.5% of the adult population [2].

Diabetes leads to serious long-term complications, which can occur after 10 to 20 years of glycemic imbalance. The disease accelerates atherosclerosis, which causes arteritis of the lower limbs. It should be noted that foot wounds are the most common cause of amputation [2].

Amputation is a mutilating surgery that alters body image and results in severe functional deficits. Amputation is defined as the removal of a limb segment or an entire limb during surgery or trauma [3].

According to the WHO, 40% to 70% of lower limb amputations are related to diabetes [2]. In the United States, 50% of all lower limb amputations are performed on diabetics.

In the medicine and endocrinology department of the Mali Hospital in Bamako, foot problems accounted for 16.37% of hospitalized diabetics, including 40.4% amputations and 5.8% deaths [3]. In Mali, diabetic foot is a major problem in our health structures and is the most common cause of amputation.

In Mali, the observation is that many structures are able to care for diabetic patients, but are not able to provide podiatric care. To this end, patients generally arrive with diabetic wounds on their feet at very advanced stages and most often the click solution is amputation to save the patient.

Hôpital du Mali, following several observations and experiences, initiated and set up a special unit for diabetic feet in order to relieve the suffering of patients who often go around in circles looking for an adequate structure for podiatric care.

This unit's role is to welcome, consult, hospitalize and initiate the surgical care procedure if necessary.

From the decision to proceed with amputation on the basis of medical-surgical arguments to the announcement of the amputation, there is an upheaval for both the patient and their loved ones, a major physical and psychological ordeal. Thus, as soon as the news of the amputation is announced, the individual plunges into the grieving process, namely: denial, aggression and revolt, bargaining, anxiety, depression and finally acceptance if the patient is supported by healthcare professionals and/or family.

Depression was found in 64.31% of patients, patients who never received Therapeutic Education constituted 67.83%, the correlation was significant between the

psychological level of the patient and his participation in therapeutic education with a correlation coefficient  $r = 0.518$  and a level  $p < 0.001$ . [4]

Given the importance of this problem, we propose to conduct this study on the development of depression in patients with diabetic foot amputations. To conduct this research, we asked ourselves the question of what is the epidemiology of depression in patients with diabetic foot amputations? To answer this question, we set the objective of evaluating psychological levels before and after amputation in diabetic patients in the medicine and endocrinology department of the Hôpital du Mali. As a hypothesis, we believe that depression is present in all patients who have to have diabetic feet amputated.

It should be noted that in Mali, there is no study that has been devoted to the depression of patients with amputations of limbs following complications of diabetes to date, hence the interest of our study.

## 2. Method and Materials

**Type of study:** this was a cross-sectional study from June 2022 to July 2023, in the medicine and endocrinology department at the CHU-Hôpital du Mali.

**Study framework:** Hospital du Mali is a 3rd reference, located on the right bank of the Niger River. Fruit of cooperation between the People's Republic of China and the Republic of Mali. It was inaugurated in 2010 and was largely equipped by a Chinese partner. It essentially includes an administrative block, a technical block, a hospitalization block including the endocrinology and metabolic diseases, medicine, pediatrics, neurosurgery, thoracic surgery, gynecology, resuscitation and emergency departments.

It has a current capacity of 225 hospitalization beds and its mission is to ensure the diagnosis, treatment of the sick, the injured, pregnant women and children, to take care of emergencies and referred cases, to participate in initial training, to ensure the continuing training of health professionals and to conduct research work in the medical and paramedical fields.

The medicine and endocrinology department has 48 hospital beds, with 12 specialist doctors, including 5 endocrinologists, 1 doctor with a DU in diabetology and 16 nurses.

**Study population:** Our study population consisted of hospitalized patients, doctors and nurses in the medicine and endocrinology department.

**Échantillonnage:** Thus, 552 patients were hospitalized during the study period, including 240 diabetic patients, among these diabetics 124 had a wound at the extremities, and among them 45 were amputated and 40 of these 45 met our inclusion criteria

**Inclusion criteria:** the patients who were included are those after their hospitalization for a diabetic wound whose amputation diagnosis was made and who agreed to submit to the interview guide.

**Non-inclusion criteria:** patients who were hospitalized for diabetic wounds and who did not agree to submit to our interview guide were not included in the

sample.

**The variables measured were:** age, sex, psychological state, opinion and belief tendency. To assess the psychological level of depression of patients, we used the MADERS scale which includes 10 items which are: the expression of suicidal thoughts; pessimistic thoughts; inability to feel; weariness; difficulty concentrating; reduced appetite; reduced sleep; the existence of the expression of inner tension; described sadness and apparent sadness. Supports used: we were interested in patient records, study reviews, medical articles and publications, books and websites.

**Data entry and analysis:** text processing and entry were carried out using Microsoft Word software version 2021. Our data were entered and analyzed using IBM SPSS software version 25.0 and the chi2 test was used to compare the results for a probability  $p < 0.05$  and the 95% confidence interval. Our figures were made using Microsoft Excel 2021 software.

**Ethics and professional conduct:** Free and informed consent was obtained from the patients before their inclusion in the study. The refusal of the patient to participate in this study does not prevent his care and follow-up in the department. Personal information concerning each patient is completely confidential and will not be disclosed. Personal information concerning each patient will be coded by a number that will not allow the patient to be identified during the survey and the publication of the study.

### 3. Results

From June 2022 to July 2023, 552 patients were hospitalized, including 240 diabetic patients, among these diabetics 124 had a wound at the extremities, and among them 45 were amputated and 40 of these 45 met our inclusion criterion.

Women and men were equal in appearance with a Sex-ratio = 1 (**Table 1**).

**Table 1.** Distribution of patients collected by sex.

Sex	Numbers (N)	Frequency %
Males	20	50%
Females	20	50%
<b>Total</b>	<b>40</b>	<b>100%</b>

We observed a predominance of the age group between 50 - 65 years with a frequency of 42.5% (**Table 2**). The mean age was  $60.83 \pm 11.88$  years with extremes of 35 years and 80 years.

We noted a predominance of married patients with a frequency of 75% among the patients collected (**Table 3**).

The non-schoolers represented 50% of the study population (**Figure 1**). The average duration of diabetes was  $10.63 \pm 8.93$  years, among our patients 37.5% had a duration of evolution greater than 10 years with extremes of more than 30 years (**Table 4**).

**Table 2.** Distribution of patients collected according to age.

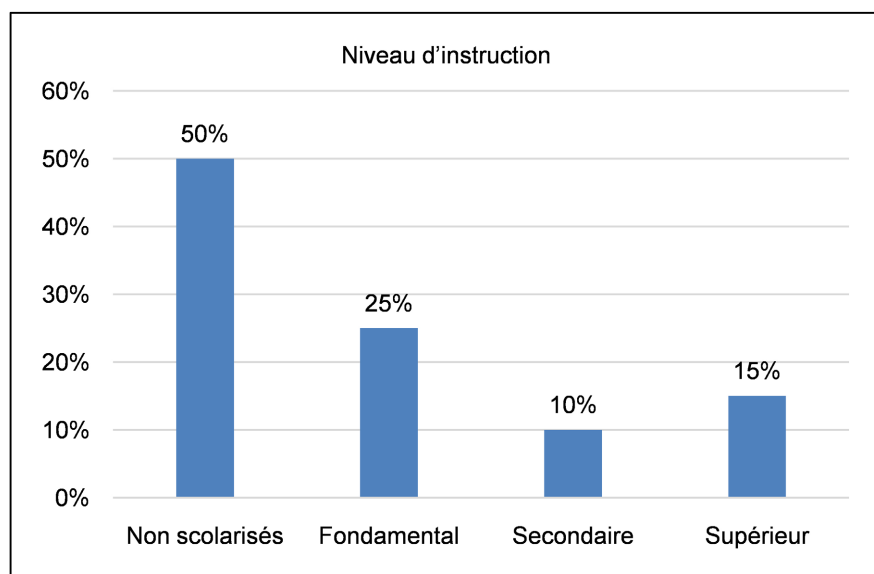
Age	Numbers (N)	Frequency %
35 - 50 years	9	22.5
51 - 65 years	17	42.5
66 - 80 years	14	35
<b>Total</b>	<b>40</b>	<b>100</b>

**Table 3.** Distribution by marital status.

Marital status	Number (N)	Frequency %
Married	30	75
Single	10	25
<b>Total</b>	<b>40</b>	<b>100</b>

**Table 4.** Repair according to the duration of diabetes development.

Duration of Diabetes	Numbers (N)	Frequency %
Less than one year	7	17.5
1 to 5 years	10	25
6 to 10 years	8	20
More than 10 years	15	37.5
<b>Total</b>	<b>40</b>	<b>100</b>

**Figure 1.** Distribution according to level of education, those without education represented 50% of the study population.

General practitioners provided psychological preparation to 92.5% of our patients collected (**Table 5**).

Major amputation was the most represented, *i.e.* 67.5% (**Table 6**).

According to the score provided by the questionnaire during the interview, we found that more than 70% of patients were depressed before amputation (**Table 7**).

We found that more than 70% of patients remained depressed in the hospital after amputation (**Table 8**).

**Table 5.** Distribution according to the agent who carried out the preoperative psychological preparation.

Agent responsible for preparation	Number (N)	Frequency %
General practitioners	37	92.5
Surgeon	1	2.5
Nurses	2	5
<b>Total</b>	<b>40</b>	<b>100</b>

**Table 6.** Distribution according to the type of amputation.

Type of amputation	Numbers (N)	Frequency %
Minor amputation	13	32.5
Major amputation	27	67.5
<b>Total</b>	<b>40</b>	<b>100</b>

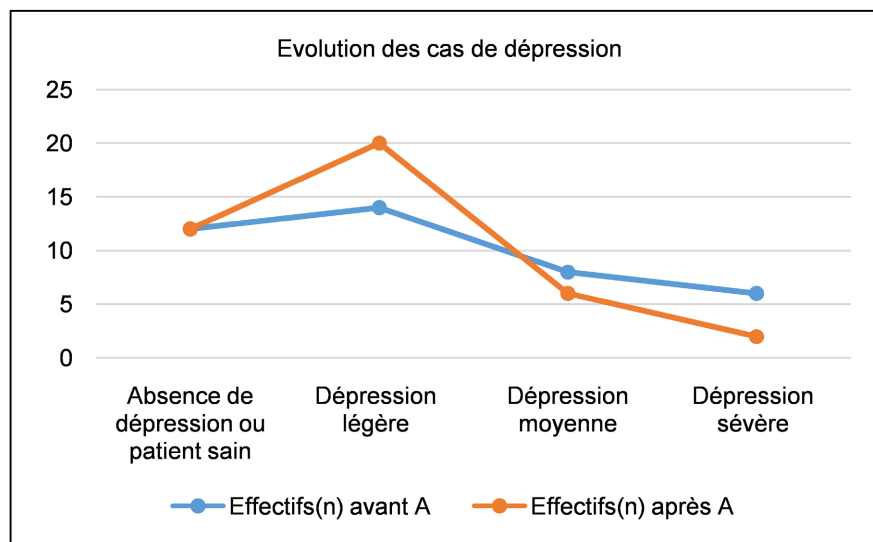
**Table 7.** Distribution according to the presence of depression before amputation.

Depression before amputation	Numbers (N)	Frequency %
Absence of depression or healthy patient	12	30
Mild depression	14	35
Moderate depression	8	20
Severe depression	6	15
<b>Total</b>	<b>40</b>	<b>100</b>

**Table 8.** Distribution according to the presence of depression after amputation.

Depression after amputation	Numbers (N)	Frequency %
Absence of depression or healthy patient	12	30
Mild depression	20	50
Moderate depression moyenne	6	15
Severe depression	2	5
<b>Total</b>	<b>40</b>	<b>100</b>

Healthy patients remained stable while the numbers of moderate and severe depression decreased and the number of mild depression increased (Figure 2). The type of amputation had a statistically significant correlation on the state of depression in amputated patients ( $p = 0.015$ ) (Table 9).



**Figure 2.** Healthy patients remained stationary while the numbers of moderate and severe depression decreased and the number of mild depression increased.

**Table 9.** Relationship between depression and type of amputation.

Type of amputation	Absence of depression	Depression	Total	<i>P</i>
Minor amputation	8 (61.5%)	5 (38.5%)	13 (32.5%)	
Major amputation	4 (15%)	23 (80%)	27 (67.5%)	0.015
<b>Total</b>	<b>12 (30%)</b>	<b>26 (65%)</b>	<b>40 (100%)</b>	

### Limitation of the Study

We were not able to take into account the individual evolutionary aspect of the patients during this study. This would allow us to know if the same patients who were healthy before amputation remained healthy after amputation.

## 4. Comments and Discussion

From June 2022 to July 2023, 552 patients were hospitalized, including 240 diabetic patients, among these diabetics 124 had a wound at the extremities, and among them 45 were amputated and 40 of these 45 met our inclusion criterion.

Women and men were equal in appearance in our series with a Sex-ratio = 1. Our results are identical to those of (Dienta 2007) [5] who reported in his study a sex ratio similar to ours 1, however [3] had found a sex ratio of 0.81 with a female predominance. These differences may be due to the sample size and the duration

of our study.

We observed a predominance of the age group between 51 - 65 years with a frequency of 42.5%. The mean age was  $60.83 \pm 11.88$  years with extremes of 35 and 80 years. Our results are comparable to those of (Kanté 2010) [6] and (Diarra 2008) [7] who all found 57 years. These data are comparable to ours and this could be explained by the fact that aging is a natural evolutionary phenomenon that constitutes a major risk factor for the onset of diabetes and its complications. This global senescence (neurological, arterial and immune) often associated in our context with insufficient geriatric care, constitutes a favorable ground for the appearance of trophic disorders.

We found a predominance of married patients with a frequency of 75%. Our results are identical to those of (Luchetti 2014) [8] with 75% of married patients in a study in Italy.

In our study, non-schooled patients represented 50% of the study population. We did not find any data in the literature for the educational level in amputation patients to compare with our results.

General practitioners provided psychological preparation to 92.5% of our patients. However, during our study, the number of depressed patients remained the same, which explains why patient follow-up in terms of therapeutic education is not effective, otherwise the general practitioners who are responsible for following these patients did not have sufficient tools to support them psychologically.

According to the score provided by the questionnaire during the interview, we found that 70% of patients were depressed before amputation. Comparable with those of (Dembélé 2019) [4] with depression present in 64.35% of patients hospitalized in medicine. According to this study, the risk of developing depression is twice as high in type 2 diabetics as in non-diabetics; Unfortunately, depression in diabetic patients is most often unidentified and untreated, while the presence of depression worsens the prognosis and increases the presence of risk factors for many complications, impairs quality of life, increases disability and increases mortality [9].

According to the score provided by the questionnaire during the interview, we found that 70% of patients were depressed after amputation. Also, the current prevalence of dysthymia was higher in patients seen in consultation than in patients hospitalized in the endocrinology department with 59% respectively [10]. Depressed subjects take less care of themselves, they do less physical exercise and have impaired adherence to care, with less compliance with drug treatments and less respect for hygiene and dietary rules [3].

## 5. Conclusion

This study allowed us to highlight that the amputation of limb(s) leads to permanent depression during hospitalization despite the psychological preparation of patients by the agents, because we found a close link between the quality of psychological preparation and the onset of depression. According to this study, there

is a statistically significant link between the level of amputation and depression. Amputation has psychological repercussions that pose socio-professional and economic problems, for this reason psychological support is always necessary so that the patient can have the capacity to participate in care and have an easy socio-professional reintegration. To this end, it is necessary and imperative to increase psychological support activities at the level of the medicine and endocrinology department of the Mali Hospital.

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### Conflicts of Interest

The author declares no conflicts of interest.

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