

Technical Report

“Feasibility of Chispitas as a Treatment for Iron Deficiency Anemia in Rural Guatemala – Report of a Pilot Study”

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Background

Rates of iron deficiency anemia in indigenous children in Guatemala are not well characterized. In Wuqu' Kawoq's clinical nutrition programs in multiple rural communities, rates of anemia in children under 5 years of age vary widely from 15% to 75%. Prevalence is higher in communities with less dietary diversity. Interestingly, although prevalence of stunting in our communities is high, ranging from 50-80% of all children under 5, there is no correlation between anemia and stunting. However, investigations from other regions do show a relationship between iron deficiency and neurocognitive outcomes (1-2), suggesting that the correction of iron deficiency remains an important public health goal.

Rural Guatemala is an excellent context for studying the impact of iron supplementation on child health outcomes, in particular because malaria, hookworm, and other infectious causes of anemia are relatively absent. Anemia in rural Guatemala, therefore, is largely a function of dietary iron intake.

Previous Work

Wuqu' Kawoq's initial attempts to intervene on childhood anemia have been unsuccessful. Educational initiatives to increase dietary diversity and the consumption of iron rich foods are limited by high levels of poverty and the resulting inability of caregivers to implement the recommended dietary changes. Similarly, supplementation with ferrous sulfate preparations (infant drops, iron tablets) have been severely limited by poor regimen adherence, with caregivers citing discoloration of teeth and unpalatability of supplements as primary reasons for poor adherence. Even in individual cases with high levels of regimen adherence, the effect of supplementation with ferrous sulfate drops has been negligible.

Chispitas

In 2010, Wuqu' Kawoq began two small pilot programs to trial the acceptability of Chispitas for the treatment of iron deficiency anemia. Chispitas is the local name for "Sprinkles" a powdered micronutrient sachet containing 12.5 mg iron, 5 mg zinc, 400 microg vitamin A, 160 microg folic acid, and 30 mg vitamin C. The iron in Chispitas is formulated as microencapsulated ferrous fumarate which, together with the inclusion of vitamin C in the sachet, increases the oral bioavailability of the iron. Other theoretical benefits of Chispitas are that the supplement is odorless and colorless when added to food, potentially increasing acceptability. In other contexts, Chispitas have proven an effective intervention for alleviating anemia (3).

Other potential health benefits of supplementation with Chispitas include a daily dose of folate and vitamin A. Furthermore, a treatment course of Sprinkles has been shown to reduce the incidence of diarrheal illness in children, presumably due to the inclusion of a daily zinc dose (4).

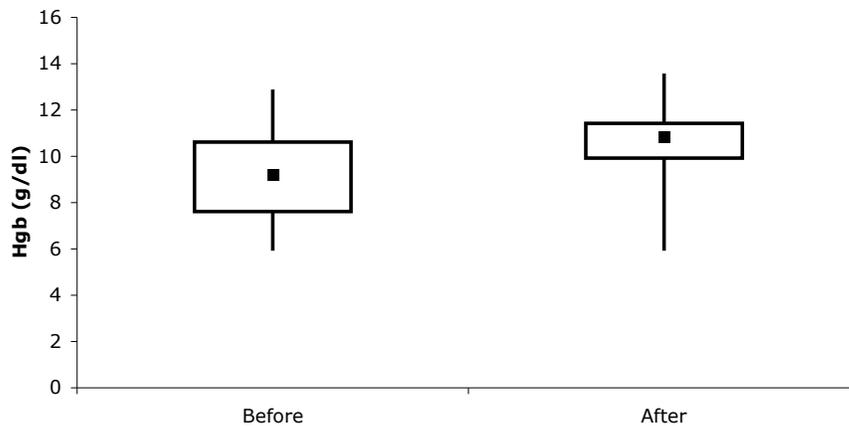
Pilot design

Children 6-59 months of age in two rural Guatemalan communities, one in the municipality of San Pablo Jocopilas and one in the municipality of San Juan Comalapa, received supplementation with Sprinkles. Hemoglobin was determined prior to supplementation and at 6 months using a point-of-care hemoglobin test (Stat-Site, Stanbio Laboratory). Chispitas were supplied locally by Nutrimed (Guatemala City).

All children 6-23 months of age received a daily sachet of Chispitas for 60 days regardless of anemia status. Children 24-59 months of age received 60 days of Chispitas only if they were anemic.

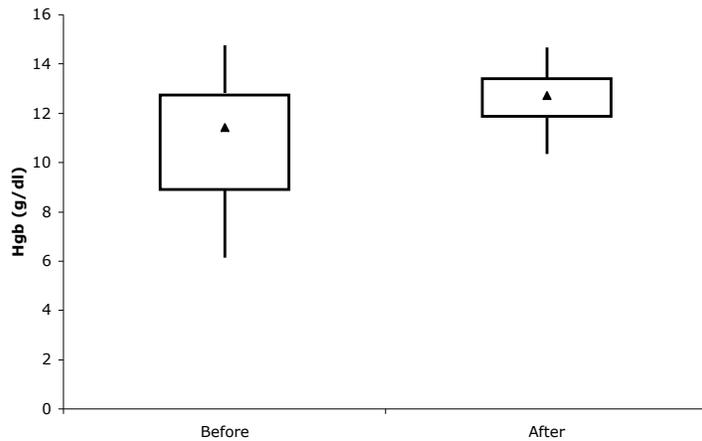
Results

In Community 1 (San Pablo Jocopilas), average hemoglobin prior to supplementation was 9.04 g/dl (95% CI 8.46-9.62, n= 42). At 6 months, average hemoglobin was 10.63 g/dl (95% CI 10.21-11.05). Results were statistically significant ($p = 0.0001$, two-tailed paired t -test).



Box plot of Hgb values in children from Community 1 before and after supplementation with Chispitas

In Community 2 (San Juan Comalapa) average hemoglobin prior to supplementation was 10.93 g/dl (95% CI 10.04-11.82, n= 27). At 6 months, average hemoglobin was 12.55 g/dl (95% CI 12.13-12.96). Results were statistically significant ($p = 0.002$, two-tailed paired t -test).



Box plot of Hgb values in children from Community 2 before and after supplementation with Chispitas

Conclusions

Chispitas are effective in reducing rates of iron deficiency anemia in rural Guatemala. Rates of regimen adherence are higher than with traditional ferrous sulfate preparations. Ongoing larger scale studies (n=500) are underway to validate these pilot results and also to examine the effects of Chispitas supplementation on rates of acute diarrheal illness, acute respiratory illness, and attainment of developmental milestones.

References

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