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Fiji, Factor 11: Malnutrition

A Re-evaluation of the Iron Fortification Program in Fiji

Fiji is an archipelago of more than 300 islands in the South Pacific, and is home to approximately 800,000 people (Tong). A typical Fijian family can be an extended family and might include the parents, their unmarried children, their married sons and their families, an elderly widowed parent, and possibly the sister of the head of the household (“Culture of Fiji”). The Fijian diet consists mostly of a starch, a meat and a beverage (“Culture of Fiji”). Common starches include yams, sweet potatoes, nuts and breadfruit (“Culture of Fiji”). The most common meat sources are canned meat and fish, and beverages are often tea, with the most consumed beverage being water (“Culture of Fiji”). Education is a part of everyday life in the Fijian culture. While children are not required by law to attend school, they most often attend primary school, as well as secondary schools that are subsidized by the government (“Culture of Fiji”). Though western medicine and medical practices are used at several government-provided hospitals and health centers, there is still a heavy reliance on traditional medicine practitioners, seers, massage masters and herbalists (“Culture of Fiji”). Life can be very different between urban and non-urban Fiji residents, but the most common jobs are in manufacturing, distribution, commercial farming, and service occupations (“Culture of Fiji”). The local food supply for a Fiji resident usually comes from local markets and resources, as well as individual small-scale gardens (“Culture of Fiji”). It is now reported that half of the local Fiji people suffer from anaemia due to iron deficiency (Tong). It is believed that because there has been an increase in island imports, Fijians are straying away from their native diets (Parry). It is suspected that this divergence is leading to a rise in the number of Fijians suffering from malnutrition, specifically iron-deficiency anemia (Parry). These are the main barriers to improving adequate nutrition for residents. As a result, The Ministry of Health, a company committed to promoting healthier lifestyles, has sought to decrease iron deficiency anemia by adding iron to locally milled wheat flour in Fiji (Codling, Tsang). Unfortunately, wheat flour is not a native ingredient to Fiji, and recent data is showing a dangerous trend towards obesity related illnesses, including but not limited to diabetes (“Obesity”). In this paper, I propose the iron-fortification of gluten-free coconut flour that is native to the islands instead of wheat flour, and decreased consumption of tea coupled with increased consumption of the native taro vegetable as its high vitamin C content allows it to aid iron absorption. This would serve as a method to supplement the diet with much needed iron, while also preventing obesity related illnesses (Dewar). In conclusion, I am confident that a re-evaluation of the wheat flour iron fortification program would benefit the long-term health of the Fiji residents.

Food quality is a contributing factor to malnutrition in Fiji. Because imported goods do not contain the amount of iron necessary for Fijians who lack it, it is most important for Fiji residents to consider reverting back to their native diet (Parry). The native Fiji diet is iron-rich and contains large amounts of coconut products and taro vegetable which provides local residents with the vitamins and minerals needed to naturally combat both iron deficiency anemia and obesity (Parry). But, due to increases in the consumption of imports, fortifying foods is an opportunity to provide Fijians with the vitamins and minerals they need without a complete reversion to the native Fiji diet. That being said, the fortification of coconut flour will increase food quality, and is important for the development of Fiji.

Iron deficiency anemia is a curable condition where the body does not have enough red blood cells, meaning that oxygen is not getting to the body’s tissues (“Iron Deficiency Anemia”). It has many side effects ranging from headaches, fatigue, weakness, and poor appetite, to chest pain, and unusual cravings for things with no nutritional value, such as ice, dirt, or starch (“Iron Deficiency Anemia”). This disease is severe in Fiji, and is the result of inadequate nutrition. Currently, children and women are particularly

disadvantaged, because almost fifty percent of kids under five suffer from iron deficiency anemia, as well as forty percent of women (“Iron Deficiency”). After the Ministry of Health’s iron fortification program, trends in the data show that the situation is improving, but more people are now obese (“Obesity”). According to the World Health Organization, more than 30% of the Fijian population is obese which is an 8.5% increase since 2002 (“Obesity”). Due to wheat flour’s high score on the glycemic index and known contributions to weight related issues, I speculate that fortified enriched wheat flour could be indirectly contributing to this problem (Axe).

In the long term, a major factor that may increase the amount of Fijians suffering from iron deficiency anemia is climate volatility. Fiji is among a group of pacific islands that are particularly vulnerable to climate volatility, which could possibly inhibit the growth of iron rich foods that are currently grown in Fiji (“Pacific Islands Overview”). Also, because many households in Fiji are overpopulated, population growth is another major factor that could increase the amount of people suffering from iron deficiency anemia (“Effects of Population Growth”). However, at this moment, a re-evaluation of the current iron fortification program could benefit the 400,000 people that suffer from iron deficiency anemia, and subsequently improve the overall health of Fiji as a whole, by also decreasing the percentage of Fijians that are obese. This reevaluation is also a proactive attempt to combat issues related to possible future climate volatility and depletion of local iron rich resources. In addition, a re-evaluation could play a role in improving economic growth in Fiji by decreasing imports and subsequently improving Fiji’s \$1.39B negative trade balance observed in 2015 (“Fiji”).

In order to combat both iron deficiency anemia and obesity, fortified coconut flour should replace enriched wheat flour in Fiji’s current iron fortification project by the Ministry of Health, as coconut flour is more beneficial for health (Axe). This would allow Fijians to receive the iron that they need without the concern of obesity (Axe). Coconut flour has a high fiber content, a high nutrient density and a low score on the glycemic index, meaning that it will not spike blood sugar levels and is a good food to help fight obesity (Axe). Coconut flour is also very unlikely to cause digestive and/or autoimmune responses, which makes it a more desired alternative to wheat flour, and allows it to be available to more people who might not have used enriched wheat flour for these reasons (Axe). These facts show that coconut flour is safe for those who are gluten free, as well as diabetics and people who could not eat wheat flour because of its digestive and autoimmune effects. This means that coconut flour can be more widespread than enriched wheat flour and more iron will get to more people, improving the overall health of Fiji as a result. Because of this, coconut flour would be an effective replacement for enriched wheat flour. In addition to fortifying coconut flour, I propose that local Fiji residents be encouraged by their communities and the government to increase consumption of taro. Taro, a vegetable that contains approximately 52 grams of vitamin C, greatly aids iron absorption because of its high vitamin C content and can help maximize iron intake (“Taro Leaves”). Finally, Fijians should also be discouraged from regularly drinking tea with their meals because tannins, compounds found in tea, can combine with non-heme iron found in plant based foods and make less iron available for absorption (“Does Tea Cause Iron Deficiency?”). Because drinking tea with a meal can decrease iron absorption by 50% or more, decreasing consumption of tea is essential to maximizing the amount of iron absorbed from the iron fortified coconut flour (“Does Tea Cause Iron Deficiency?”).

Coconut flour is a byproduct of coconut oil production, and out of approximately 250 million coconuts produced in Fiji, 65% is available for coconut oil production (“High Level Consultation”). As a result, this percentage of coconuts could continue to be used to produce coconut oil, and also be used to produce coconut flour. That being said, Fiji demonstrates the capacity to produce coconut flour long term because coconut flour can be made in the same facilities as coconut oil or in local facilities that already produce wheat flour. Furthermore, there exists a private wheat flour producer in Fiji called the Flour Mills of Fiji, that currently fortifies the wheat flour and could possibly be tasked with the fortification of coconut flour (“Reduced Anemia”). Fiji also demonstrates this capacity to produce it’s own coconut flour because the

coconuts used to make coconut flour are locally grown, and utilizing local coconuts would be cheaper and easier than importing wheat for wheat flour production.

There are two main methods of producing coconut oil that subsequently produce coconut flour as a result (“Production of Coconut Flour”). These methods are called the dry and wet methods (“Production of Coconut Flour”). The dry method produces a high-protein coconut flour that is most commonly used in nutrition feeding programs and can be used as a wheat flour substitute, making this the preferred method (“Production of Coconut Flour”). This dry method requires the meat of a coconut to be ground and dried, and the oil of the dried meat to be extracted (“Production of Coconut Flour”). Then, left over meal from the previous step is grinded to create high protein coconut flour (“Production of Coconut Flour”). The alternative to the dry method is the wet method, in which the meat of a coconut is extracted with the coconut milk, and the remaining residue left in the coconut is dried and ground to produce coconut flour (“Production of Coconut Flour”). The dry method allows for 88% oil recovery, which is significantly higher than the 52% oil recovery of the wet method, making it the preferred technique for producing both coconut oil and coconut flour (“Production of Coconut Flour”). Also, coconut flour produced by the dry-process is reported to have a better flavor due to a higher fat content, which could potentially make it more appealing to Fiji residents (“Production of Coconut Flour”). But, because both methods produce coconut flour, either one could potentially be used. I propose that either of these fortification methods are appropriate for the Fiji residents because they utilize local resources and technologies already present in the communities. The infrastructure is already present at facilities that produce coconut oil and there wouldn’t be a need to invest additional land or water resources in new technologies which ultimately reduces the ecological impact. The potential for job creation also exists because a new manufacturing sector could be created for local residents to be trained and employed in the creation of coconut flour from the coconut oil production by-products.

After the coconut flour is made by coconut oil producers and local flour mills, it can then be fortified with iron by the Ministry of Health using the techniques already in use for wheat flour. To do this, the appropriate form of iron is mixed with a diluent, which usually includes other vitamins and minerals to chemically balance the iron (“Food Fortification”). This mixture is then appropriately measured and metered into the coconut flour and afterwards, it is ready to be distributed. (“Food Fortification”). Also, flours, including coconut flour, are easy to transport and have a relatively long shelf-life (“Food Fortification”). This makes the coconut flour easy to distribute to the residents of Fiji and means that this process has the potential to be kept up long term (“Food Fortification”).

In order for residents of Fiji to implement these proposed dietary changes, the community, the government, and organizations such as the Ministry of Health have a role to play in the promotion of these new ideas. Because the Ministry of Health already fortifies wheat flour, I propose that they be responsible for fortifying coconut flour instead. In addition, the Ministry of Health could promote these ideas through outreach programs by local community healthcare workers that have been successful in previous Ministry of Health health programs (“The Fiji Islands”). Other types of promotions by the Ministry of Health could include pamphlets to distribute or articles on their website describing what coconut flour is and the benefits of using it rather than wheat flour. Due to the fact that the Ministry of Health is the prime vessel for implementing these ideas and already has an established presence in Fiji, as well as the fact that coconut flour and taro are original components of the native Fijian diet, cultural and language barriers should not be a problem in the implementation of changes. Also, the Ministry of Health could potentially distribute the fortified coconut flour through school meals for school-age children and through local markets. Local health departments that provide medical services to the community members could also be a source to encourage residents to consume locally grown and produced coconut flour products.

The government of Fiji plays a huge role in implementing these changes as well as the Ministry of Health, and could do so by encouraging local flour mills, including the Flour Mills of Fiji, and local coconut oil

producers to produce coconut flour for the Ministry of Health to fortify, and provide funding for this alongside the Ministry of Health. Finally, the government could also utilize World Coconut Day, a two-day celebration to appreciate the coconut, to encourage and educate citizens about the use of coconut flour and healthy eating at a government sponsored festival with recipe testing (Kate). The government could also create incentive programs for individuals who are able to obtain positive health measurements from eating healthy. Community chefs and bakers could further encourage the consumption of coconut flour as well as the consumption of taro by creating and sharing recipes utilizing these ingredients. An award winning Fiji-based chef named Lance Seeto is a very active member of the Fijian community, and could help encourage the consumption of iron-fortified coconut flour and taro as well by sharing his recipes at World Coconut Day celebrations and on his website.

In conclusion, Fiji would see a drastic decrease in the 400,000 residents suffering from iron-deficiency anemia and the 30% of residents suffering from obesity if coconut flour replaced wheat flour in the Ministry of Health's current iron fortification program. This decrease could be further enhanced by the increased consumption of taro, an iron absorption enhancer, and the decreased consumption of tea, an iron absorption inhibitor. Food quality would be greatly increased in Fiji, as the fortified coconut flour coupled with taro would provide adequate vitamins and minerals to the residents of Fiji. This will improve the overall health in Fiji as a whole, including the fifty percent of kids that are iron deficient, as well as the forty percent of women that are also iron deficient. In addition, this proposition has the potential to encourage economic growth in Fiji as well. The Ministry of Health, the Fijian government, and community leaders all play a major role in a re-evaluation of the iron fortification program that is currently in place in Fiji, which has the potential to greatly benefit several different aspects of Fiji, making it a viable proposition.

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