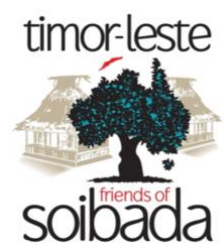


KOSE NEHAN SOIBADA

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Friend of Soibada Charity | Kose Nehan Project | In partnership with the directors of Kose Nehan

Friends of Soibada would like to thank Dr Martin Hall and
Dr Bradley Christian (Directors of Kose Nehan) for their
support and advice in the implementation of this program.

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Introduction:

Soibada is a remote village in Timor-Leste most known for its past role in the Timor-Leste educational system, being the home of the first college in Timor-Leste. Soibada was almost entirely destroyed during Indonesian occupation and the community of Soibada now face shocking living conditions and border complete poverty. Over the past 13 years, Friends of Soibada has been working with the community of Soibada to provide support across several project areas including, but not limited to, education and health and medical. Friends of Soibada recognises that through friendship long term change can be affected.

The Kose-Nehan project was implemented in partnership with the education and health and medical projects teams from Friends of Soibada after representatives from each team noticed that there was almost a complete absence of tooth brushing in Soibada. After discovering this, team members from Friends of Soibada contacted representatives of the Timor Dental Program as well as other Timor-Leste Friendship groups. The organisation placed Friends of Soibada in contact with the directors of Kose Nehan, Bradley Christian and Martin Hall.

The Soibada Kose Nehan project is a run-off project from the Kose Nehan project started in Timor-Leste by North Richmond Community Health. The directors of Kose Nehan, Bradley Christian and Martin Hall, have provided advice to Elijah Thomson (Friends of Soibada Health and Medical Project Manager) on how to best implement the project within Soibada, Timor-Leste. With the help of Timorese dental technicians and assistants, the Kose Nehan project was rolled out over an eight-day period across five primary schools representative of the greater Soibada area. Due to the number of students across Soibada, estimated at over 1000 in primary school alone, the Kose Nehan project was limited to years one and two only. Friends of Soibada hope that Kose Nehan can eventually be rolled out across all primary schools and secondary schools within Soibada. Although, it was decided that the project would be best implemented initially in a smaller population.

Data from the project will be used to gain an understanding of what proportion of students are affected by dental caries. The data will then be used to apply for grants and support that may help to improve dental hygiene in Soibada. The data will be fed back to the Kose Nehan directors for their use and dispersion.

Aim:

To implement the Kose Nehan project in Soibada across five primary schools and to collect data on the prevalence of caries amongst primary school students. The program is inclusive of SDF application, the provision of toothbrushes, and the relaying of education regarding the project.

Method:

The Kose Nehan clinic should run as follows across each primary school:

1. Discuss project with school director, teachers, and parents.
2. Provide education to target year group using Kose Nehan Manual and picture book to assist.
3. Distribute toothbrushes and toothpaste to the students one year group at a time.
4. Instruct students on how to brush with correct technique one year group at a time.
5. Observe students brushing teeth using a sing-along song to assist with timing and technique one year group at a time.
6. Wash toothbrushes only, not the student's mouth, following brushing.
7. Apply SDF to the teeth of the students one year group at a time.
8. Use a rough grouping when collecting data on the distribution and grading of caries.

The Carie Grading Scheme:

- a. Low decay: one small carie or one tooth with some decay was classed as mild decay.
- b. Moderate decay: two-to-three caries and sparse decay was classed as moderate.
- c. High decay: more than three caries and significant decay on nearly every tooth.

Feed data back to the administration officer to be noted next to the child's name.

9. Following clinic, review collected data and add to spread sheet.

This project kept toothbrushes in a toothbrush bristle case (figure 1) as opposed to water bottles.



Fig 1. Toothbrush bristle case

Discussions on 3/10/23 with community leaders identified the location of the first program to be held within the parish hall. This was thought to allow the program to be implemented without disruption to schooling.

Due to the proximity of the pilgrimage to Aitara, the school day was cut short from 0900-1200. The pilgrimage to Aitara happens during the month of October annually and students are required to assist in preparations from 1200 onwards.

Education:

The program began formally at 0930 with oral education. Years 1 and 2 were lined up for a lesson by Anna Tilman (Dental Technician). The lesson covered the Kose Nehan manual as well as the Kose Nehan booklet. Following this short discussion, the students were instructed on how to brush their teeth with correct technique and a song was sung to assist with the timing of the teeth brushing as well as the actions. Toothbrushes were handed out along with toothpaste and a small amount of water to wet the bristles. Using the song, the students followed the directions of the leader to brush their teeth.

Following the teeth brushing, the brushes were washed with water, although this was difficult to achieve in a timely fashion due to the number of students present. It is best to do one class at a time rather than two-year groups as it was hard to relay all the required information and maintain the student's attention. For future Kose Nehan clinics, it may be better to line students up after teeth brushing and get them to wash their toothbrush under a pump operated water bottle. This may minimise wasted water and ensure that this process is achieved quickly.

SDF application:

Ten students were placed in a room at one time where their name, age and class group were noted down by Ana Paula (Dental Assistant). During this time, the student's toothbrushes were labelled to ensure that the toothbrushes were identifiable. A quick check of the teeth was performed by Ana Paula where caries were identified. If no caries were identified, the students bypassed the SDF application station. If caries were identified, they were sent through to the SDF application station within the parish hall. Here Anna Tilman applied the Riva Star™ SDF to the identified caries and this was noted next to the child's name. Additionally, the need for a dentist review and specialist dental work was noted next to the child's name.

Overall, the system worked successfully, and 50 students were incorporated in the program during the first day. The system identified below (figure 2) should be replicated for future clinics.

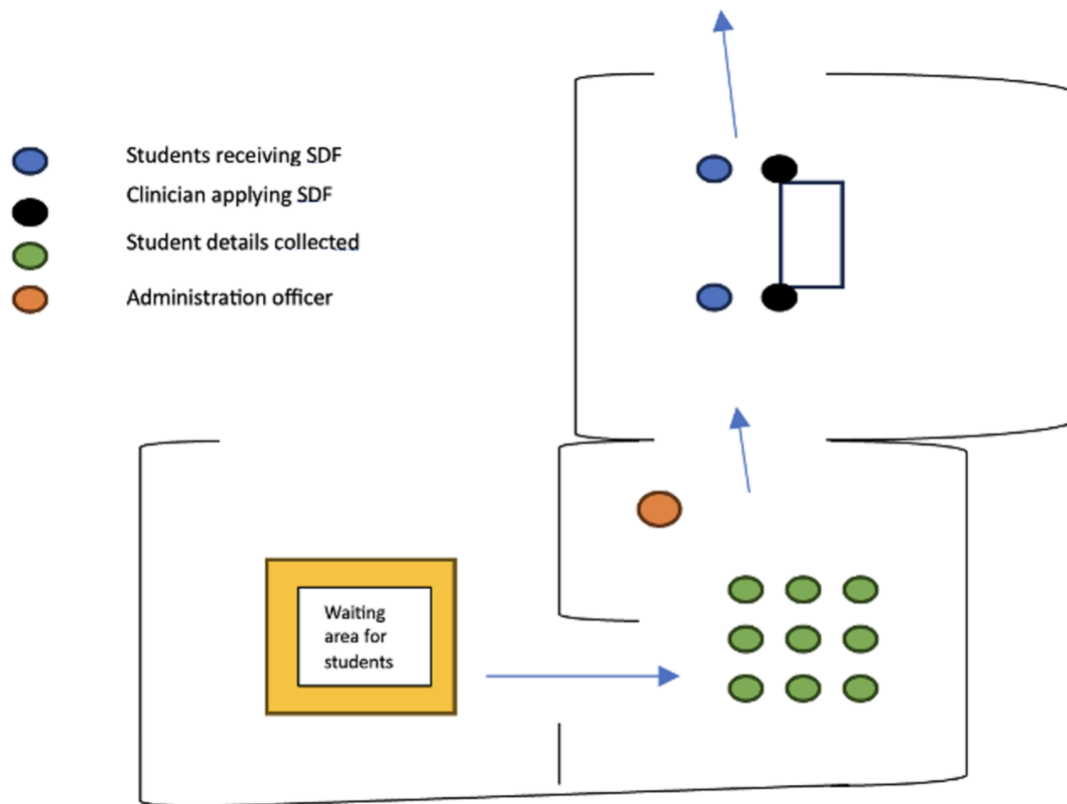


Fig 2. Ideal student flow

Samoro- Year Two - 10/10/23

The Kose Nehan dental clinic was for year two of Samoro Primary school and was held within the school classroom. This allowed students to be present for the feeding program rather than missing it due to the dental program being held in a place remote to the school (i.e. parish hall).

The school coordinator was briefed using the Kose Nehan manual and the participant information statement and following this agreed to allow participation of year two within the program. Their signature and number was recorded on the director consent form and will be passed-on to future Kose Nehan clinic members.

Samoro has the most students when compared with other schools in Soibada. Therefore, the students had to be split up into smaller groups for education to allow for better control over the class. Although the year two students did receive education on the 4/10/23, the Kose Nehan team decided to repeat the education and tooth brushing component to ensure retention of information. The students were educated by Anna Tilman using the Kose Nehan Manual as well as the Kose Nehan picture book. The students then brushed their teeth under supervision of the Kose Nehan team to ensure proper technique. A two-minute-long song about toothbrushing was also played during this period.

Following tooth brushing, the students were led back into the classroom where their toothbrushes were collected, and the students were reviewed by Ana Tilman. Ana Tilman applied SDF to the students with caries and reported to Anna Paula the carie grade per student.

Salau – Year one- 5/10/23

The clinic was held in Salau Primary School with permission from the school principal. On presentation to the school the dental nurses and charity representative came first to the teacher's office where education was given about the program and there was an opportunity for question and answer. Following this period, the school principal signed the consent form.

It was decided, following the clinic in Samoro, that the entire group of year one and two students should be separated into two smaller groups. This could allow for better control over the education and minimised disruptions to learning.

Year one was first provided with education with the help of the Kose Nehan picture book and Kose Nehan manual. The education was led by Anna Tilman with a charity representative holding pictures from the Kose Nehan book during her lesson. The combination of a visual aid along with the verbal lesson may have added to information retention. Following education, the students were led from the classroom to an open area so that the teeth cleaning portion of the clinic could be conducted without disrupting other classes. The students were lined up and provided with a toothbrush. The toothbrush was moistened using a water from a bottle (*To minimise waste of water, a partially screwed on cap allows for a slow dribble of water*). Toothpaste was added to the toothbrushes. Once all children had a toothbrush with toothpaste, a two-minute-long brushing teeth song was started which helped gamify the cleaning. Clinic nurses and school teachers stood at the front of the students and modelled correct technique during this time.

Once the teeth brushing was complete, the students spat the toothpaste out and the toothbrush was washed and placed in a brush case (Figure 2). Toothpaste was not washed from the mouth to ensure that fluoride in the toothpaste could take maximum effect.

The students were led back to the classroom where the SDF was applied one at a time. The student's name was collected by the administration officer where their name was written on their toothbrush. The administration officer then directed the student to the clinic dental technician who checked the student's tooth and applied SDF. Dental decay was noted down next to the student's name per the carie grading scheme.

Tasi Fatin – 6/10/23

Tasi Fatin is the most remote village of Soibada. There is one primary school within the village with combined classes of grades one to six.

The clinic team met with the school director and teachers in the morning. Education was provided to the director and teachers by Ana Tilman using the Kose Nehan Manual and

participant information statement. Following this education, the director signed the school consent form.

The clinic began with education which was provided to the entire school (approximately 60 students). The Kose Nehan manual was used as a guide whilst Ana Tilman verbally distributed information. A team member stood next to Ana and displayed key pictures from the Kose Nehan picture book. A set of model teeth were also used to display correct brushing technique, this was found to be helpful to the students.

Following education, year one (12 students) were led out into the courtyard to brush their teeth along to a tooth-brushing sing-along song. The song aided in ensuring adequate duration of the teeth brushing and provided direction on when to move on to different areas of the mouth. Toothbrushes were also distributed during this time. Once the students had finished brushing their teeth, they were led into a classroom where Ana Tilman was ready to perform SDF application. The names of the students were noted down by Anna Paula and the students name was written on their toothbrush. The student was then directed to the dental technician for SDF application. The teeth were graded according to the dental carie grading scheme and this data was collected and compiled by Ana Paula and Elijah Thomson at the conclusion of the clinic. This same procedure was repeated with grade two and three as well as with the teachers.

Manu Fahe – 9/10/23

Manu Fahe Kose Nehan clinic was held within the local public school, E.B.F Maun Fahe. Years one and two were incorporated into the program. Firstly, Education was dispersed to the teaching faculty by way of verbal and written information (Kose Nehan Manual and Participant information statement) and the director signed the consent form.

Following this, arrangements were made for both years to be placed into one classroom where the education would be given. Anna Tilman provided the education to the students using the Kose Nehan manual and a Friends of Soibada representative stood next to her to display concordant pictures from the Kose Nehan Picture book. Following this short lecture, Anna Tilman demonstrated correct brushing technique on a tooth model.

For the teeth brushing section of the program, the students split into years again. Year one brushed their teeth first to the musical aid. Each student as well as the teacher were provided with a toothbrush and actively participated in the program. This year group then went directly into SDF application. After the feeding program and a short break, year two underwent the same process; tooth brushing followed by SDF application.

The teachers were left with a Kose Nehan picture book as well as extra toothbrushes and toothpaste. The teachers were instructed again about the importance of keeping the student's toothbrushes at school and conducting the tooth brushing component of the program twice daily.

Results

Samoro Primary School – Year One 4/10/23 | Year Two 10/10/23

88 students from Samoro Primary School were incorporated into the program from years one (52 students) and two (36 students). All these students were provided with a toothbrush and toothpaste, education regarding the Kose Nehan project, and a dental check-up from the dental technician +/- SDF application. Toothbrushes were given to the teachers for the absent students along with six spare toothbrushes and one spare toothpaste tube for each class.

Samoro Year One

Amongst those reviewed (52), 44 were found to have caries and underwent SDF application. The distribution of the carie grade is indicated in the chart below (Figure 3). Of the students present, 84% had dental caries (16% had good teeth, 2% had low caries, 4% had moderate caries, and 78% had high caries). 56 toothbrushes were distributed to the students.

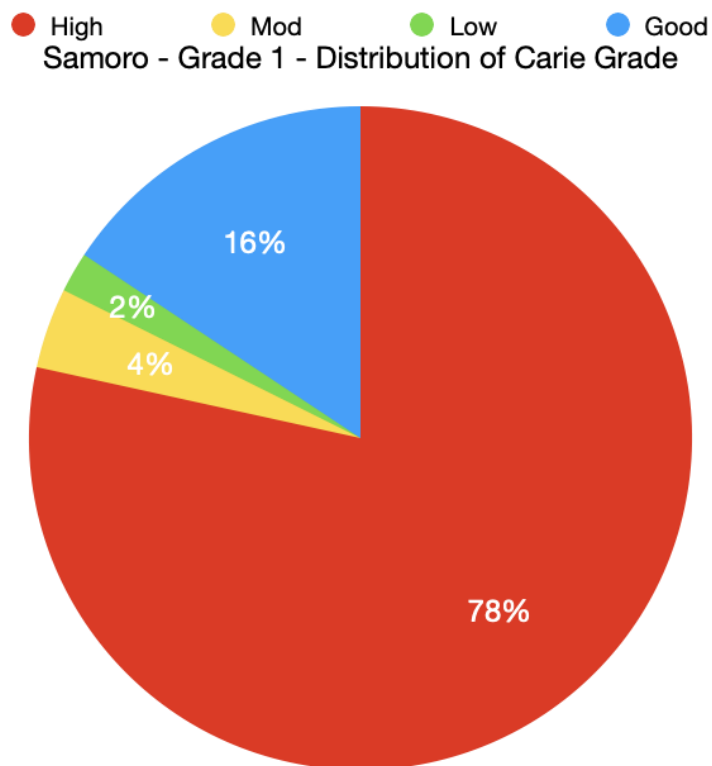


Figure 3

Samoro Year Two

Amongst those reviewed (36), 32 were found to have caries and underwent SDF application. The distribution of the carie grade is indicated in the chart below (Figure 4). Of the students present, 89% had dental caries (11% had good teeth, 33% had low caries, 31% had moderate caries, and 25% had high caries). 36 toothbrushes were distributed to the students including seven to the teachers for absent students.

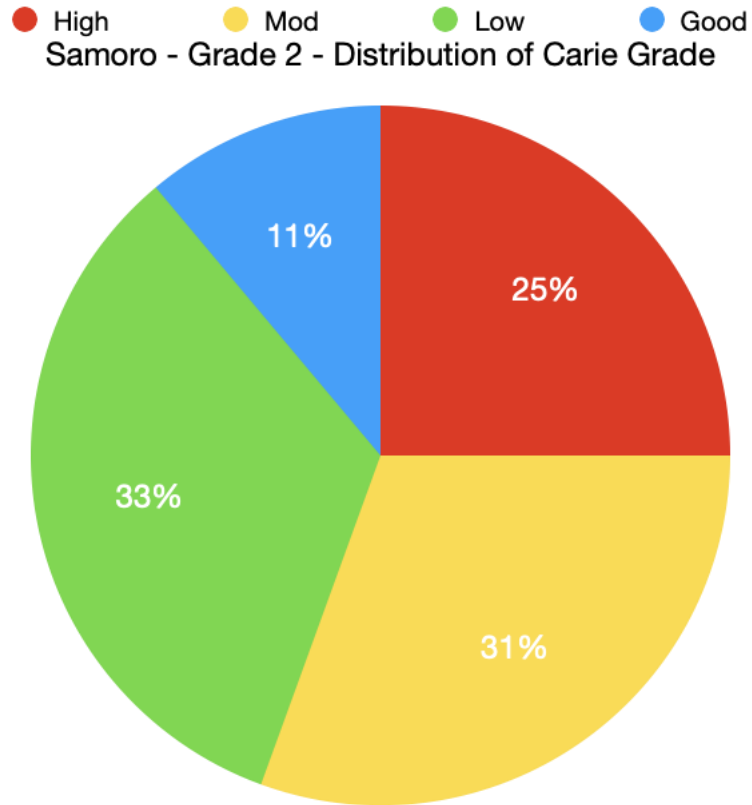


Figure 4

45 students from Salau primary school were incorporated into the program from years one and two. All these students were provided with a toothbrush and toothpaste, education regarding the Kose Nehan project, and a dental check-up from the dental technician +/- SDF application. Toothbrushes were given to the teachers for the absent students along with six spare toothbrushes and one spare toothpaste tube for each class.

Amongst those reviewed (52), 37 were found to have caries and underwent SDF application. The distribution of the carie grade is indicated in the chart below (Figure 5). Of the students present, 84% had dental caries (16% had good teeth, 18% had low caries, 42% had moderate caries, and 24% had high caries). 52 toothbrushes were distributed to the students including seven to the teachers for absent students.

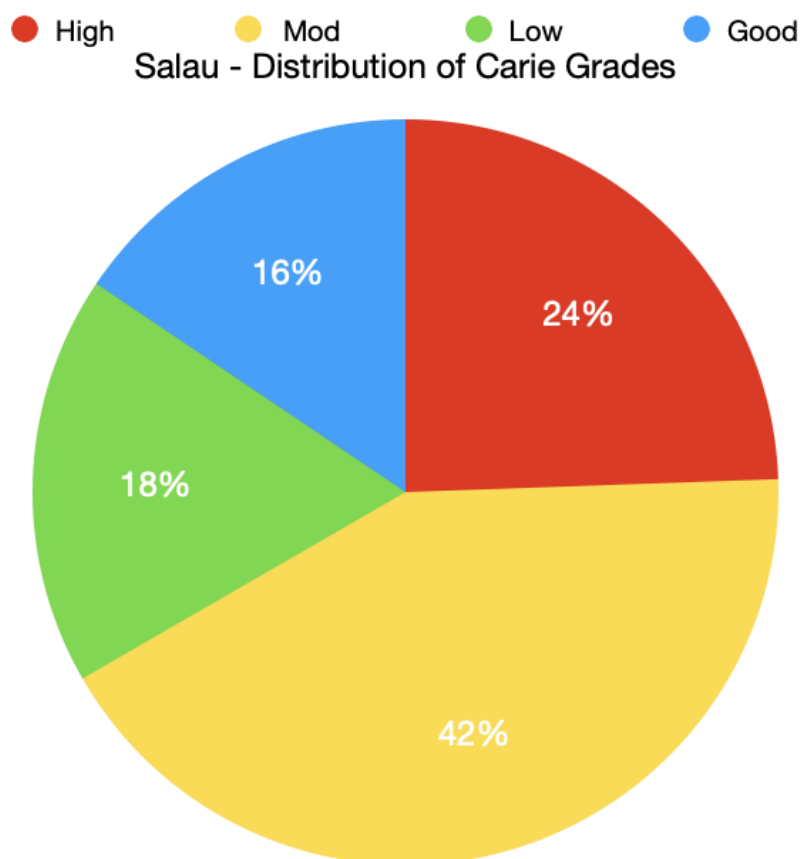


Figure 5

34 students were incorporated into the program from years one, two, and three of Tasi Fatin primary school. Three teachers were also included. All these students and teachers were provided with a toothbrush and toothpaste, education regarding the Kose Nehan project, and a dental check-up from the dental technician +/- SDF application. Toothbrushes were given to the teachers for the absent students along with six spare toothbrushes and one spare toothpaste tube for each class.

Amongst the students reviewed (34), 26 were found to have caries and underwent SDF application. The distribution of the carie grade is indicated in the chart below (Figure 6). Of the students present, 83% had dental caries (17% had good teeth, 43% had low caries, 26% had moderate caries, and 14% had high caries). 34 toothbrushes were distributed to the students. Three toothbrushes were distributed to the teachers, of which, all underwent SDF application (of the teachers: 66% had low caries, 33% had high caries).

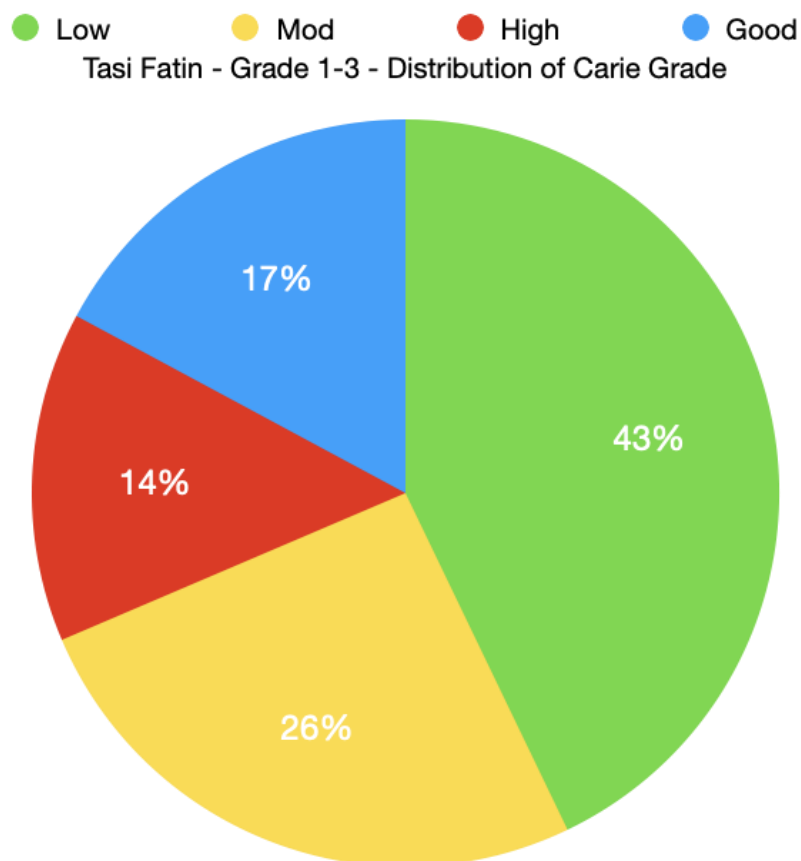


Figure 6

29 students from Manu Fahi primary school were incorporated into the program from years one and two. All these students were provided with a toothbrush and toothpaste, education regarding the Kose Nehan project, and a dental check-up from the dental nurse +/- SDF application. Toothbrushes were given to the teachers for the absent students along with six spare toothbrushes and one spare toothpaste tube for each class.

Amongst those reviewed (29), 25 were found to have caries and underwent SDF application. The distribution of the carie grade is indicated in the chart below (Figure 7). Of the students present, 86% had dental caries (14% had good teeth, 28% had low caries, 31% had moderate caries, and 28% had high caries). 29 toothbrushes were distributed to the students and one to each teacher for grades one and two.

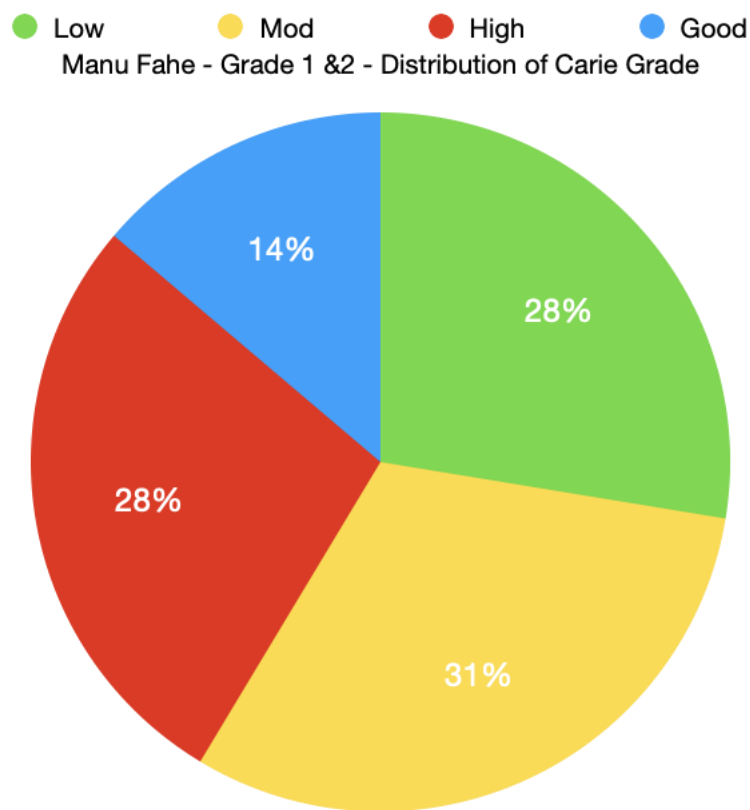


Figure 7

Soibada- Total Students

196 students from grades one and two were seen in a Kose Nehan Clinic over 5 days in October 2023. The clinics took place in 4 primary schools: Samoro, Tasi Fatin, Manu Fahe, and Salau.

253 toothbrushes were distributed to the students and teachers within Soibada. 164 students were found to have at least one dental cavity and received SDF. As a percentage of the entire population of students seen in clinic, 84% were found to have a dental carie [Figure 8] (37% high, 26% moderate, 22% low, 15% good teeth) [Figure 9]. Samoro school had the highest carie prevalence at 86.5% [Figure 10].

Percentage of total students with caries vs without

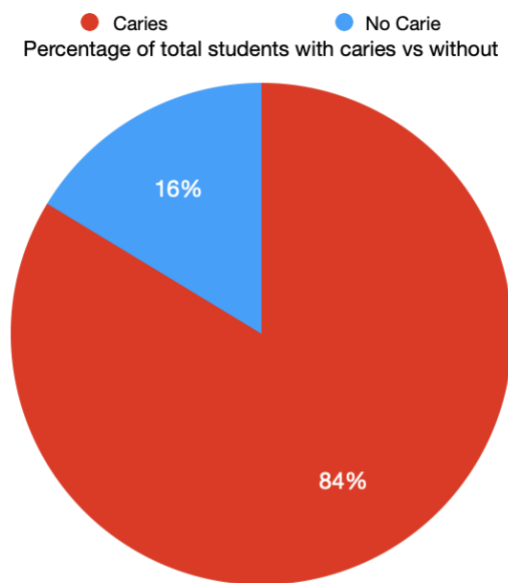


Figure 8

Soibada - Distribution of Carie Grades

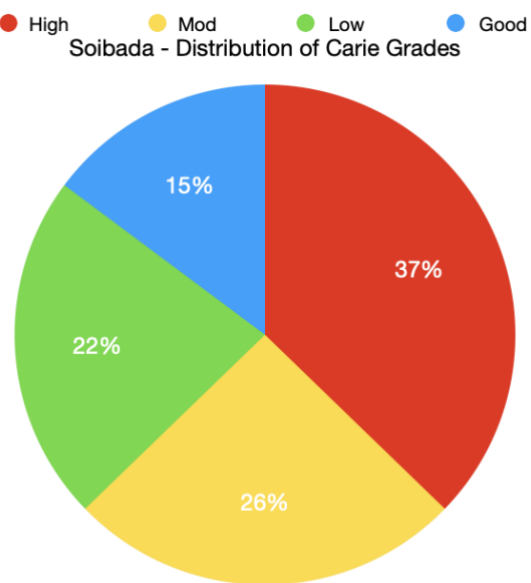


Figure 9

Soibada - prevalence of dental caries

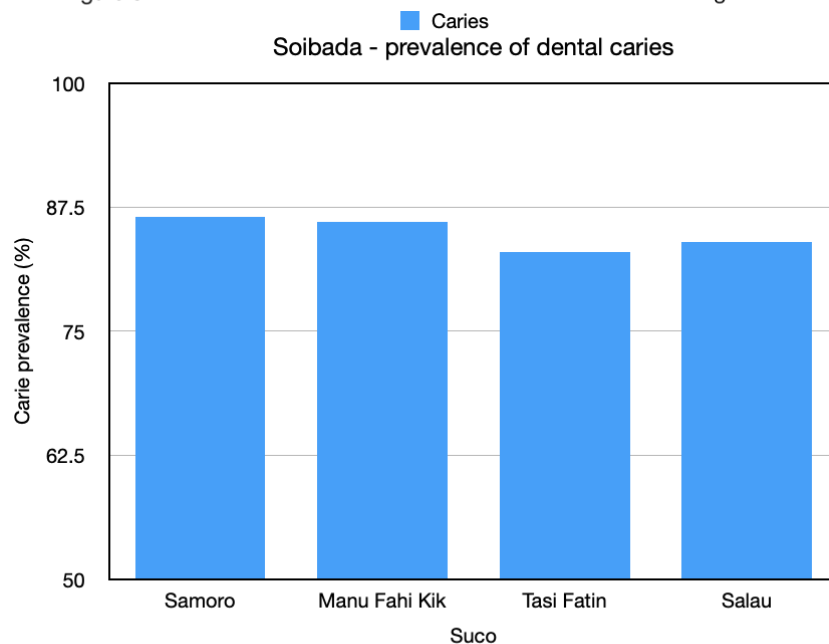


Figure 10

Discussion

The Kose Nehan program has been implemented in Soibada with the chief purpose of curbing the prevalence of dental pain and dental caries within the primary school age groups. Currently, there is a very limited understanding of the role of dental hygiene in health amongst the Soibada community. Kose Nehan moves to change this reality through the provision of tooth brushing information and information surrounding healthy food choices and health-wise behaviours. The role of SDF application in this program is to arrest cavity development in the period where the children are learning how to incorporate tooth brushing and good dental hygiene into their day-to-day lives.

Year one and year two were chosen as the target group of this Kose Nehan program as they will likely be in primary school for a further four to five years allowing for repetition of the Kose Nehan program within the same school setting throughout the years. Additionally, limiting the introduction of the Kose Nehan project to two year-groups allowed for better control of the program as team-members worked to iron out problems that arose with the introduction of the program. Groups of students should be limited to 40 students to allow for easier provision of education. It was found that groups over 50 students became difficult to control in a manner conducive to education. Smaller groups stayed focused for longer and allowed the Kose Nehan clinic members to have a greater focus on the individual, ensuring that their tooth brushing technique was appropriate and that they had retained imparted information.

Having a proficient interpreter is integral to the success of the Kose Nehan project. Ideally, a Timorese dental technician or assistant should be employed as they have a good understanding of medical terminology and health promotion principles relevant to the Kose Nehan project and can employ these understandings in a culturally sensitive manner.

The original Kose Nehan project had the students keeping their toothbrushes in an empty plastic bottle, bristle down. For this Kose Nehan project, the Friends of Soibada team trialed toothbrush covers as it was decided that these may offer more sanitary protection of the toothbrush. However, there is a potential that the toothbrush covers will get lost or broken meaning that they are no longer used, leaving the brush to be exposed to the environment. Extra toothbrush covers were provided to overcome this potential problem. Furthermore, bottled water is expensive and more burdensome on the environment with large wastes incurred when the bottle needs to be discarded. However, toothbrush covers can be easily washed and reused and have a smaller waste area when it comes to disposal.

The education component of the program is extremely important as it equips the students and teachers with the ability to make health wise decisions. Ultimately, this will be what affects prolonged changes in health amongst the Soibada population. It was found that having two instructors was helpful during the education as one person (Tetun speaking) explained the Kose Nehan manual whilst the other person held up the Kose Nehan picture book and provided a visual aid which matched what the other educator was teaching on. This helped to teach through different methods, both visual and auditory. Furthermore, utilising a tooth model to demonstrate good tooth brushing technique helped students to visualise the tooth brushing actions before they were to do it themselves.

During the toothbrushing component of the program, a member of the Friends of Soibada team suggested that the children may be receptive to a musical aid when brushing their teeth. Originally, this member sang a simple song that the students brushed their teeth to. This evolved into playing a song over a speaker to the students as they brushed their teeth. This song was in English with instructions on how to brush and went for two minutes allowing the students to properly time their brushing. This was well received by the students and helped to gamify the tooth brushing and helped the students to remember the next steps to tooth brushing. It would be worth looking into developing a Tetun version of a tooth brushing song which the students would understand.

Each student was reviewed by a dental nurse to determine whether they had caries or not. The students that were identified to have caries received SDF treatment to arrest carie development. On average, 84% of students reviewed had a dental carie which is most likely due to the students' poor dental hygiene practices and lack of understanding surrounding dental health. Of note, a child with a high dental carie grade was 5.6 x more likely in Samoro primary school (found in the centre of Soibada) than in a more remote village like Tasi Fatin. This may be because of the easier access to sugary foods in Samoro than in Tasi Fatin. It was observed that many of the children in Samoro were eating popping candy frequently. This activity was not observed in any other school and is likely due to the lower socioeconomic status within other primary schools.

Overall, the Kose Nehan project was well received by all the sucos in which it was introduced. Each director was happy to have the program within their school and wanted to see the program flourish and continue in the long term. Multiple directors and teachers pressed the importance of having continual supply of toothbrushes and toothpaste. The directors also wanted reassurance that a dental nurse would return to check on the program. This discussion suggests that the teachers see the benefit of the program and are concerned about the current state of their students' teeth. One teacher from Samoro stated that that she was excited by the program as it was addressing a big problem in her classroom where children are less engaged due to ongoing dental pain.

The Kose Nehan team had the opportunity to review Samoro school a second time, five days after initial implementation of the program. The dental technician was able to check-in with the teacher of year one and found that there had been good compliance with the program thus far with each student performing the tooth brushing after the food program in the morning and before returning home. All the toothbrushes that were handed out five days earlier were still within the classroom and kept by the teacher. Although this was a small time between visits, this gave the Kose Nehan team reassurance that the program was received well by the community and would likely be successful if proper support was given.

Going forward:

With the program in its early stages in Soibada, Friends of Soibada should look to closely support the schools in the continuation of the Kose Nehan project. It is likely that the early stages of the program present the biggest barrier to long term change. This is because teachers may abandon the project promptly if it becomes a hassle to complete or if they feel unsupported in their endeavours.

Therefore, Friends of Soibada must find a representative from Soibada who can regularly (monthly) call each director of the primary school recruited into the program. The purpose of these phone calls would be to ascertain whether the students are continuing the twice-daily tooth brushing and whether there have been any barriers to Kose Nehan continuation within the village. This information must be fed back to the Friends of Soibada Health and Medical Project team so that it can be promptly rectified.

The students should be provided with a new toothbrush every three-months, per Dr Hall's and Dr Christian's (Kose Nehan Directors) recommendations based on their previous Kose Nehan programs. It would be beneficial to secure a continual supply of toothbrushes from a larger dental hygiene company that would be willing to donate toothbrushes and toothpaste.

Additionally, six monthly SDF application would be ideal to ensure best effect on the arrest of caries (American Dental Association 2023). A dental nurse/technician should be employed to visit the schools to reapply the SDF and to check up on the tooth brushing branch of the program.

Limitations:

This Kose Nehan project was limited by the lack of trained dental technicians who could apply SDF and perform check-ups. In the future, a second dental technician or nurse would be helpful.

Additionally, the grading of low, mod, and high caries was created through consensus amongst the dental technician and dental assistant present. This grading scheme is not supported by any literature and therefore is limited in its scientific significance. However, even without the carie grading scheme, the data collected on carie prevalence (one or more carie vs no carie) is significant.

Conclusion:

The data collected in the Kose Nehan project in Soibada supports the conclusion that greater than 84% of students in years one and two within Soibada have at least one dental carie. This data suggests that the community of Soibada may see a great improvement in dental health and a decline in dental pain through the introduction of tooth brushing education through a format like Kose Nehan.

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