GCDFund Dental Student Elective Project 2013

1. Elective Project

Training as an undergraduate dental student in the country’s capital for 4 years has provided me with an extensive outlook on the dental treatment needs of the British population. I have developed my clinical and communication skills whilst treating patients of varying age, ethnicity and socioeconomic background.

For my elective, I decided to explore a clinical environment different to London teaching hospitals, where I could use my current skills and knowledge to advantage those in desperate need of dental care. I believe Western Province in Papua New Guinea (PNG) is such an environment. As an active promoter of good oral hygiene, I aimed to improve the dental health of others while broadening my clinical experience.

For the 6 million PNG inhabitants, the word “dentist” is associated with an unknown magical practice. Despite global advances in the prevention of dental caries, its incidence in PNG remains unacceptably high. I volunteered aboard the YWAM Medical Ship and was an integral part of a healthcare team dedicated to addressing the dental needs of individuals with limited, if any, access to dental care (Fig. 1).

Aims

- To increase awareness and educate the population regarding dental caries
- To identify the severity of dental caries in adults
- Improve oral hygiene techniques and promote oral health.

Methods

Since 2010, YWAM volunteers have delivered health services to 594 villages in PNG. This 2-week project involved oral health education, examination and treatment of adults from 6 different villages along the Bamu River in Western Province, PNG (Fig. 2). Inclusion criteria were life-long residents of the village, individuals in pain and those requesting treatment. Land-based triage occurred prior to treatment on the ship.

Tutorials were provided via village interpreters on the ship, and preventative dietary advice was given (Fig. 3, 4). Each participant received a toothbrush and toothpaste after tooth-brushing technique was demonstrated (Fig. 3).

Examinations included visual and tactile caries detection methods followed by necessary treatment only by one clinician, eliminating intra-operator variability (Fig. 4).

Severity of dental caries was identified using the DMFT caries index (Klein et al., 1938 as cited by Daly et al., 2013), which involved counting the number of decayed (D), missing (M) and filled (F) teeth per individual. Mean DMFT scores per village were calculated.

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Fig. 2. Papua New Guinea is located north of Queensland, Australia (A). The area highlighted by black box is magnified in B. This outreach was aimed at villages situated along the Bamu River (B). The remote location and tortuous river has resulted in the treatment needs of these villagers to be overlooked. One of the villages, Emeti, is indicated by the red pin.

Fig. 3. Demonstration of tooth-brushing technique (left) and individually tailored oral hygiene instruction (right) in order to improve oral health.
Results

- Oral health education

Teaching sessions were very well received and participants possessed sufficient manual dexterity needed to brush their teeth effectively, probably due to weaving straw baskets. Over 500 villagers were advised to reduce frequency of sugar intake, maintain a balanced diet and stop chewing betel quid, which was the most challenging as betel quid use is considered a cultural norm in PNG. Our success with oral health education was partly due to excellent translation from village interpreters.

- Severity of caries

The mean DMFT score for villages ranged from 5.6 to 7.8 with an overall average of 6.9 (Fig. 5, Table 1). Decayed teeth accounted for over 50% of the total DMFT score in all villages, indicating that active disease continues to affect a substantial number of teeth in rural villagers (Table 1). Individuals from Emeti had the greatest number of missing teeth, probably as a result of extractions performed in their village health centre. The absence of fillings in individuals from Torobina combined with the high mean DMFT score suggests that caries is most extensive here, leading to tooth extraction rather than restoration.

- Dental Treatment

This predominantly involved extraction of grossly carious teeth (Fig. 6). Some restorative work was also provided. Surprisingly no oral soft tissue lesions were identified despite regular use of betel quid by individuals.
**Mean DMFT Score**

Fig. 5. Mean DMFT scores in 6 different villages along the Bamu River in Western Province, PNG.

<table>
<thead>
<tr>
<th>Village</th>
<th>Participants</th>
<th>Total Decayed (D)</th>
<th>Total Missing (M)</th>
<th>Total Filled (F)</th>
<th>Total DMFT Score</th>
<th>Mean DMFT Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torobina</td>
<td>25</td>
<td>125</td>
<td>70</td>
<td>0</td>
<td>195</td>
<td>7.8</td>
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<tr>
<td>Bamio</td>
<td>44</td>
<td>132</td>
<td>113</td>
<td>1</td>
<td>246</td>
<td>5.6</td>
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<tr>
<td>Aniadai</td>
<td>20</td>
<td>68</td>
<td>39</td>
<td>10</td>
<td>117</td>
<td>5.9</td>
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<tr>
<td>Emeti</td>
<td>54</td>
<td>200</td>
<td>179</td>
<td>10</td>
<td>389</td>
<td>7.2</td>
</tr>
<tr>
<td>Miruwo</td>
<td>19</td>
<td>88</td>
<td>55</td>
<td>6</td>
<td>149</td>
<td>7.8</td>
</tr>
<tr>
<td>Oropai</td>
<td>17</td>
<td>70</td>
<td>29</td>
<td>10</td>
<td>109</td>
<td>6.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>110</td>
<td>426</td>
<td>302</td>
<td>36</td>
<td>764</td>
<td>6.9</td>
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Table 1. Summary of total DMFT scores and their components in individuals from 6 different rural villages in Western Province, PNG.

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**Dental Procedures**

Fig. 6. Breakdown of the different dental procedures which were carried out on the ship. Total number of procedures performed was 411.

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Conclusions

During this project, we provided oral hygiene and dietary advice to over 500 villagers and dental treatment to 411 individuals. Our data confirm that there remains a desperate need for oral health education and treatment in Western Province. With only 32 dentists in PNG, the population requires greater access to dental care and the figures indicate severe disease, which is preventable.

Two major barriers to achieving oral health are poor access to dental care and lack of knowledge. This project addressed both these issues by providing dental treatment and oral health education in remote areas, the success of which was largely due to excellent translation from village interpreters. The tutorials were very well received and despite the alien nature of the toothbrushes, the villagers seemed keen to learn from us.

There was a stark contrast in attitudes towards dental professionals and treatment between UK and PNG. While dental complaints and litigation continue to rise in the UK, we were associated with a sense of divinity and were referred to as “answers to God’s prayers” in PNG. This was evident in the gratitude of the people and their immense respect towards us.

The DMFT data collected confirm that dental caries, a preventable disease, continues to be a significant problem in PNG. The mean DMFT score for villages ranged from 5.6 to 7.8 with an overall average of 6.9. Decayed teeth accounted for over 50% of the total DMFT score in all villages, indicating that active disease continues to affect a substantial number of teeth in rural villagers. As a result of the widespread caries, dental treatment predominantly involved extraction of grossly carious teeth.

While Western nations have successfully developed strategies to prevent dental caries, less economically developed countries such as PNG remain desperately in need of oral health education and treatment. These data are valuable for analysis of trends in oral disease and oral health inequalities in conjunction with data from previousYWAM outreaches.

These data are valuable for analysis of trends in oral disease and oral health inequalities in conjunction with data from previousYWAM outreaches. In future, this may enable better identification of high risk groups so that preventive interventions can be appropriately targeted such as application of fluoride varnish for school children.

Further work

Future work should involve data collection for children enabling global comparison of disease severity but this will be difficult as the children were very reluctant to seek dental treatment on board the ship. Further, population size in the study should be increased to improve data validity.

Due to the skewed distribution of caries prevalence, future investigations should use the significant caries index (SCI) to focus attention on individuals with highest caries scores in each population and explore the aetiology of caries (Bratthall, 2000; Campus et al., 2003).

Our method does not account for teeth missing due to reasons other than caries such as trauma or periodontal disease (Daly et al., 2013). Thus other indices like BPE or presence of bleeding pockets should also be used in future to assess periodontal disease status.

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2. Social Context

PNG is ranked 90 out of 108 countries in the United Nations Human Poverty Index. Life in the rural villages is extremely basic; clean drinking water is sadly regarded a luxury. The combination of high temperatures, poor hygiene and lack of proper sanitation enables diseases such as TB and malaria to flourish. It is therefore not surprising that most villagers have never seen, let alone used a toothbrush.

The people are kind and welcomed us into knee-deep mud with song, dance and flower garlands, referring to us as their “answers to God’s prayers”. They are a happy community and share their limited resources. Many individuals are skilled in canoe-building, allowing travel to neighbouring villages.

While English is an official language of PNG, there are approximately 806 other languages. Providing oral hygiene advice to individuals was a challenge to say the least. The cultural diversity was evident when we had to repeatedly learn dental vocabulary in various local dialects upon arrival at new villages.

Everyone was thankful for our work and respected us. They were fearless despite the alien nature of the ship and dentists. It was encouraging to note no differences in cross infection control compared to the UK. Unlike patients in the UK, individuals did not acknowledge pain and this made history taking and assessment of local anaesthesia difficult.

Being 9000 miles away from home in a country with cannibals has been life-changing. Making a difference by providing oral hygiene advice was rewarding and the experience will hopefully better prepare me not only for my foundation training years, but also for future years in general practice.

I would certainly recommend everyone visits PNG. It is a land of paradise.

Acknowledgements

I would like to thank Ms Adriel Booker, YWAM Medical Ships Media for use of the photographs.

References


YWAM Medical Ships - Australia 2013: Papua New Guinea

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