

Berta Barge Urcera

**Prevalence of Periodontal Disease among the Younger Population in Tanzania**

University Fernando Pessoa  
Faculty of Health Sciences  
Porto, 2020



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Pos-graduated project presented to  
University Fernando Pessoa  
as part of the requirements for obtaining  
a Master's Degree in Dental Medicine

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## **Resumo**

**Objetivos:** O objetivo deste trabalho foi avaliar a prevalência das doenças periodontais em crianças e adolescentes órfãos na Tanzânia de acordo com a idade e gênero, assim como promover a saúde oral.

**Material e métodos:** Um estudo transversal foi realizado em 2019 em Dar es Salaam, Tanzânia. Participaram neste estudo 100 crianças e adolescentes órfãos. Análises estatísticas descritivas foram realizadas e um teste qui-quadrado foi realizado para calcular as associações entre variáveis independentes.

**Resultados:** A idade média foi de 10,8 anos. 59% da amostragem era do gênero feminino e 41% gênero masculino. 19% apresentaram outras condições que afetam o periodonto, enquanto 18% apresentaram profundidades de bolsa iguais ou superiores a 4mm. 14% dos indivíduos apresentaram (PI) maior que 50% e 21% apresentaram (BoP) acima de 30%. O diagnóstico periodontal foi o seguinte: 43% saúde periodontal, 36% gengivite localizada, 21% gengivite generalizada e entre todos os participantes o 18% tiveram um possível diagnóstico de periodontite.

**Conclusão:** Os achados do presente estudo sugerem a presença de hábitos inadequados de higiene oral por parte da população em questão, onde se destacam os elevados índices de PI e BoP. Também foi possível observar a existência de associação positiva com relação à idade e ao diagnóstico de suspeita de periodontite. A incorporação de programas de saúde oral em orfanatos na Tanzânia parece ser fundamental como medida contra o desenvolvimento de doenças periodontais.

**Palavras-chave:** Tanzânia, Saúde Oral, Doença Periodontal, Crianças, Órfão.

## **Abstract**

**Objectives:** The purpose of this study was to evaluate the prevalence of periodontal diseases in orphan children and adolescents in Tanzania, according to the new classification of the periodontal diseases and promote oral health.

**Material and methods:** A cross-sectional based study was conducted in 2019 in Dar es Salaam, Tanzania. A total of 100 orphan children and adolescents participated in this study. Descriptive statistical analyses were performed and a chi-square test were summarized to calculate the associations between independent variables.

**Results:** The mean age was 10.8 years (4.0 SD). 59% of the participants of the study were females and 41% were males. 19% had other conditions that affect the periodontium, while 18% had pocket depths greater than or equal to 4mm. 14% of the participants showed a (PI) greater than 50% and 21% had a (BoP) over than 30%. The periodontal diagnosis was as follows: 43% periodontal health, 36% localized gingivitis, 21% generalized gingivitis and of all the participants 18% had a possible diagnosis of periodontitis.

**Conclusion:** Findings of the present study suggest the presence of poor oral hygiene habits on the part of the population in question, where the high rates of PI and BoP stand out. It was also possible to observe the existence of a positive association with respect to age and the diagnosis of suspected periodontitis. Incorporation of oral health programs in orphanages in Tanzania seems to be fundamental as a measure against the development of periodontal diseases.

**Keywords:** Tanzania, Oral Health, Periodontal Disease, Children, Orphan.

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## **List of abbreviations**

MTC: Mother Theresa Center

KHC: Kiwalani Orphan Center

PI: Plaque Index

BoP: Bleeding on Probing

PPD: Probing Pocket Depths

GR: Gingival Recession

OH: Oral health

NGO: Non-governmental Organization

CIA: Central Intelligence Agency

CPITN: Community Periodontal Index of Treatment Needs

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## **I. Introduction**

Periodontal disease is a collective term used to describe a set of pathogen-associated inflammatory processes that affect normal periodontal functions and has a multifactorial etiology. The periodontal functions are to support teeth in bone tissues and keep the integrity of the masticatory mucosa (Lindhe, Karring and Araujo, 2008a; Tonetti, Greenwell and Kornman, 2018). The course of periodontal disease begins with gingivitis, which is easily treatable if the necessary therapeutic measures are taken in time. If not, it can progress to a more severe infection that permanently and irreversibly destroys the tissues and bone that support the teeth, namely periodontitis, causing a great impact on the comfort and quality of life of the individual. Among the serious final consequences of this disease it is worth highlighting: problems with chewing, phonation and loss of dental structures (FDI). It is common in children and adolescents, the presence of gingival diseases in it is various forms of involvement. Although, despite the high prevalence of gingivitis, the incidence of more severe forms of periodontal diseases is low, often being associated with systemic diseases (Marbán and Abad, 2004).

McDonald, Avery and Weddell in 1995, reported that tooth brushing habits, necessary for the control of dental plaque, seems to be closely related to socioeconomic status. This fact leads us to speak directly of the context in which this study was carried out, United Republic of Tanzania.

Several studies were analyzed, both coinciding with the high prevalence of periodontal diseases and the need to promote oral hygiene education. One of them, concluded that gingivitis had a prevalence between 55% and 61% and showed a visible plaque percentage of 93% (Frencken *et al.*, 1986). Another one, concluded that almost all children showed signs of gingivitis and the Community Periodontal Index of Treatment Needs (CPITN) demonstrate that more than 50% of the sextants of the mouth were affected (Kerosuo *et al.*, 1986). It is possible to observe that there is a great lack of epidemiological studies with updated information regarding children who live and grow up in orphanages.

According to an article published by Baelum and Scheutz (2002), the African continent stands out for its social inequality, whether due to the distribution of wealth, the precarious quality of life and the scarce or non-existent health resources. The harsh environmental conditions mean that the requirements for a minimally decent life are not always guaranteed, a situation that is worsened by the current climate crisis. Just as access to basic products such as water and food supplies is not always guaranteed.

Tanzania is located in East Africa, it borders with Kenya, Mozambique and the Indian Ocean. It stands out for its nature, geography, natural resources and cultural diversity. With a total population of 58,552,845 (July 2020, est.), its demographic profile is practically young (mean age 18.2) and rapidly growing due to the high fertility rate. The main major urban areas are Dodoma and Dar es Salaam, the latter is home to 6,702 million people. Access to drinking water has improved in the urban area and about 77.2% of the population has access to it, while sanitary access facilities is 31.3% (2015 est.). The number of people living with HIV / AIDS is 1.6 million and causes 24,000 deaths (2018 est.), which places the country compared to the world in 6th Market Stall. Other diseases are transmitted by water, vectors or animals according to Central Intelligence Agency (CIA). According to the World Health Organization (WHO), Tanzania presents a gross national income per capita of 1,750 (in international dollars, 2013). Life expectancy at birth men/women is 62/66 (2016). The probability of dying before reaching the age of five counts 53 (per 1,000 live births, 2018) and, between 15 and 60 years of age, is 299/222 men/women (per 1,000 inhabitants, 2016). With a total health expenditure per inhabitant of 137 (\$ int, 2014) and a total health expenditure as a percentage of GDP (Gross Domestic Product) that is around 5.6 (2014).

With the help of the non-governmental organization (NGO) «Mother Teresa of Calcutta», it was possible to conduct this study. The purpose of such a project was to evaluate the prevalence of periodontal diseases in children and adolescents, hosted in the Mother Theresa Center (MTC) and Kiwalani Orphan Center (KHC), according to their age and sex, based on the new classification of periodontal diseases (Caton *et al.*, 2018). Secondary objectives were the promotion of oral health with a sensitizing, motivating and teaching action in basic oral hygiene care, and the clarification of doubts and demystification of preconceived ideas with the resources of adapted classrooms, lectures and games.

## **II. Material and methods**

### **II.1 Type of study:**

A cross-sectional epidemiological study was conducted in the city of Dar es Salaam, Tanzania, during the month of August of 2019. It is important to refer that this study was a non-profit project. It was approved by the Ethics Commission of the Faculty of Health Sciences of the University Fernando Pessoa (Porto, Portugal) and by each of the institutions (annex 1 and 2). Once in Tanzania, a letter of access to the participants (annex 3 and 4) was delivered to the directors of the orphanage. The study was explained again and the doubts were clarified in both English and Kiswahili (national languages). Subsequently, the informed consent for each minor was delivered to the legal guardians, the inherent ethical procedures for the study were approved and safeguarded all the principles of the Declaration of Helsinki (annex 5). Both children and guardians were free to refuse to carry out the study at any time. Finally, a periodontal evaluation was carried out in a knee-to-knee position and measurements were performed to complete the clinical record (annex 6). Confidentiality and anonymity were guaranteed at all times with the use of an encrypted numeric code.

### **II.2 Sample size:**

A previous study of the literature available in PubMed and Scopus was necessary, there was no time limits to have the maximum number of articles using the keywords: Tanzania, oral health, periodontal disease, children and orphan. A sample size with a minimum of 92 participants was estimated assuming that the prevalence of periodontal disease in minors was 50% and admitting an estimated population between the two orphanages of 120, with a margin of error of 5% and a 95% confidence level. In total 100 individuals were evaluated.

### **II.3 Participants and inclusion / exclusion criteria:**

The following criteria were required to participate in the study: be between 5 and 18 years of age, be institutionalized in MTC and KOC, want to voluntarily participate in the study and have the informed consent signed by the legal guardians. All children aged outside

that range and/or who did not belong to one of the orphanages mentioned above were excluded from the study.

#### **II.4 Calibration:**

The evaluations were carried out by a single examiner who was trained in the use of the measurement system at the same time that the clinical record was collected. The diagnosis was subsequently made according to the data. No inter or intra-examiner calibration was performed at different time points, due to limited time and difficult local examination conditions.

#### **II.5 Material and methods:**

To carry out this study it was necessary: disposable CP12 periodontal probes (Toscana: 20151009), disposable dental mirror (Starline: KT190213), surgical masks and latex gloves, copies of the clinical record and pen. Natural light and front light were used. Materials to perform dental hygiene such as: toothpastes, toothbrushes and mouthwashes were provided by the Cygom Dental Clinic, Vigo (Spain).

#### **II.6 Clinical indicators:**

To observe the presence or absence of periodontal disease, the clinical indicators were evaluated: Plaque Index (PI), Bleeding on Probing (BoP), Probing Pocket Depths (PPD) and Gingival Recession assessment (GR).

#### **II.7 Statistic analysis:**

All the data was entered in the Microsoft Excel program, Vs.16.37. Subsequently, Predictive Analytics Software, IBM© SPSS© Statistics, Vs.26 was used for data analyses. Descriptive statistics were summarized using counts and percentages for categorical variables while means and standard deviation were used for normally distributed continuous variables. Chi-square tests were used to determine the associations between a set of independent variables and the outcome of interest. A  $p$ -value < 0.05 was considered statistically significant.

### III. Results

This study had a total of 100 participants ( $n = 100$ ), 75% and 25% belonged to MTC and KHC respectively. The demographic characteristics were as follows: the calculated mean age was 10.8 years (4.0 SD), most of them (52%) were 10 years old or above and more than half of the sample (59%) were women (Table 1).

**Table 1: Demographic description (N=100)**

<b>Characteristics</b>	<b>Mean + SD</b>
<b>Age</b>	10.8 + 4.0
	<b>n (%)</b>
<b>Age category</b>	
<10 years	48 (48.0)
≥10 years	52 (52.0)
<b>Gender</b>	
Female	59 (59.0)
Male	41 (41.0)

The mean total number of teeth evaluated in the sample, taking into account that there were children from 5 to 18 years old, was 24 teeth per individual.

During the evaluation of the periodontal affectations, it was observed that 19% of the individuals presented abscesses and/or gingival recessions, classified as other conditions that affect the periodontium. Gingival recessions were present in 14% of the individuals with an average of 0.31mm (0.907 SD) was calculated. The presence of suspected true pathological periodontal pockets was also measured and was present in 18% of the evaluated individuals (Table 2).

**Table 2: Periodontium affectations (N=100)**

<b>Other conditions affecting the periodontium</b>	<b>n (%)</b>
Presence	19 (19.0)
Absence	81 (81.0)
<b>Pocket depths <math>\geq 4</math> mm (assuming no pseudo pockets)</b>	<b>n (%)</b>
Presence	18 (18.0)
Absence	82 (82.0)

Regarding the Plaque Index (PI) and the Bleeding on Probing (BoP), lower levels (less than 25% and less than 10%, respectively) were the most common in 62% and 43% of the individuals, respectively. Even so, it is important to highlight that regarding the PI, 14% of the population had bacterial plaque accumulation above 50% and, 21% had hemorrhage values (BoP) greater than 30% (Table 3).

**Table 3: Periodontal status (N=100)**

<b>Plaque Index (PI)</b>	<b>n (%)</b>	<b>Bleeding on Probing (BoP)</b>	<b>n (%)</b>
<25%	62 (62.0)	<10%	43 (43.0)
25-50%	24 (24.0)	10-30%	36 (36.0)
51-75%	9 (9.0)	>30%	21 (21.0)
>75%	5 (5.0)		
Score $\leq 50\%$	86 (86.0)	Score $\leq 30\%$	79 (79.0)
Score $> 50\%$	14 (14.0)	Score $> 30\%$	21 (21.0)

It should be noted that the presence of dental plaque was always greater than or equal to 1% and had a maximum value analyzed of 88%. Contrary, when observed BoP, there were patients with complete absence of bleeding (3% of the sample) and its maximum registered value was 81%.

Factors such as age and gender did not have a significant association ( $p > 0.05$ ) in respect to periodontal diagnosis (periodontal health, localized or generalized gingivitis) (Table 4).

**Table 4: Factors associated with periodontal diagnosis (N=100)**

	<b>Total</b>	<b>Periodontal Health</b>	<b>Localized Gingivitis</b>	<b>Generalized Gingivitis</b>	<b><i>p</i>-values*</b>
<b>Age</b>					
<10 years	48 (48.0)	23 (23.0)	16 (16.0)	9 (9.0)	0.63
≥10 years	52 (52.0)	20 (20.0)	20 (20.0)	12 (12.0)	
<b>Gender</b>					
Female	59 (59.0)	27 (27.0)	23 (23.0)	9 (9.0)	0.24
Male	41 (41.0)	16 (16.0)	13 (13.0)	12 (12.0)	

\* $p \leq 0.05$  (Chi-square test)

There was also no association between gender and suspected diagnose of periodontitis. However, the results showed a significant association between age and suspicion of periodontitis ( $p > 0.05$ ), therefore, as the age of the individual increased, the probability of suffering periodontitis increased too (Table 5).

**Table 5: Factors associated with suspected diagnose of periodontitis (N=100)**

	<b>Suspect Periodontitis</b>	<b><i>p</i>-values*</b>
<b>Age</b>		
<10 years	4 (4.0)	<b>0.016</b>
≥10 years	14 (14.0)	
<b>Gender</b>		
Female	9 (9.0)	0.39
Male	9 (9.0)	

\* $p \leq 0.05$  (Chi-square test)

#### **IV. Discussion**

Few studies assess the periodontal condition of children and adolescents in Tanzania. To the best of our knowledge, this would be one of the first investigations that aims to provide information on institutionalized minors in orphanages residing in the city of Dar es Salaam.

In our study, it was possible to observe a positive relationship between age and suspicion of periodontitis. These data are in accordance with the available literature, so that the prevalence of more severe forms of periodontal disease increases as the individual ages (Marbán and Abad, 2004). On the other hand, we were also able to examine the presence of poor oral hygiene. All the participants presented visible bacterial plaque and approximately 14% of the sample had higher levels than 50% of plaque. BoP was present in 97% of the individuals.

Oral health education begins through the primary socialization process that is normally acquired by children from their parents. Poor oral hygiene not only causes mere dental problems. Oral Health (OH) is closely related to general health and the well-being of the individual. So, the first stages of life are a critical period for the development of the healthy child (Nyandindi *et al.*, 1994; Masumo, Ndekero and Carneiro, 2020).

In the African continent, the health system stands out for the shortage of personnel and the lack of resources, while the majority of the personnel is located in the main capitals or in the most important urban centers, the population resides mainly in rural areas (Baelum and Scheutz, 2002). To cope with this fact and the high prevalence of oral diseases, the Tanzanian Ministry of Health promoted in 1988 a national plan for the improvement of OH, whose subsidy from public funds has suffered from frequent cuts since the beginning of the program (Mosha *et al.*, 1994; Kikwilu and Mandari, 2001). Such a program appears to be feasible as long as routine monitoring is done. In many situations OH did not improve and this could be associated with three possible factors: first, the teachers in charge of teaching these classrooms may not be properly trained and motivated to deal with these issues. Second, the children may not have put into practice what they learned in school. Lastly, it is very likely that they did not receive the support from their families (Nyandindi *et al.*, 1996; Palenstein Helderma *et al.*, 1997; Mbawalla

*et al.*, 2012). It is unknown whether children living in Tanzanian orphanages have access to this state program, as it appears to be taught in certain public schools.

The available literature states that the ability to brush teeth at an early age is not effective, they depend largely on those responsible. This fact makes the tutors instruction indispensable for the correct OH of the child. This was made known to us by an analysis carried out in Kisarawe (Tanzania), which evaluated the presence of caries and the impact on the well-being of children between 4 and 6 years of age, and where a percentage of bacterial plaque of 93.2% was calculated (Mbawalla *et al.*, 2012; Masumo, Ndekero and Carneiro, 2020).

On the other hand, another study carried out in the volcanic regions of Tanzania, found a BoP in 87.95% of the cases and 27.29% of the individuals had an PI greater than 50% (Miranda-Rius *et al.*, 2020). A study in special primary schools was also carried out in the city of Dar es Salaam. The presence of an 82.8% calculus and 73.5% of gum bleeding was determined (Simon *et al.*, 2009). Although they claimed to show higher values compared to other studies conducted in children without disabilities, these values were lower than those obtained in the present study. This leads us to think about the role played by the presence of social caregivers in charge of these children.

In our research we were able to observe that there were no significant differences between genders ( $p > 0.05$ ). These results contrast with the ones from Kerosuo *et al.* (1986), who showed that the group of girls with ages between 15-18 years showed a significantly higher number of periodontal health than other children of Dar es Salaam city schools. Almost all the children showed signs of gingivitis and the CPITN showed that in more than half of the cases all the sextants were affected.

Frencken *et al.* in 1986, observed that the presence of gingivitis was more frequent in rural than urban areas, showing a PI of 93%. In the present study, no distinction was made between rural and urban areas, since the two orphanages were located in the same urban area. As this same author explains, the differences that exist between the diagnostic criteria for bacterial plaque and the age differences between the samples of the available articles may be the reason why there is still no consensus on the true prevalence of the biofilm. It should also be borne in mind that most studies only studied the presence of

caries, PI and in some cases BoP. In the few investigations that gingivitis was diagnosed there was no differentiation between localized and generalized gingivitis. To compare these results with those obtained, the two variables of our study were added together and the result gave a total of 57% (cases of localized gingivitis + cases of generalized gingivitis). This is a value very close to that given by this author of 55%, although slightly higher than that given at the time.

To give another point of view to the study, we also wanted to compare information with some countries of the European Union. We know that in most industrialized countries primary prevention measures have been adopted and that the implementation of this program caused a significant decrease in oral diseases (Pereira *et al.*, 2013). These are the guidelines that should be given to society to maintain an adequate oral condition: brushing the teeth 2 times a day (as a minimum) and the incorporation of additional measures for cleaning the gums and tongue. Use of fluoride toothpastes with fluoride levels according to the age of the individual and as a complementary means, use dental floss to remove interdental plaque. Furthermore, the literature states that it is essential to regularly attend dental medicine consultations at least 2 times a year (Lafuente and García, 2005; Manju *et al.*, 2015).

Several studies were carried out in Portugal in which OH behaviors were evaluated: One of them was carried out in public schools in Viseu (Portugal), concluded that 23.5% of the individuals brushed their teeth 2 or more times a day. In addition, it significantly related the frequency of tooth brushing with the literary ratings of the parents and the area of residence (Pereira *et al.*, 2013). Once again, we may reflect on the importance of the presence of parents committed to the health of their children. Another study carried out in schools in Castelo de Paiva, found that children who brushed their teeth only once a day (59.7%) were more prevalent, being that habit more common at night, before going to sleep (Frias-Bulhosa *et al.*, 2015).

Iglesias Guerra *et al.*, in 2013, carried out a study similar to those mentioned above, analyzing the evolution of knowledge and habits of oral hygiene in school children in Palencia (Spain). The results showed that the number of students who brushed their teeth more than 3 times a day increased, while candy intake decreased. In this case, the results of the OH prevention program seem to be positive, since there was an improvement in

hygiene knowledge and habits. Other analyzes were carried out in Romania. One of them determined that in a Siret orphanage, gingival disease and completely neglected oral hygiene with a high presence of plaque and calculus were common (O'Sullivan and Stephens, 2009). Another analysis carried out in Constanta aimed to implement the oral health of orphans and the elderly who lived in residences. Dental students made frequent visits for health promotion and instruction in oral hygiene procedures. The results were positive in the orphan population, hygiene improved as well as the knowledge of OH and the attitude of the caregivers of the residence (Zusman *et al.*, 2014).

With all this we can highlight the importance of the role of the dentist within the society. When programs are carried out to promote health with time and dedication, the results were positive. Papapanou and Lindhe in 2008, classified the accumulation of specific microbiota as one of the etiological factors for the appearance of periodontal diseases, which can be easily prevented if you have the right knowledge.

Finally, in this study, a sensitizing action was promoted in MTC and KHC. The researcher carried out: classes and seminars, games adapted for children, doubts were explained and preconceived ideas were demystified, motivating and instructing actions on oral health care. Lastly, toothbrushes, toothpastes and mouthwashes were given to both children and the adults in charge of them.

#### **IV. 1 Limitations of the study and futures studies:**

Regarding the validity of this study, to avoid inequality in the number of adolescents between the age category, they were divided between less than 10 years and 10 years or more, although the ideal would have been a 50-50 ratio. The same happened with respect to gender, where there was a greater population of girls than boys. The sample could also have been larger, analyzing other orphanages in Tanzania or comparing data with orphanages from other countries. Secondly, it must be taken into account that there was only a single examiner, that the lighting and time conditions were poor and could have affected the observation, as well as the absence of x-ray equipment made it impossible to determine which patients had in reality periodontitis.

## **V. Conclusion**

In conclusion, the findings of the present study suggest the presence of poor oral hygiene habits on the part of the population in question, where the high rates of PI and BoP stand out. It was also possible to observe the existence of a positive association with respect to age and the diagnosis of suspected periodontitis. Given this fact, the incorporation of oral health programs in orphanages in Tanzania seems to be fundamental as a measure against the development of periodontal diseases in children and adolescents.

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Annex 1

Tanzania, 07 / 08 / 2019

**Subject:** Request for authorization to perform the epidemiological study on the periodontal status among the institutionalized youth at Orphanage Mother Teresa of Calcuta, Tanzania.

Dear Sir or Madam,

My name is Berta Barge Urcera, I am a student of the 4th year of the Integrated Master in Dental Medicine at Fernando Pessoa University, Porto, Portugal. I am developing an epidemiological study on the periodontal status among the institutionalized youth in orphanages in Dar es Salaam, Tanzania on the topic *Prevalence of Periodontal Disease among the Younger Population in Tanzania*, under the guidance of Professor Dr. Hélder Oliveira and co-orientation Professor Dr. J. Frias Bulhosa.

This study aims to promote Oral Health of all the children of the institution and classify the periodontal situation of children between the ages of 5 and 18.

I intend to perform a clinical evaluation of the periodontal condition, as well as the completion of a periodontal file, which shall consist of:

1. Clinical Examination;
2. Dental biofilm Index;
3. Bleeding on Probing;
4. Probing Pocket Depths;
5. Gingival Recession.

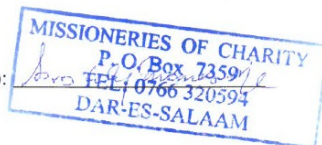
The investigation is **confidential** and **anonymous** and does not present any prejudice to the Institution or to the children. Sensitive data are not questioned. This questionnaire is only intended for the interpretation of data relating to periodontal disease in order to find measures to promote oral health.

The above-mentioned researcher is available for an action to transmit any knowledge about appropriate oral hygiene care to be adopted by the population. It is also available to clarify any doubts regarding this study, and can be contacted at the number +34 636 482 029 or at "[33370@ufp.edu.pt](mailto:33370@ufp.edu.pt)".

I hereby request your authorization to carry out the study. Since your contribution would help me to develop this study, I thank you in advance for your collaboration and availability.

I, (full name) Dr. M. Lily Thomas, M.S., responsible for Missionaries of Charity, authorize the collection of data in the framework of the research study *Prevalence of Periodontal Disease among the Younger Population in Tanzania*.

Responsible (signature):



Fernando Pessoa University - Portugal

**Annex 2**

Tanzania, 16 / 08 / 2019

**Subject:** Request for authorization to perform the epidemiological study on the periodontal status among the institutionalized youth at Kiwalani Orphan Center, Tanzania.

Dear Sir or Madam,

My name is Berta Barge Urcera, I am a student of the 4th year of the Integrated Master in Dental Medicine at Fernando Pessoa University, Porto, Portugal. I am developing an epidemiological study on the periodontal status among the institutionalized youth in orphanages in Dar es Salaam, Tanzania on the topic *Prevalence of Periodontal Disease among the Younger Population in Tanzania*, under the guidance of Professor Dr. Hélder Oliveira and co-orientation Professor Dr. J. Frias Bulhosa.

This study aims to promote Oral Health of all the children of the institution and classify the periodontal situation of children between the ages of 5 and 18.

I intend to perform a clinical evaluation of the periodontal condition, as well as the completion of a periodontal file, which shall consist of:

1. Clinical Examination;
2. Dental biofilm Index;
3. Bleeding on Probing;
4. Probing Pocket Depths;
5. Gingival Recession.

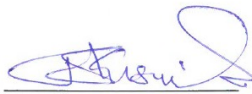
The investigation is **confidential** and **anonymous** and does not present any prejudice to the Institution or to the children. Sensitive data are not questioned. This questionnaire is only intended for the interpretation of data relating to periodontal disease in order to find measures to promote oral health.

The above-mentioned researcher is available for an action to transmit any knowledge about appropriate oral hygiene care to be adopted by the population. It is also available to clarify any doubts regarding this study, and can be contacted at the number +34 636 482 029 or at "33370@ufp.edu.pt".

I hereby request your authorization to carry out the study. Since your contribution would help me to develop this study, I thank you in advance for your collaboration and availability.

I, (full name) JOSEPH MWAKUSYALA, responsible for KIWALANI ORPHAN CENTER SCHOOL, authorize the collection of data in the framework of the research study *Prevalence of Periodontal Disease among the Younger Population in Tanzania*.

Responsible (signature):



Fernando Pessoa University - Portugal

### Annex 3

#### LETTER OF ACCESS TO PARTICIPANTS

Dear Sir or Madam,

My name is Berta Barge Urcera. I am a student of the 4th year of the Integrated Master in Dental Medicine at Fernando Pessoa University, Porto, Portugal. I would like to ask the institution to carry out the epidemiological study on the periodontal status among the institutionalized youth in Dar es Salaam orphanages under the topic *Prevalence of Periodontal Disease among the Younger Population in Tanzania*.

This study is based on the performing of a clinical assessment and the completion of a periodontal file to all children aged 5 to 18 at Mother Teresa of Calcuta, which volunteered to receive periodontal clinical evaluation consisting of: Clinical Examination, Dental Biofilm Index, Bleeding on Probing, Probing Pocket Depths and Gingival Recession. As this evaluation is **confidential** and **anonymous**, it does not present any damage to the Institution. This questionnaire is only intended to perform the interpretation of data relating to periodontal disease in order to find more effective oral health promotion measures.

Whether or not to participate in the study is voluntary. By participating in this study, you shall take into account that:

- The decision to participate implies authorization to collect data on the periodontal status of children;
- The data collected will be confidential and anonymous;
- Contribute to contributing to the improvement of oral health care and quality of life;
- You may leave the study without having to provide any explanation;

Should you have any questions or require any additional information, please contact Berta Barge Urcera at +34 636 482 029 or at “ [33370@ufp.edu.pt](mailto:33370@ufp.edu.pt) ”. Since your contribution would help to develop this study, thank you in advance for your collaboration and availability.

Fernando Pessoa University - Portugal

## Annex 4

### LETTER OF ACCESS TO PARTICIPANTS

Dear Sir or Madam,

My name is Berta Barge Urcera. I am a student of the 4th year of the Integrated Master in Dental Medicine at Fernando Pessoa University, Porto, Portugal. I would like to ask the institution to carry out the epidemiological study on the periodontal status among the institutionalized youth in Dar es Salaam orphanages under the topic *Prevalence of Periodontal Disease among the Younger Population in Tanzania*.

This study is based on the performing of a clinical assessment and the completion of a periodontal file to all children aged 5 to 18 at Kiwalani Orphan Center in Tanzania, which volunteered to receive periodontal clinical evaluation consisting of: Clinical Examination, Dental Biofilm Index, Bleeding on Probing, Probing Pocket Depths and Gingival Recession. As this evaluation is **confidential** and **anonymous**, it does not present any damage to the Institution. This questionnaire is only intended to perform the interpretation of data relating to periodontal disease in order to find more effective oral health promotion measures.

Whether or not to participate in the study is voluntary. By participating in this study, you shall take into account that:

- The decision to participate implies authorization to collect data on the periodontal status of children;
- The data collected will be confidential and anonymous;
- Contribute to contributing to the improvement of oral health care and quality of life;
- You may leave the study without having to provide any explanation;

Should you have any questions or require any additional information, please contact Berta Barge Urcera at +34 636 482 029 or at “ [33370@ufp.edu.pt](mailto:33370@ufp.edu.pt) ”. Since your contribution would help to develop this study, thank you in advance for your collaboration and availability.

Fernando Pessoa University - Portugal

**Annex 5**

STATEMENT OF CONSENT

Considering the "Declaration of Helsinki" of the World Medical Association (Helsinki 1964, Tokyo 1975, Venice 1983, Hong Kong 1989, Somerset West 1996 and Edinburgh 2000)

*Prevalence of Periodontal Disease among the Younger Population in Tanzania*

I, the undersigned, (full name) -----

----- Head of the orphanage (full name)-----

-----, I understood the explanation which has been provided to me regarding the participation in the research that is planned to be carried out, as well as the study in which it will be included. I was given the opportunity to ask the questions that I thought necessary, and I got a satisfactory answer from all of them.

I have been informed that, according to the recommendations of the Helsinki Declaration, the information or explanation given to me has addressed the objectives and methods and, if a clinical practice situation occurs, the expected benefits, potential risks and possible discomfort . In addition, I have been told that I have the right to refuse to participate at any time in the study, without this having the effect of any personal injury.

For this reason, I agree that the method or the treatment, if any, proposed by the researcher will be applied to him.

Date: \_\_\_\_ / \_\_\_\_\_ / 200\_\_

Signature of the person Responsible for the project participant: \_\_\_\_\_

The Investigator in charge:

Name: Berta Barge Urcera

Signature:

Ethics Committee of the University

**Annex 6**

*Prevalence of Periodontal Disease among the Younger Population in Tanzania*

Nº do estudo \_\_\_\_\_ Género \_\_\_\_\_ Idade \_\_\_\_\_

Nome do Orfanato \_\_\_\_\_

**EXAME CLÍNICO**

PAPILA                                    normal  cor alterada  forma alterada  consistência alterada   
 MARGEM GENGIVAL                    normal  cor alterada  forma alterada  consistência alterada   
 GENGIVA ADERIDA                    normal  cor alterada  forma alterada  prob. mucogengivais   
 EXSUDADO (dente nº) \_\_\_\_\_

**DEPÓSITOS DE CÁLCULO**

PIGMENTAÇÃO	nenhum <input type="checkbox"/>	ligeira <input type="checkbox"/>	moderada <input type="checkbox"/>	severa <input type="checkbox"/>
CÁLCULO SUPRA (generalizado)	nenhum <input type="checkbox"/>	ligeira <input type="checkbox"/>	moderada <input type="checkbox"/>	severa <input type="checkbox"/>
CÁLCULO SUPRA (localizado)	nenhum <input type="checkbox"/>	ligeira <input type="checkbox"/>	moderada <input type="checkbox"/>	severa <input type="checkbox"/>
CÁLCULO INFRA (generalizado)	nenhum <input type="checkbox"/>	ligeira <input type="checkbox"/>	moderada <input type="checkbox"/>	severa <input type="checkbox"/>
CÁLCULO INFRA (localizado)	nenhum <input type="checkbox"/>	ligeira <input type="checkbox"/>	moderada <input type="checkbox"/>	severa <input type="checkbox"/>

**MAXILA**

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
PROGNÓSTICO INDIVIDUAL																
PROBLEMAS MUCOGENGIVAIS																
MOBILIDADE INICIAL																
MOBILIDADE T/O SUPORTE																

Prevalence of Periodontal Disease among the Younger Population in Tanzania

ÍNDICE DE PLACA														ÍNDICE DE HEMORRAGIA																	
VESTIBULAR	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28															
PROF.SONDAGEM INICIAL																															
PALATINO	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28															
PROF.SONDAGEM INICIAL																															
VESTIBULAR	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28															
RECESSÃO GENGIVAL INICIAL																															
PALATINO	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28															
RECESSÃO GENGIVAL INICIAL																															
Lesões de Furcação .....																															
Outras .....																															

Prevalence of Periodontal Disease among the Younger Population in Tanzania

ÍNDICE DE PLACA

ÍNDICE DE HEMORRAGIA

18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
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VESTIBULAR      18   17   16   15   14   13   12   11   21   22   23   24   25   26   27   28

PROF.SONDAGEM INICIAL

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PALATINO      18   17   16   15   14   13   12   11   21   22   23   24   25   26   27   28

PROF.SONDAGEM INICIAL

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VESTIBULAR      18   17   16   15   14   13   12   11   21   22   23   24   25   26   27   28

RECESSÃO GENGIVAL INICIAL

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PALATINO      18   17   16   15   14   13   12   11   21   22   23   24   25   26   27   28

RECESSÃO GENGIVAL INICIAL

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Lesões de Furcação .....

Outras .....

Prevalence of Periodontal Disease among the Younger Population in Tanzania

**MANDIBULA**

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
PROGNÓSTICO INDIVIDUAL																
PROBLEMAS MUCOGENGIVAIS																
MOBILIDADE INICIAL																
MOBILIDADE T/O SUPORTE																

DIAGNÓSTICO:

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