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Prevalence of Suicidal Risk in the General Population in Parakou (Benin) in 2022

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Abstract

Introduction: Every year worldwide, the WHO estimates that nearly one million people take their own lives, the equivalent of one suicide occurring every 40 seconds, despite the fact that this harm is preventable. **Objective:** The aim of this study is to investigate the risk of suicide in the general population in the commune of Parakou in 2022. **Methods:** Descriptive cross-sectional study conducted from December 2021 to December 2022. Sampling was probabilistic, using the WHO cluster sampling technique. **Results:** A total of 582 subjects were surveyed, of whom 99 (17.01%) were at risk of suicide (low (7.6%), moderate (5.7%) and high (3.8%)). Evaluation of suicidal behaviors revealed suicidal ideation (15.12%), suicidal planning (4.46%), suicide attempts (3.78%) and suicidal equivalents (6.90%). After multivariate analysis, the following were statically associated with suicidal risk: wet nurse status of less than one month ($p = 0.003$), family history of suicide attempt ($p = 0.004$), lack of affection from parents or guardians ($p = 0.044$), poor relationship with partner ($p = 0.033$) and depression ($p = 0.001$). **Conclusion:** Approximately one person in five is at risk of suicide at the end of this study. There is every interest to implement effective preventive measures at national level.

Keywords

Risk, Suicide, Benin-2022

1. Introduction

Suicidal risk is defined as the probability that a person will commit a suicidal act, whether fatal or not, within a given period of time [1]. Suicidal gestures or behaviors comprise a nosographic group including the terms suicidal ideation, suicidal planning and suicide attempt [2]. Suicidal ideation corresponds solely to the formation and concatenation of thoughts about the desire to commit suicide [3]. It logically precedes the act of attempting suicide, which may or may not end in suicide, which is the act of voluntarily taking one's own life [4]. The latter gives suicide risk all its seriousness [5]. The impact on families, loved ones and communities remains deeply devastating, even long after the loss of a loved one [6]. Suicide then becomes a tragedy. On the other hand, although also part of the register of suicidal behaviors, suicidal equivalents refer rather to any dangerous, often repetitive behavior, expressing in the symbolic register a desire for death, but of which the subject denies the risk and the purpose [7] [8].

According to the WHO, nearly a million people die by suicide every year, the equivalent of one every 40 seconds, and for each suicide, there are numerous attempts [6]. In France, Chabaud *et al.*, in a "mental health in the general population" survey in 2010, found an overall suicide risk of 13.70%, *i.e.* 3 times the number of deaths caused by traffic accidents [9] [10]. In West Africa, Akinyemi *et al.* in 2015 found an overall suicidal risk of 17.30% in the general population of Oru-Ijebu State in Nigeria [11]. In Benin, Tognon Tchégnonsi *et al.* in 2017 in the commune of Cobly, had recorded 52 cases of death by suicide over 5 years, an average of 10.40 cases of suicide per year [12]. In Parakou, suicidal risk was studied among adolescents attending school and medical students at the University of Parakou in 2021, with an overall prevalence of 12.54% and 24.44% respectively [2] [3]. These findings show that suicide remains a major public health problem. Yet it is preventable, given that the population at risk is identifiable [13]. In 2014, the WHO identified only 28 countries in the world with a national suicide prevention strategy, and no African country was on this list. These countries have succeeded in significantly decreasing suicide rates in recent years. Scotland, for example, was able to reduce its suicide rate by 18% between 2002 and 2012 [6]. This is impossible without first understanding the determinants of suicide risk in our sociocultural context. Hence the interest of the present study, which investigated the prevalence and factors associated with suicidal risk in the general population in the commune of Parakou in 2022.

2. Study Framework and Methods

2.1. Population and Procedures

These data were collected from the general population in the commune of Parakou, capital of the Borgou department, in the north-eastern region of the Republic of Benin. The study was a cross-sectional, descriptive, analytical study conducted from December 2021 to December 2022 among residents of the city of

Parakou who met the following criteria: they had been residents of that city for at least 06 months prior to the start of the survey; they were aged between 18 and 90 at the time of the survey; and they had given their free and informed consent to participate in it. The minimum sample size was calculated using the Schwartz formula. Sampling was probabilistic, using the WHO cluster sampling technique. A total of 582 targets were surveyed.

Cluster and respondent selection procedure

➢ **Cluster selection**

At first, the 30 clusters were selected according to the following specific steps:

- random distribution of the list of neighborhoods in the commune of Parakou, together with the number of households in each;
- calculation of the cumulative number of households in the Parakou neighborhoods, in the order in which they appear on the list;
- definition of the k cluster step, obtained by dividing the total number of households in all neighborhoods by the total number of clusters (30);
- random selection of a digit between 1 and k to identify the starting point; this made it possible to identify the neighborhood of the first cluster (this selection was made using Excel software);
- determining the distribution of the other clusters, each time by adding the number of clusters to the random digit, until all 30 clusters were reached.

➢ **Selection of houses**

Once selected, the city districts (those with at least one cluster) were all visited for the collection. The day before collection in the said city district or village, the survey team contacted the head of the district to introduce themselves, explain the process underway and present the authorizations. After discussing the matter with the chief, he indicated the boundaries and center of his area. On the day of the investigation, after signaling their arrival, the investigators positioned themselves in the center of the neighborhood and randomly drew a direction using the bottle-turning method. Once the direction and street have been chosen, they assign a number to each house on the street. One of those numbers is drawn at random, and the house thus chosen is the site of the first collection. The other elements of the cluster are selected in the vicinity of this one (houses behind and on both sides of the house drawn). There may be more than one household in a house. One and only one individual was surveyed per house each time.

➢ **Selection of survey subjects**

When the house in which the survey was to be carried out comprised a single household, the individuals in that household were drawn to determine the subject to be surveyed. For houses with several households, the interviewers assigned a number to each household. Then, using a random number generator, they drew a number. The household corresponding to this number was the one selected for the survey. Thus, per house, only one individual in a single household was taken into account in the survey. Once the household had been se-

lected, the interviewers asked to meet the head of household, to whom they introduced themselves and explained the reason for their intrusion. They next seek the head's permission to recruit and interview the subject being surveyed. If the head of household was physically absent, the authorization of an adult representative was required.

When the selected household included several individuals meeting the inclusion criteria, only one was randomly selected to take part in the study. The selection technique consisted of writing "selected" and "not selected" on slips of paper. The total number of slips corresponded to the number of potential survey subjects present in the selected household at that time. The word "selected" was entered only once. The slips of paper, once folded over so that they could not be distinguished from the outside, were placed in a container. Each person in turn drew a piece of paper from the container. The individual who drew the piece of paper marked "selected" was then selected to be interviewed, after obtaining his or her consent. If consent was withdrawn, the target was changed. The recruitment process was interrupted as soon as the required number of subjects for the district had been obtained.

2.2. Measures

For data collection, a structured, digitized survey form (ODK collect) was used, comprising a number of data items: socio-demographic data, including the respondent's contacts; antecedents; biographical data; clinical data; therapeutic data.

Respondents' clinical data were collected using the following scales:

- The suicide risk module of the Mini International Neuropsychiatric Interview (MINI) [14] to determine suicidal risk
- The Patient Health Questionnaire (PHQ-9) [15] to diagnose and measure the severity of depression
- Rosenberg Self-Esteem Scale to assess self-esteem
- EMICoV: for assessing the socioeconomic conditions of households in Benin

MINI is a diagnostic tool for the main psychiatric disorders. It is used to determine the current and/or lifetime prevalence of the various disorders explored. It was jointly developed by Sheehan *et al.* (1998) and Lecrubier *et al.* (1997) in English and French respectively. In its French version, the MINI is divided into 16 modules. The suicidal risk assessment module comprises six (06) questions on suicidal thoughts, self-aggressive ideas and suicide attempts, both in the past month and over a lifetime. Each question was composed of a dichotomous response type (yes/no). The total number of "yes" answers reflects the severity of the suicidal risk, which is classified into three levels: low, moderate and high. The scale is interpreted as follows: when Q1 or Q2 or Q6 = Yes, the suicidal risk is low; when Q3 or (Q2 + Q6) = Yes, the suicidal risk is moderate; and when Q4 or Q5 or (Q3 + Q6) = Yes, the suicidal risk is high.

The Patient Health Questionnaire (PHQ-9) is a brief tool used to diagnose and measure the severity of depression. The PHQ-9 is shorter than many other

depression screening instruments, and can be self-administered. Adapted from the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), the PHQ-9 includes the 9 diagnostic symptom criteria used in the DSM-IV, including the two cardinal signs of depression: anhedonia and depressed mood. The PHQ-9 was developed by Drs. Robert L. Spitzer, Janet W.B. Williams and Kurt Kroenke in 1999. Each item is rated on a severity scale from 0 to 3, where the respondent is asked to rate how often each symptom has occurred in the past two weeks (0-not at all; 1-few days; 2-over half the days or 3-almost every day), producing a total score ranging from 0 to 27. The respondent is also asked to what extent the identified problems have interfered with work, home or social life, however, responses to this item are neither scored nor included in the total score.

The PHQ-9 is interpreted as follows: 0-4: minimal depression; 5-9: mild depression; 10-14: moderate depression; 15-19: moderately severe depression; 20-27: severe depression.

PHQ-9 can be self-administered or administered by a clinician. No formal training is required for its use.

Most widely used in English-speaking countries, the Rosenberg Self-Esteem Scale is one of the most highly-qualified tools for assessing self-esteem, thanks to its psychometric qualities. It was developed by Morris Rosenberg in 1965. With a very short handover time, it takes only 10 items to complete, and provides a very global assessment of subjects' perception of their own self-worth. It is a unidimensional scale with a 90% reproducibility coefficient. Self-esteem is very low for a score < 25, and low when the score is between [25 - 31]. It is average for a score between [31 - 34]. When the score is between [34 - 39], self-esteem is high, and will be very high for a score ≥ 39.

The Integrated Modular Survey of Household Living Conditions in Benin (EMICoV) is part of INSAE's permanent household survey program, set up in 2006. The aim of this survey is to disseminate data on living conditions, in particular those relating to poverty, employment, unemployment, access to microfinance, food security, human security, governance, democracy and land issues, with a view to better defining and planning the interventions to be carried out. This scale is therefore designed to be an effective tool for assessing the socioeconomic conditions of households in Benin. An EMICoV score ≤ 50% reflects a low standard of living, while a score between [50% - 85%] indicates an average standard of living. An EMICoV score of 85% or more is proof of a high standard of living.

Data collection was carried out following a pre-test. Ten interviewers were recruited and trained among medical and epidemiology students at the University of Parakou.

2.3. Statistical Analysis

Data analysis was carried out with R software. Quantitative variables are expressed as mean with standard deviation or percentage; qualitative variables as

proportion with confidence interval. For bivariate analysis, the association between two variables has been established for a p value < 0.05 (significance threshold of 5%). Regarding the comparison of two quantitative variables, the linear correlation test was used, and the CHI test2 was used for the comparison of qualitative variables or quantitative variables rendered categorical. Dependent variables have been explained by explanatory variables using binary logistic regression.

3. Results

3.1. Socio-Demographic and Economic Characteristics of the Study Population

The average age of the respondents was 32.02 ± 13.8 years, with extremes ranging from 12 to 82 years. The majority were 23 years old. Females predominated (51.4%), with a gender ratio (F/H) of 1.05. More than a third of the subjects (35.90%) had no schooling. Most (54.6%) were Muslims, and 58.76% had a monthly income below the minimum wage (40.000FCFA = 61.06€ = $65.40). Evaluated using the EMICoV score, the majority (64.80%) had an average socioeconomic level. There were 09 respondents of a nationality other than beninese (1.50%) (Table 1).

Medical antecedents were present in 24.40% of respondents, and the rate of psychoactive substance use was 30.30% in the same population (Table 2).

The family histories found among the subjects surveyed were as follows: serious physical pathology in a parent (29.40%), psychiatric pathology in a parent (12.54%), attempted suicide in a parent (06.06%), death by suicide in a parent (04.0%) and use of psychoactive substances (38.14%), (Table 3).

Table 1. General characteristics of the study population.

	Study population (n = 582)	Population at risk of suicide (n = 99)
Age		
[0 - 24]	212 (36.42%)	29 (29.29%)
[25 - 34]	184 (31.61%)	40 (40.40%)
[35 - 44]	80 (13.75%)	18 (18.18%)
[45 - 54]	49 (08.41%)	04 (04.04%)
[55 - 64]	35 (06.01%)	07 (07.07%)
[65 - 74]	17 (02.92%)	00 (00.00%)
[75 - 82]	05 (00.86%)	01 (01.01%)
Gender		
Male	283 (48.70%)	40 (40.40%)
Female	299 (51.30%)	59 (59.59%)
Study level		
Out of school	209 (35.90%)	35 (35.35%)

Continued		
Literate	14 (02.40%)	00 (00.00%)
Primary	83 (14.30%)	11 (11.11%)
Secondary	116 (19.90%)	21 (21.21%)
Higher	160 (27.50%)	32 (32.32%)
Religion		
Muslim	318 (54.63%)	53 (53.53%)
Christian	240 (41.23%)	44 (44.44%)
Endogenous	15 (02.57%)	01 (01.01%)
No	09 (01.54%)	01 (01.01%)
Monthly income		
<SMIG*	342 (58.76%)	68 (68.68%)
=SMIG	42 (07.20%)	06 (06.06%)
]SMIG-3×SMIG]	36 (06.18%)	03 (03.03%)
]3×SMIG-6×SMIG]	151 (25.94%)	22 (22.22%)
]6×SMIG-9×SMIG]	08 (01.37%)	00 (00.00%)
]9×SMIG-12.5×SMIG]	02 (00.34%)	00 (00.00%)
]12.5×SMIG-25×SMIG]	01 (00.17%)	00 (00.00%)
Socioeconomic level		
Low	173 (29.70%)	36 (36.36%)
Medium	377 (64.80%)	57 (57.57%)
High	32 (05.50%)	06 (06.06%)

*SMIG = 40 000 FCFA = 61.06€ = $ 65.40 USD.

Table 2. Field-related characteristics of respondents.

	Study population (n = 582)	Population at risk of suicide (n = 99)
Medical history		
No	440 (75.60%)	69 (69.69%)
Yes	142 (24.40%)	30 (30.30%)
Psychiatric history		
No	572 (98.30%)	93 (93.93%)
Yes	10 (01.70%)	06 (06.06%)
Criminal record		
No	559 (96.04%)	95 (95.95%)
Yes	23 (03.95%)	04 (04.04%)
Gestating		
No	281 (48.18%)	55 (55.55%)

Continued		
Yes	18 (03.09%)	04 (04.04%)
Wet nurse with newborn under one month old		
No	272 (46.73%)	50 (50.50%)
Yes	27 (04.63%)	09 (04.63%)
Personal use of psychoactive substances		
No	406 (69.70%)	66 (66.66%)
Yes	176 (30.30%)	33 (33.33%)

Table 3. Family history characteristics of respondents.

	Study population (n = 582)	Population at risk of suicide (n = 99)
Severe physical illness in a parent		
No	411 (70.61%)	71 (71.71%)
Yes	171 (29.40%)	28 (28.28%)
Psychiatric pathology in a parent		
No	509 (87.46%)	85 (85.86%)
Yes	73 (12.54%)	14 (14.14%)
Suicide attempt by a parent		
No	544 (93.40%)	84 (84.84%)
Yes	38 (06.06%)	15 (15.15%)
Death by suicide of a parent		
No	559 (93.40%)	88 (88.88%)
Yes	23 (04.0%)	11 (11.11%)
Family use of psychoactive substances		
No	360 (61.85%)	56 (56.56%)
Yes	222 (38.14%)	43 (43.43%)

3.2. Prevalence of Suicidal Risk

Of the 582 subjects surveyed, 99 targets were screened as positive for suicidal risk. This reveals an overall prevalence of suicidal risk in the general population of the commune of Parakou in 2022 equal to 17.01%.

Respondents screened for suicidal risk are categorized according to severity as follows: light, medium and high suicidal risk. The prevalence of mild suicidal risk is 07.60%. Medium suicidal risk was 03.80%, while high suicidal risk was 05.70%.

3.3. Prevalence of Suicidal Behavior and Associated Psychological Disturbances

3.3.1. Suicidal Behavior

Taking into account the current stage of suicidal behavior in the study popula-

tion, the proportion of ideators, suicidal planners and those who had already attempted suicide were 15.12%, 04.46% and 03.78% respectively (Table 4).

3.3.2. Suicidal Equivalents

Of the 582 subjects surveyed, 40 had answered positively the question of whether or not they committed acts likely to end their lives without intending to commit suicide. This means that 6.90% of those surveyed had suicidal equivalents (Table 5).

3.3.3. Associated Psychological Disturbances (Self-Esteem and Depression)

Only 14.40% of respondents had very low self-esteem, compared with 39.39% of those at risk of suicide. The proportion of depressed people in the study population was 40.70%, whereas it was twice as high (80.80%) in the targets at risk of suicide (Table 6).

4. Analytical Aspect

4.1. Relationship between Suicidal Risk and Explanatory Variables in Bivariate Analysis

A statically significant association existed between suicidal risk and the following variables: marital status (p = 0.001); presence of at least one personal psychiatric

Table 4. Distribution of subjects at risk of suicide by gender and according to the current stage of suicidal behavior (n = 99).

	Male	Female	Total (%)
Suicidal ideation			
Absence of suicidal ideation	08	03	11 (11.11)
Presence of suicidal ideation	32	56	88 (88.88)
Suicidal planning			
No suicidal planning	31	42	73 (73.73)
Presence of suicidal planning	09	17	26 (26.26)
Suicide attempt			
No suicide attempts	30	47	77 (77.77)
Presence of at least one suicide attempt	10	12	22 (22.22)
Total	**40**	**59**	**99 (100)**

Table 5. Distribution of respondents by presence or absence of suicidal equivalents according to gender (N = 582).

	Male	Female	Total (%)
No suicidal equivalents	255 (43.80%)	287 (49.30%)	542 (93.10%)
Presence of suicidal equivalents	28 (4.80%)	12 (2.10%)	40 (6.90%)
Total	**283 (48.60%)**	**299 (51.40%)**	**582 (100%)**

Table 6. Distribution of subjects surveyed according to associated psychological disturbances.

	Study population (n = 582)	Population at risk of suicide (n = 99)
Level of self-esteem		
Very low	84 (14.40%)	39 (39.39%)
Low	203 (34.90%)	38 (38.38%)
Average	144 (24.80%)	12 (12.12%)
Strong	145 (24.90%)	10 (10.10%)
Very strong	06 (01.00%)	00 (00.00%)
Depression		
No depression	345 (59.30%)	19 (19.19%)
Mild depression	151 (25.90%)	34 (34.34%)
Moderate depression	68 (11.50%)	32 (32.32%)
Severe depression	18 (03.10%)	14 (14.14%)

antecedent (p = 0.002); presence of a family history of suicide attempts (p<0.001); presence of a family history of suicide (p<0.001); parental separation or divorce (p = 0.001); violent behavior of parents or educators in childhood (p<0.001); childhood lack of affection (p<0.001); childhood violence or sexual abuse (p<0.000); disappointment in love (p = 0.002); poor relationship with partner (p = 0.002); poor relationship with offspring (p = 0.002); mild to moderate depression (p<0.001); suicidal equivalents (p<0.001). The findings of the bivariate analysis are displayed in Table 7.

4.2. Relationship between Suicide Risk and Explanatory Variables in Multivariate Analysis

After multivariate modeling, we find that five factors are statistically associated with suicidal risk.

Wet nurse status with a newborn less than a month old multiplies suicidal risk by 21 compared to a woman who is not a wet nurse (OR = 21.26; IC 95%: [2.87 - 157.28]; p = 0.003). The subject's suicidal risk is multiplied by 1218.41 when a member of his or her family has already committed suicide (OR = 1218; IC 95%: [9.91 - 149,821.44]; p = 0.004). A poor relationship with a partner increased the risk of suicide by a factor of 23 compared with a good relationship (OR = 23.17; IC 95%: [01.29 - 414.05]; p = 0.033). Lack of affection from parents or guardians multiplies suicide risk by 5.1 (OR = 5.19; IC 95%: [1.05 - 25.79]; p = 0.044). The multiplication of the suicide risk of a depressed subject varies between 13.936 and 713.901 depending on whether the depression is mild (OR = 13.93; IC 95%: [2.47 - 78.58]; p = 0.003) or severe (OR = 713.9; IC 95%: [12.11 - 42,065.85]; p = 0.002) (Table 8).

Table 7. Results of bivariate analysis of explanatory variables and suicidal risk.

	Suicide Risk		Bivariate analysis	
	Absent (n = 483)	Present (n = 99)	OR (IC 95%)	*P*
Age				
[12 - 24]	183 (31.40%)	29 (05.00%)	0.634[0.06 - 5.87]	0.688
[25 - 34]	144 (24.70%)	40 (06.90%)	1.111[0.12 - 10.22]	0.926
[35 - 44]	62 (10.70%)	18 (03.10%)	1.161[0.12 - 11.05]	0.897
[45 - 54]	45 (07.70%)	04 (00.70%)	0.356[0.03 - 3.99]	0.402
[55 - 64]	28 (04.80%)	07 (01.20%)	1.000[.09 - 10.41]	1.000
[65 - 74]	17 (02.80%)	00 (00.00%)	0.000[0.000]	0.998
[75 - 82]	04 (00.70%)	01 (00.20%)	1:0	
Gender				
Female	240 (41.20%)	59 (10.10%)	1:0	
Male	243 (41.80%)	40 (06.90%)	0.67[0.43 - 1.03]	0.074
Study level				0.44
Out of school	189 (32.50%)	36 (6.20%)	1:0	
Primary	72 (12.40%)	10 (1.70%)	0.75[0.44 - 1.28]	0.29
Secondary	95 (16.30%)	21 (3.60%)	0.55[0.25 - 1.18]	0.12
Higher	127 (21.80%)	32 (5.50%)	0.87[0.47 - 1.61]	0.67
Respondent's marital status				
Unmarried	163 (28.00%)	31 (05.30%)	1:0	
Married	214 (36.80%)	26 (04.50%)	0.44[0.27 - 0.72]	0.001
Personal psychiatric antecedent				
No	479 (82.30%)	93 (16.00%)	1:0	
Yes	04 (00.70%)	06 (01.00%)	7.44[2.13 - 27.90]	0.002
Family history of suicide attempt				
No	460 (79.0%)	84 (14.40%)	1:0	
Yes	23 (04.0%)	15 (02.60%)	3.59[1.90 - 7.12]	<0.001
Family history of suicide				
No	471 (80.90%)	88 (15.10%)	1:0	
Yes	12 (02.10%)	11 (01.90%)	4.90[2.09 - 11.14]	<0.001
Currently pregnant				
No	226 (75.60%)	55 (18.40%)	1:0	
Yes	14 (4.70%)	4 (1.30%)	1.74[0.37 - 3.70]	0.780
Wet nurse under one month old				
No	222 (74.30%)	50 (16.70%)	1:0	

Continued

Yes	18 (6.00%)	9 (3.0%)	1.74[0.37 - 3.70]	0.068
Parents' marital status				
Living together	393 (67.50%)	63 (10.80%)	1:0	
Divorced	30 (05.20%)	12 (02.10%)	2.22[0.94 - 5.32]	0.001
Physically separated	60 (10.30%)	24 (04.10%)	2.49[1.21 - 5.12]	0.013
Parental behavior in childhood				
Permissive	445 (76.50%)	74 (12.70%)	1:0	
Violent	38 (06.50%)	25 (04.30%)	3.95[2.25 - 6.93]	<0.001
Lack of affection in childhood				
No	413 (71.0%)	62 (10.70%)	1:0	
Yes	70 (12.0%)	37 (06.40%)	3.52[2.13 - 5.68]	<0.001
Victim of aggression or violence during childhood				
No	459 (78.90%)	81 (13.90%)	1:0	
Yes	24 (04.10%)	18 (03.10%)	0.23[0.13 - 0.45]	<0.001
Disappointment in love				
No	332 (57.0%)	52 (08.90%)	1:0	
Yes	151 (25.90%)	47 (08.10%)	1.98[1.28 - 3.08]	0.002
Type of relationship with colleagues at work				
Good	154 (26.50%)	43 (07.40%)	1:0	
Wrong	329 (56.50%)	56 (09.60%)	0.97[0.32 - 2.91]	0.96
Type of relationship with partner				
Good	322 (79.10%)	63 (15.50%)	1:0	
Wrong	12 (02.90%)	10 (02.50%)	4.25[1.76 - 10.28]	0.002
Type of relationship with offspring				
Good	286 (82.40%)	57 (16.40%)	1:0	
Wrong	01 (0.30%)	03 (0.90%)	15.05[1.53 - 147.36]	0.02
Current depression				
No depression	326 (56.0%)	19 (03.30%)	1:0	
Mild depression	117 (20.10%)	34 (05.80%)	4.96[2.76 - 9.08]	<0.001
Moderate depression	36 (06.20%)	32 (05.50%)	15.25[7.85 - 29.62]	<0.001
Severe depression	04 (0.70%)	14 (02.40%)	60.05[18.02 - 200.10]	<0.001
Suicidal equivalents				
Present	463 (76.60%)	79 (13.60%)	5.86[3.01 - 11.38]	<0.001
Absent	20 (03.40%)	20 (03.40%)	1:0	

Continued

Socio-economic level				0.25
Low	137 (23.50%)	36 (6.20%)	1.13[0.43 - 2.97]	0.79
Medium	320 (55.00%)	57 (9.80%)	0.77[0.30 - 1.90]	0.58
High	26 (4.50%)	6 (1.0%)	1:0	

Table 8. Factors associated with suicidal risk: multivariate analysis of explanatory variables and suicidal risk.

	Suicide risk		Bivariate analysis	
	Absent (n = 483)	**Present (n = 99)**	**ORb**	***p***
Wet nurse status with a newborn under one month old				
No	222 (74.30%)	50 (16.70%)	1:0	
Yes	18 (6.00%)	9 (3.0%)	2.20[0.94 - 5.23]	0.068
Family history of suicide				
No	471 (80.90%)	88 (15.10%)	1:0	
Yes	12 (02.10%)	11 (01.90%)	3.57[1.79 - 7.12]	0.000
Lack of affection from parents or guardians				
No	413 (71.0%)	62 (10.70%)	1:0	
Yes	70 (12.0%)	37 (06.40%)	3.52[2.18 - 5.68]	0.000
Nature of relationship with partner				
Good	322 (79.10%)	63 (15.50%)	1:0	
Wrong	12 (02.90%)	10 (02.50%)	4.25[1.76 - 10.28]	0.001
Current depression				
Absent	326 (56.0%)	19 (03.30%)		
Slight	117 (20.10%)	34 (05.80%)	4.98[2.73 - 9.08]	0.000
Moderate	36 (06.20%)	32 (05.50%)	15.25[7.85 - 29.62]	0.000
Severe	04 (0.70%)	14 (02.40%)	60.05[18.02 - 200.11]	0.000

	Suicide risk		Multivariate analysis	
	Absent (n = 483)	**Present (n = 99)**	**ORa IC 95%**	***p***
Wet nurse status with a newborn under one month old				
No	222 (74.30%)	50 (16.70%)	1:0	
Yes	18 (6.00%)	9 (3.0%)	21.26[2.87 - 157.28]	0.003
Family history of suicide				
No	471 (80.90%)	88 (15.10%)	1:0	
Yes	12 (02.10%)	11 (01.90%)	1218.41[9.91 - 149821.44]	0.004

Continued

Lack of affection from parents or guardians				
No	413 (71.0%)	62 (10.70%)	1:0	
Yes	70 (12.0%)	37 (06.40%)	5.19[1.05 - 25.79]	0.044
Nature of relationship with partner				
Good	322 (79.10%)	63 (15.50%)	1:0	
Wrong	12 (02.90%)	10 (02.50%)	23.17[01.29 - 414.05]	0.033
Current depression				0.001
Absent	326 (56.0%)	19 (03.30%)	1:0	
Slight	117 (20.10%)	34 (05.80%)	13.93[2.47 - 78.58]	0.003
Moderate	36 (06.20%)	32 (05.50%)	41.76[5.90 - 295.16]	0.001
Severe	04 (0.70%)	14 (02.40%)	713.9[12.11 - 42065.85]	0.002

Binary logistic regression; 1:0 is the Odd Ratio (OR) for the reference/comparison group. ORb, raw Odd Ratio. ORa, Adjusted Odd Ratio.

5. Discussion

5.1. Study Limitations and Biases

There are a number of limitations to this study that should be highlighted. The data in this study were based on subjective statements. This poses the problem of over- or under-estimation of the questions by some targets, even though the detailed explanations given on the day of collection about the importance of the study and the confidentiality of the data collected helped to minimize those biases considerably.

It should also be noted that the lack of validation of the scales in our socio-cultural and ethnic context for diagnosing depression, assessing self-esteem and suicidal risk constitutes a bias for this work. Studies should be conducted to adapt these scales to our realities for this purpose.

In addition, after analyzing and processing the results obtained, we were curious to know what would have come out of the study if the data had been collected over a 12-month period, or even over a much longer period.

Nevertheless, these limitations and biases in no way detract from the reliability of the results obtained, since a scientifically acceptable methodology was rigorously adhered to.

5.2. Comparison with Studies by Other Authors

Of the 582 targets surveyed, 99 were at risk of suicide. This represents an overall prevalence of suicidal risk of 17.01%.

This result is roughly equal to that of Akinyemi *et al.* who found an overall suicidal risk of 17.30% in the general population of Oru-Ijebu State in Nigeria in 2015 [11]. It also corroborates that of Danel *et al.* who found an overall suicidal risk of 15.01% in the general population of Nord Pas de Calais in France in 2010 [16].

Nonetheless, this prevalence is about twice as high as the 9.50% and 8.50% reported by Pengpid *et al.* respectively in Kiribati and Zambia in 2021 [17] [18]. There may be a reason for these lower prevalences than in the current study. Even though Pengpid *et al.* conducted their study in a general population, as we did, their sample size was quite large (2156 in Kiribati and 4302 in Zambia respectively). Moreover, the suicide risk assessment tool used in their work was the WHO STEPS suicide module. That instrument was more focused on thoughts of suicide attempts (planning) and previous notions of suicide attempts than on ideation of the desire to die, as it excluded Q1 and Q2 from the MINI suicide risk module (Q1: "Did you think it would be better if you were dead?" and Q2: "Did you want to harm yourself?").

Results similar to ours have been found by other authors, although suicide risk was not assessed in the general population. This was the case for Darré *et al.* in Togo in 2019, who found a similar result: 16.50% in school-going adolescents aged 15 to 19 [19].

Assessed within the medical system among community healthcare consultants, the prevalence of suicidal risk was much higher than that found in this study. Thus, in France in 2021, Ducher *et al.* found that 24.30% of consultants to the French general medical system were positive for suicidal risk [20]. Similarly, Schriver *et al.* in Pennsylvania, USA, in 2020, found 25.80% of subjects at risk of suicide [21]. In contrast, Oneib *et al.* in Morocco in 2016 found a low prevalence of 13.60%. This could easily be explained. Indeed, although his study population was community healthcare consultants, Oneib had excluded from his study individuals treated for a psychiatric disorder and/or for a chronic and disabling physical illness such as diabetes, endocrine disorders, neurological disorders, cancers and others [22]. However, the presence of these medical antecedents in a subject constitutes primary risk factors for suicidal behavior, and makes him or her more likely to have suicidal thoughts.

Furthermore, the suicidal risk assessed in a population of psychiatric patients by Wu *et al.* in 2016 in Taiwan, notes a proportion of 27.40% of subjects at risk among psychiatric patients followed as outpatients versus 57.80% among those interned in psychiatric centers [23].

The prevalence of suicidal risk therefore decreases as we move from psychiatric patients in psychiatric centers to those undergoing outpatient treatment in psychiatric centers, then to community healthcare consultants and finally to the general population, and these different prevalences observed are not negligible. These findings show that, despite the taboo associated with the subject of suicide, the phenomenon remains a major public health problem in our sociocultural context. A suicide prevention strategy is therefore needed, first and foremost among the general population, in order to reduce or even neutralize the rate that will be found among patients admitted to psychiatric centers, where the prevalence is higher.

The difficulties associated with childbirth make women vulnerable, particu-

larly during the immediate postpartum period. In the present study, being a wet nurse for less than a month increased suicidal risk symptoms by a factor of 21.264 (ORa = 21.264; 95% CI: 2.875 - 157.287 P = 0.003). Cumbe *et al.* in Mozambique also found an association between postpartum and suicidal behavior symptoms (OR: 0.04; 95% CI: 0.01 - 0.27) [24]. In a meta-analysis, Rao *et al.* after an objective meta-analysis found a significant association between suicidal risk and the first year postpartum, p = 0.0013 [25].

In this study, there was a statistically significant relationship between family history of suicide attempts and suicidal risk symptoms after bivariate analysis (p = 0.000). This result is superimposed on those of other authors who also found an association in multivariate analysis.

These include Darré *et al.* in 2019 in Togo for family history of suicide attempts (p = 0.0461; OR: 2.04; 95% CI: 1.01 - 4.13), as well as Pengpid *et al.* in 2021 in Zambia, where family history of suicide attempts was associated with suicide attempts (OR: 1.58; 95% CI: 0.95 - 2.60), and Thompson *et al.* in 2008 in the USA, for whom family history of suicide attempts was associated with suicidal ideation, (p < 0.05; OR: 1.40; 95% CI: 1.03 - 1.91) and suicide attempts (p < 0.05; OR: 1.94; 95% CI: 1.22 - 3.10) [18] [19] [26].

A family history of suicide multiplies the risk of suicidal behavior by a factor of 1218 among our respondents (p = 0.004; ORa = 1218.41; 95% CI: 9.909 - 149,821.443). This phenomenon of suicide in a family can be explained by a contagion effect. It is possible to question the existence of a genetic note linked to suicide.

There is a statistically significant relationship between lack of affection from parents or guardians and suicidal risk symptoms. The risk of suicidal symptoms was multiplied by 5 (p = 0.044; ORa: 5.191; 95% CI: 1.045 - 25.798) in subjects who lacked affection. Florenzano *et al.* in 2011 in Chile, found the same significant association between poor expression of parental physical affection and suicidal risk (p = 0.000; ORa: 1.77 95% CI: 1.47 - 2.14) [27]. Likewise, Randall *et al.* in 2014 in Benin reported that poor parental support was significantly associated with suicidal risk (RRR: 0.88; 95% CI: 0.80 - 0.96) [28].

A statistically significant association in both bivariate (p = 0.001) and multivariate (p = 0.033) analysis between a poor relationship with one's partner and suicidal risk was observed in this study. It multiplied the risk of occurrence of suicidal risk symptoms in targets by 23.170 (ORa: 23.170; 95% CI: 01.297 - 414.054). The same finding was made by Darré *et al.* in 2019 in Togo (p = 0.0316; OR: 2.25; 95% CI: 1.07 - 4.72) [19].

Depression is the main etiology of suicidal behavior, and when it is present in a subject at risk, it also confers all its seriousness. This research work shows that, statistically, whatever its stage (mild, moderate or severe), depression is associated with suicidal risk in both bivariate (p = 0.000) and multivariate (p = 0.001) analyses. Severe depression increases suicidal risk symptoms in the study population by a factor of 713.901 (p = 0.002; ORa: 713.901; 95% CI: 12.11 -

42065.853). This is the finding of most authors in the literature including among others Fekadu *et al.* in 2016 in Ethiopia (OR: 23.61; 95% CI: 15.19 - 6.70); Adewuya *et al.* in Nigeria in 2020 (OR: 5.14; 95% CI: 4.12 - 6.41); Shibre *et al.* in Ethiopia in 2014 (adjusted OR: 2.71; 95% CI: 1.60 - 4.58); Ongeri *et al.* in Kenya in 2018 (p = 0.000; OR: 18.99 95% CI: 4.56 - 19.05); Danel *et al.* in Nord-Pas de Calais in 2010 (OR: 5.290; 95% CI: 4.702 - 5.950); Goodwill in the USA in 2020 (OR: 1.18; 95% CI: 1.15 - 1.22); Guedria-Tekari in 2019 in Tunisia (OR: 5.50; 95% CI: 2.14 - 14.11) [16] [29]-[34].

A statistically significant association between gender and suicidal risk could only be observed in bivariate analysis. However, in the literature, many studies have shown that such an association exists in multivariate analysis. For the majority, the female gender is the one most at risk of suicide, just as the results of this work revealed a high proportion of female subjects at greater risk of suicide than males (10.10% vs. 06.90%).

Among the authors making the same finding are: Culbreth *et al.* in 2018 in Uganda, female gender (OR: 1.01; 95% CI: 1.15 - 2.25); Darré *et al.* in 2019 in Togo, female gender (OR: 2.68 95% CI: 1.28 - 5.90; p = 0.0107); Guedria-Tekari *et al.* in 2019 in Tunisia, female (OR: 2.56 95% CI: 1.32 - 4.95; p = 0.005) and Cumbe *et al.* in Mozambique in 2022, female (OR: 2.8 95% CI: 1.5 - 5.5) [19] [24] [34] [35].

In contrast, Ganesh *et al.* in 2021 reported, following the example of this work, that it was rather the male gender that was associated with suicidal risk (OR 0.7; p= 0.034) [36]. It should be noted, however, that Ganesh conducted his study of suicidal risk within the population of Singapore, where demographically, the population is made up of more men than women.The high association of the female gender with suicidal risk noted by various African authors can also be justified by the position of women in sociocultural realities in Africa.

6. Conclusion

Although downplayed, neglected and stigmatizing, suicide is a silent destroyer, rampant in all countries around the world, and Benin is no exception. The study revealed that one (01) person in six (06) within the population of Parakou was at risk of suicide. This has a significant impact on the development of the commune, and hence the country as a whole. After multivariate analysis, wet nurse status with a newborn under a month old, family history of suicide attempts, lack of affection from parents or guardians, poor relationship with partner and depression were identified as factors associated with suicidal risk.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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