

EFFICACY OF NUTRITIONAL TALKS IN THE PREVENTION OF ANEMIA IN CHILDREN (6 TO 36 MONTHS OF AGE) FROM A HEALTH CENTER IN CHICLAYO, PERU

EFICACIA DE CHARLAS NUTRICIONALES EN LA PREVENCIÓN DE ANEMIA EN NIÑOS (6 A 36 MESES DE EDAD) DE UN CENTRO DE SALUD EN CHICLAYO, PERÚ

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ABSTRACT

Introduction: There is a high prevalence of anemia in Peruvian children. **Objective:** To evaluate the effectiveness of nutritional talks in the reduction and prevention of anemia in boys and girls from 6 to 36 months of age. **Methods:** Longitudinal analytical study of retrospective cohorts. The sample included 78 children attended at a primary health care center. The information was extracted from a database generated by the center. The hemoglobin (Hb) level was recorded close to the date of the intervention and in subsequent controls ≥ 1 month. **Results:** 41 children (52.6%) participated in the nutritional talk, not observing significant differences with the group that did not participate. A higher frequency of anemia was observed in the group that did not participate in the nutritional talk (23%) compared to the group that did participate (0%), a significant difference was evidenced in the time between Hb evaluations ($p < 0.001$), and the indication of micronutrients ($p < 0.001$) for both groups. Despite this, there was no significant difference between the initial and final Hb values. **Conclusion:** Children whose parents participated in nutritional talks had less anemia. This suggests that nutritional talks could help prevent anemia.

Keywords: Anemia; Applied Nutrition Programs; Infant Nutritional Physiological Phenomena; Infant care. (Source: MESH-NLM)

RESUMEN

Introducción: Se han creado programas de prevención y control debido a la alta prevalencia de anemia en niños y niñas peruanos. **Objetivo:** Evaluar la eficacia de las charlas nutricionales en la disminución y prevención de anemia en niños y niñas de 6 a 36 meses de edad. **Métodos:** Estudio longitudinal analítico de cohortes retrospectiva. La muestra incluyó 78 niños atendidos en un centro de atención primaria en salud. La información se extrajo de una base de datos generada por el centro. Se registró el nivel de hemoglobina (Hb) cerca a la fecha de la intervención y en controles posteriores ≥ 1 mes. **Resultados:** 41 niños (52,6%) participaron en la charla nutricional, no observándose diferencias significativas con el grupo que no participó. Se observó una mayor frecuencia de anemia en el grupo que no participó en la charla nutricional (23%) con respecto al que sí participó (0%), se evidenció diferencia significativa en el tiempo entre evaluaciones de Hb ($p < 0,001$) y la indicación de micronutrientes ($p < 0,001$) para ambos grupos. A pesar de ello no hubo diferencia significativa entre los valores de Hb inicial y final. **Conclusión:** Los niños cuyos padres participaron en las charlas nutricionales tuvieron menos anemia. Esto sugiere que las charlas nutricionales podrían ayudar a prevenir la anemia.

Palabras clave: Anemia; Programas de nutrición aplicada; Fenómenos Fisiológicos Nutricionales del Lactante, cuidado del lactante. (Fuente: DeCS- BIREME)

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INTRODUCTION

Anemia is a disorder that affects child development, especially in the first years of life. The negative impact on children may be irreversible in the long term, even when the anemia is reversed⁽¹⁻⁴⁾. Anemia in children is a significant problem in Peru, with a prevalence of 42.2%^(5,6). In the Lambayeque region, where the city of Chiclayo is located, the prevalence of this problem varies between 31.4 and 53.9%^(7,8).

Due to the importance of this problem, the Peruvian health system has various measures for its prevention and control, such as nutritional talks⁽¹⁾. Nutrition talks, such as nutritional education, are believed to impact socioeconomic development and health positively. This would occur by reducing the incidence of infectious diseases and improving nutrition. Likewise, they are interventions that can affect a population with a reduced investment, which is why they are of interest for low-complexity health centers⁽⁹⁻¹³⁾.

Nutritional talks are educational-demonstrative sessions where food preparation is presented to mothers of children. These sessions are scheduled days after the development checks of the children at the health center, with the participation of the mothers being voluntary. A nutritionist carries out the sessions following a protocol established by the Ministry of Health (MINSa). During these sessions, the recommended foods are presented, considering their portions, as well as their preparation and cooking steps. Complementary activities are carried out to strengthen this information, where the participants prepare food according to the recommendations provided⁽¹⁴⁾.

Even though there is evidence of the efficacy of these interventions, the studies focused mainly on treating anemia or evaluating the preventive effect of anemia for said interventions in combination with other complementary ones^(1,2,14-17). The latter have regular contact with their participants through long periods of pre-established and controlled follow-up. Therefore, the effectiveness of the intervention applied in our country has not been evaluated. Likewise, it is different from what has been done in other pieces of literature, limiting its application and frequency to the participants' will so that the findings of other studies could not be extrapolated.

It is pertinent to study the effectiveness of this type of intervention since this information allows for the evaluation of its continuity or the need to make modifications for its optimization. Therefore, this study aims to evaluate the effectiveness of nutritional talks at a health center in Chiclayo in reducing and preventing anemia.

METHODS

Design and study area

A longitudinal, analytical, retrospective cohort study was conducted in northern Peru.

Population and sample

The population consisted of 2,217 children in the Anemia Program between July 2018 and October 2019 from the Manuel Manrique Nevado Polyclinic, located in Chiclayo, Peru. Seventy-eight children without anemia were selected between 6 and 36 months of age; they had baseline hemoglobin (Hb) data and controls at least 30 days after the evaluation. This minimum time was selected since it would be sufficient to observe changes in these values⁽¹⁸⁻²⁰⁾. In addition, because the teachings were after the baseline Hb assessment, only those teachings with a difference of 7 days or less from the baseline Hb assessment were considered.

Variables and instruments

A database generated for epidemiological surveillance by the Manuel Manrique Nevado Polyclinic was used. The dependent variable was the diagnosis of anemia according to the hemoglobin level, and the state of anemia was subclassified into mild (10.0-10.9 g/dl), moderate (7.0-9.9 g/dl), and severe (<7 g/dl)⁽¹⁸⁾. La variable independiente fue la realización de charla nutricional. The independent variable was the nutritional talk. The intervening variables studied were the child's age in months, sex, Hb level (initial evaluation and subsequent controls), the dates of controls and talks, and the indication of micronutrients. Based on the database data, the time between the Hb evaluations was generated in months (considering the first control at least 30 days after the baseline evaluation) and the child's anemia status (<11 g/dl).

Procedures

We worked with an existing database generated by the health center that was utterly anonymized and did not contain information that would allow the identification of the participants. The database was provided by the director of the health center at the request of the authors.



Statistic analysis

Exploratory analyses were performed with non-parametric tests, such as the Wilcoxon test (Mann Whitney U) and Fisher's exact test, using the statistical program Stata v14. Unfortunately, an adequate multivariate model could not be developed to evaluate the proposed association due to the small number of units of analysis per group (nutritional talk) and the absence of events (anemia).

Ethical aspects

The database did not contain the participants' personal information and was anonymized entirely before being released.

RESULTS

Seventy-eight children were included in the study after the screening process. Most of the children were male (60.3%), with a median age of 12.4 months (p25=6.90/p75=21.21). At the time of the initial evaluation, none of the children had anemia, presenting a median Hb of 11.6 g/dl (p25=11.30/p75=11.90). Most of the children who attended were told to use micronutrients (85.9%) with a median time of 1 month (p25=1/p75=2).

Forty-one mothers (52.6%) participated in the nutritional talks. It was found that the group that did not participate in the nutritional conversations presented a

higher frequency of anemia at the time of the control follow-up ($p < 0.001$). Also worth highlighting is the fact that 27% of the children of mothers who did not participate in the talks presented anemia, compared to none of the children in the other group.

This difference was not observed when comparing the groups considering their final Hb values. There was also no evidence of a difference between the initial and final Hb values, both globally ($p = 0.496$) and by groups ($p = 0.694$ and $p = 0.149$ for the groups that did not participate in the talk and those that did, respectively).

When evaluating other differences between the groups according to their participation in the teachings, a significant difference was evidenced in the time between Hb evaluations ($p < 0.001$) and the indication of micronutrients ($p < 0.001$).

The group participating in the talk presented a shorter time between evaluations and a greater indication of micronutrients (Table 1).

Table 1. Characteristics according to their participation in nutritional talk.

		Received Talk				p*
		Yes (n=41)		No (n=37)		
		n	(%)	n	(%)	
Sex	Male	21	51.2%	26	70.3%	0.107
	Female	20	48.8%	11	29.8%	
Age (Months)**		12,4	(8,2/20,5)	12.3	(6.9/21.7)	0.627
Initial Hb**		11.60	(11.2/11.8)	11.6	(11.3/12.0)	0.374
Hb final**		11.70	(11.3/11.9)	11.6	(10.9/12.4)	0.881
		0.0	(0.0/0.2)	0.0	(-0.6/0.8)	0.411
ΔHb**	Si	0	0.0%	0	0.0%	>0,999
	No	41	100.0%	37	100.0%	

Initial Anemia	Yes	0	0.0%	10	27%	<0.001
	(Mild)	0	0.0%	6	16.2%	
	(Moderate)	0	0.0%	4	10.8%	
	(Severe)	0	0.0%	0	0.0%	
	No	41	100.0%	27	73%	
Time between Hb evaluations (months)**		2.4	(1.2/3.2)	4.5	(3.6/6.5)	<0.001
Indicated micronutrientes	Yes	41.0	100.00%	26.0	70.3%	<0.001
	No	0.0	0.00%	11.0	29.7%	

* Fischer's exact test.

** Median and interquartile range (p25-p75). Comparison using the Wilcoxon test (Mann Whitney).

An exploratory comparison of the groups that presented anemia revealed a significant difference in time between Hb evaluations ($p < 0.001$) and the indication of micronutrients ($p = 0.030$). In addition, the

group that developed anemia presented a more extended time between evaluations and a lower indication of micronutrients (Table 2).

Table 2. Characteristics according to the appearance of anemia.

	Anemia				p*	
	Yes (n=10)		No (n=68)			
	n	(%)	n	(%)		
Sex	Male	6	60.00%	41	60.3%	1.000
	Female	4	40.00%	27	39.7%	
Age (months)**		10.00	(6.74/25.68)	13.68	(7.13/20.83)	0.448
Initial Hb**		11.55	(11.20/12.00)	11.60	(11.30/11.80)	0.893
Final Hb**		10.10	(9.80/10.70)	11.80	(11.40/12.30)	<0.001
Δ Hb**		-1.50	(-1.80/-1.00)	0.00	(0.00/0.60)	<0.001
Time between Hb evaluations (months)**		5.22	(4.18/7.50)	3.02	(1.76/4.26)	<0.001
Nutritional talk	Yes	0	0.00%	41	60.3%	<0.001
	No	10	100.00%	27	39.7%	
Indicated Micronutrients	Yes	6	60.00%	61	89.7%	0.030
	No	4	40.00%	7	10.3%	

* Fischer's exact test.

** Median and interquartile range (p25-p75). Comparison using the Wilcoxon test (Mann Whitney).

DISCUSSION

The results show a lower frequency of appearance of anemia in the group that receives nutritional talks (27% vs. 0%). This event suggests the effectiveness of the intervention. However, despite what has been mentioned, this fact contradicts the result found when comparing the final Hb values or the initial with the

final Hb values where the difference was not observed. Therefore, we believe that the difference between these evaluation forms could be due to the reduced number of people per group and the number of cases of anemia. Likewise, the time between the Hb evaluations and the use of micronutrients could affect the final result of the study.



Unfortunately, we have not found documents that are directly comparable with our results since the intervention carried out by the Peruvian health system is very different from the interventions described in previous publications, both in its duration and in its methodology. Nevertheless, the results of the study are interesting, but they are limited by several biases related to the center's processes and the analysis of secondary information. Among these biases, the lack of Hb follow-up data and voluntary participation in the talks is pertinent to explain. However, a study carried out in Huancavelica⁽²¹⁾ found that an educational intervention program was able to improve adherence to anemia treatment in children aged 6 to 23 months in rural regions, which could partly explain our results. On the other hand, another important component to prevent anemia is also an adequate diet rich in iron, which was seen in a study carried out in eight regions of Peru⁽²²⁾.

Multiple children only had one care, so they could not be evaluated to observe the appearance of anemia. Generally, children who do not follow their controls have worse development. This is related to the interest and involvement of caregivers in children's health. Something similar to this occurs with participation in the talks; since they are voluntary, they tend to include the caregivers most involved in the children's health. The relevance of this for health is reflected in the results of Francke et al.⁽²³⁾, who found that the Qali Warma nutritional support program for children did not have a significant effect on the prevalence of anemia and malnutrition, suggesting that it is necessary to the involvement of parents in solving this problem.

Unfortunately, many mothers do not attend the nutritional talks scheduled on days other than their children's control or developmental evaluations physical. It would be suggested that the talks be held on the same day as the control of their children's appointment, with the intent to increase the number of people involved in the program.

The nutritional talks are carried out independently of the child's control, which causes problems in determining the baseline Hb before the intervention. In many cases, Hb was evaluated weeks after the talk took

place, failing to adequately represent the value before the intervention of interest since it would be affected by other unrelated factors. We controlled for this problem by working only with interventions close to the baseline Hb measurement date, but this further limited the number of participants.

Although the nutritional talks are carried out based on a protocol developed by MINSA, their execution tends to vary according to the realities where they are carried out, depending to a great extent on the personnel who apply them. This fact means that the results found do not necessarily represent what could be found in all primary care centers in the country. Likewise, when working with an existing database, it has not been possible to evaluate other factors that could modify the association, such as the use of complementary treatments or adherence to the intervention or treatments; which have been seen to be factors that can influence the level of anemia in children^(24,25).

Among the limitations are the differences in the evaluation time and the indications of micronutrients between both groups, which should be analyzed as confounding variables in larger studies. Another limitation is external validity since data extrapolation is not allowed. Despite the biases of the study, the results are promising and open the need to apply and evaluate the intervention in different realities when finding positive initial results. Although the evidence suggests the efficacy of the intervention for preventing anemia in children, the results are inconclusive due to the small number of participants and cases. Therefore, evaluating the intervention with more patients and in multiple centers is pertinent to confirming the results found in the present study and continuing its application at the primary care level.

CONCLUSIÓN

Children whose parents participated in the intervention of nutritional talks in front of anemia had a lower incidence of anemia than children whose parents did not participate in these talks. This suggests that nutritional talks could help prevent anemia, however, more studies are needed to reaffirm this hypothesis

Authorship contribution: JSF participated as the primary investigator, who contributed to the problem statement, data collection, and contribution to the writing of the original draft. VDS participated in the methodology, statistical analysis, and corrections of the initial draft. JOL participated in the methodology, statistical analysis, interpretation of the results, and revisions of the original draft.

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