CONTRIBUTION OF FISH TO NUTRITION: A CASE OF NTCHISI - MALAWI

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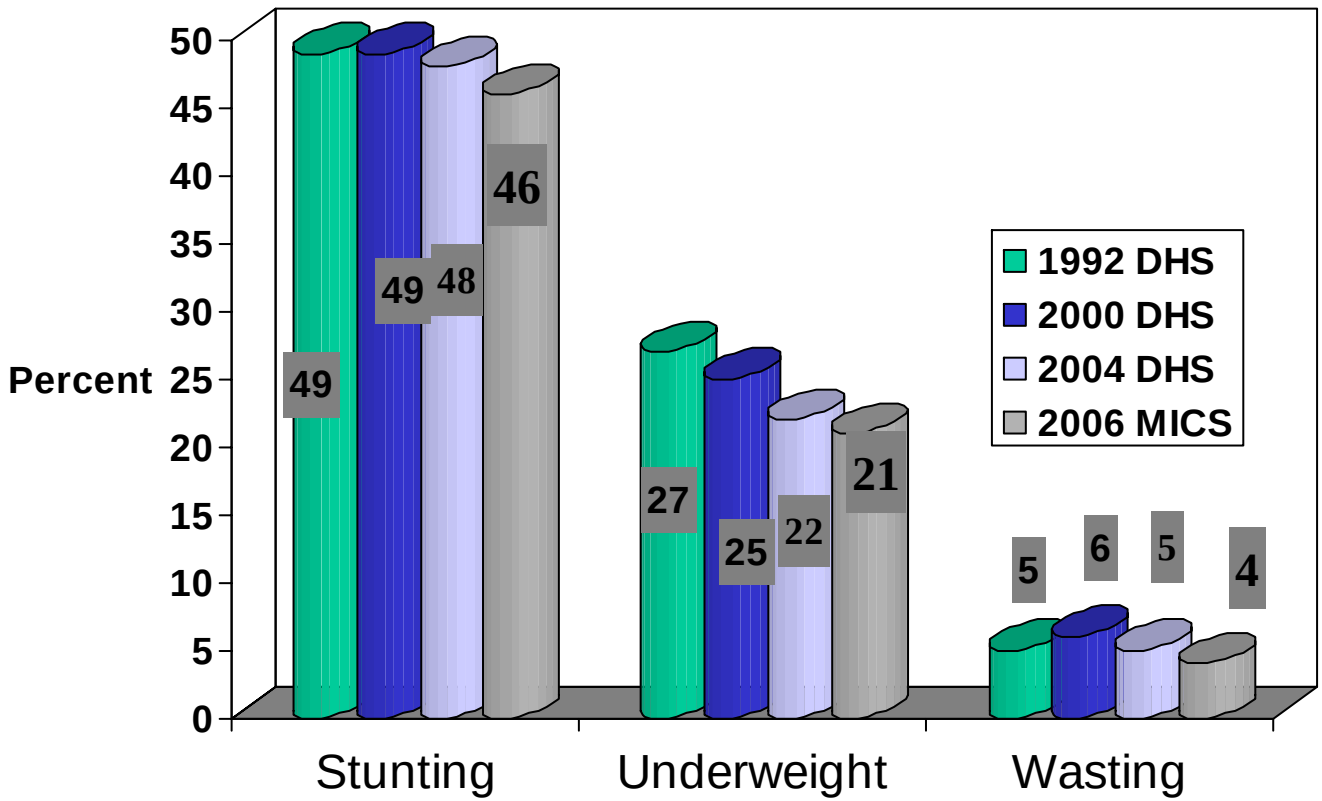
Nutrition Situation in Malawi

Levels of chronic and acute malnutrition have remained high

Prevalence from 1992 to 2006

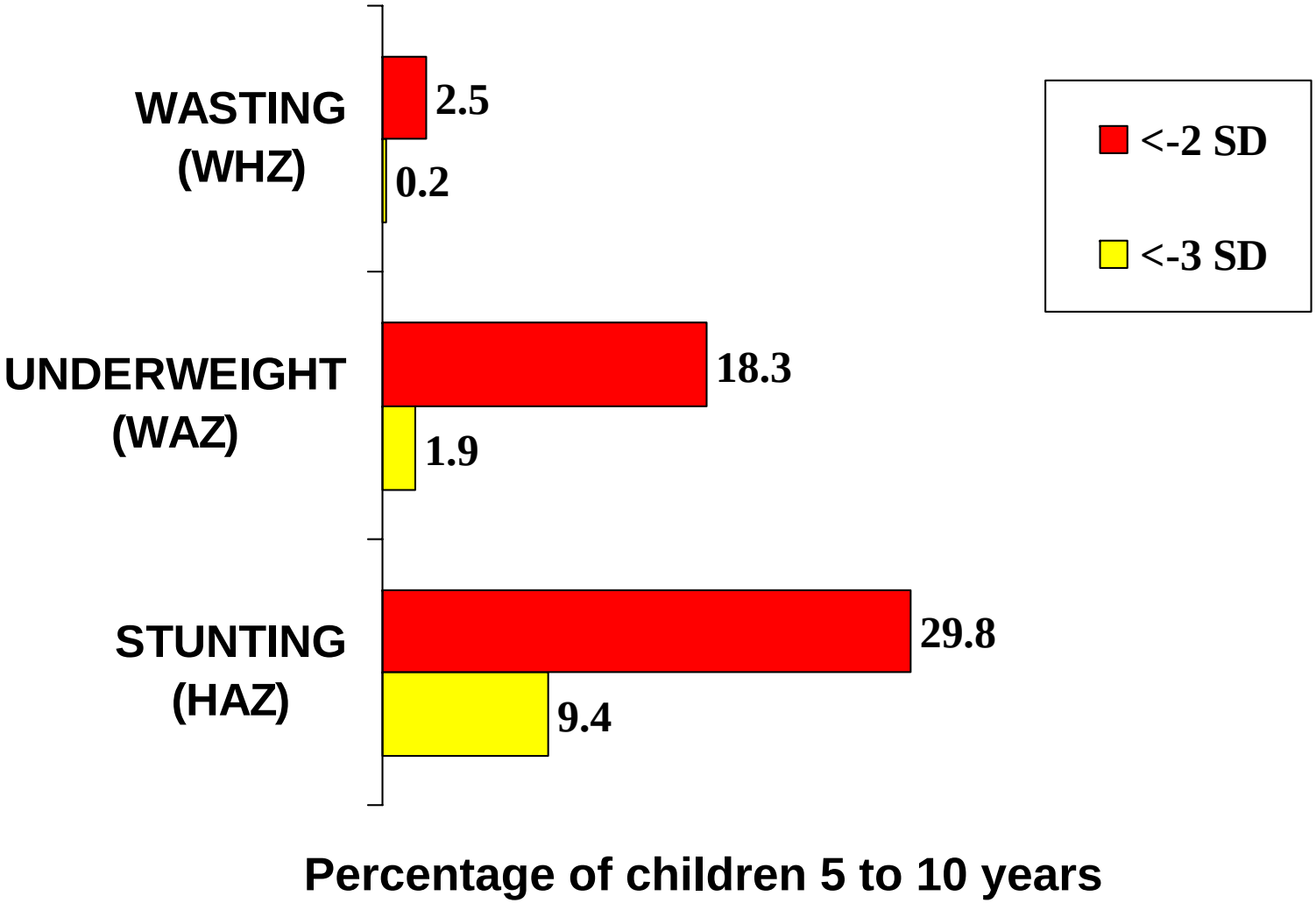


Micronutrient Malnutrition - 2001

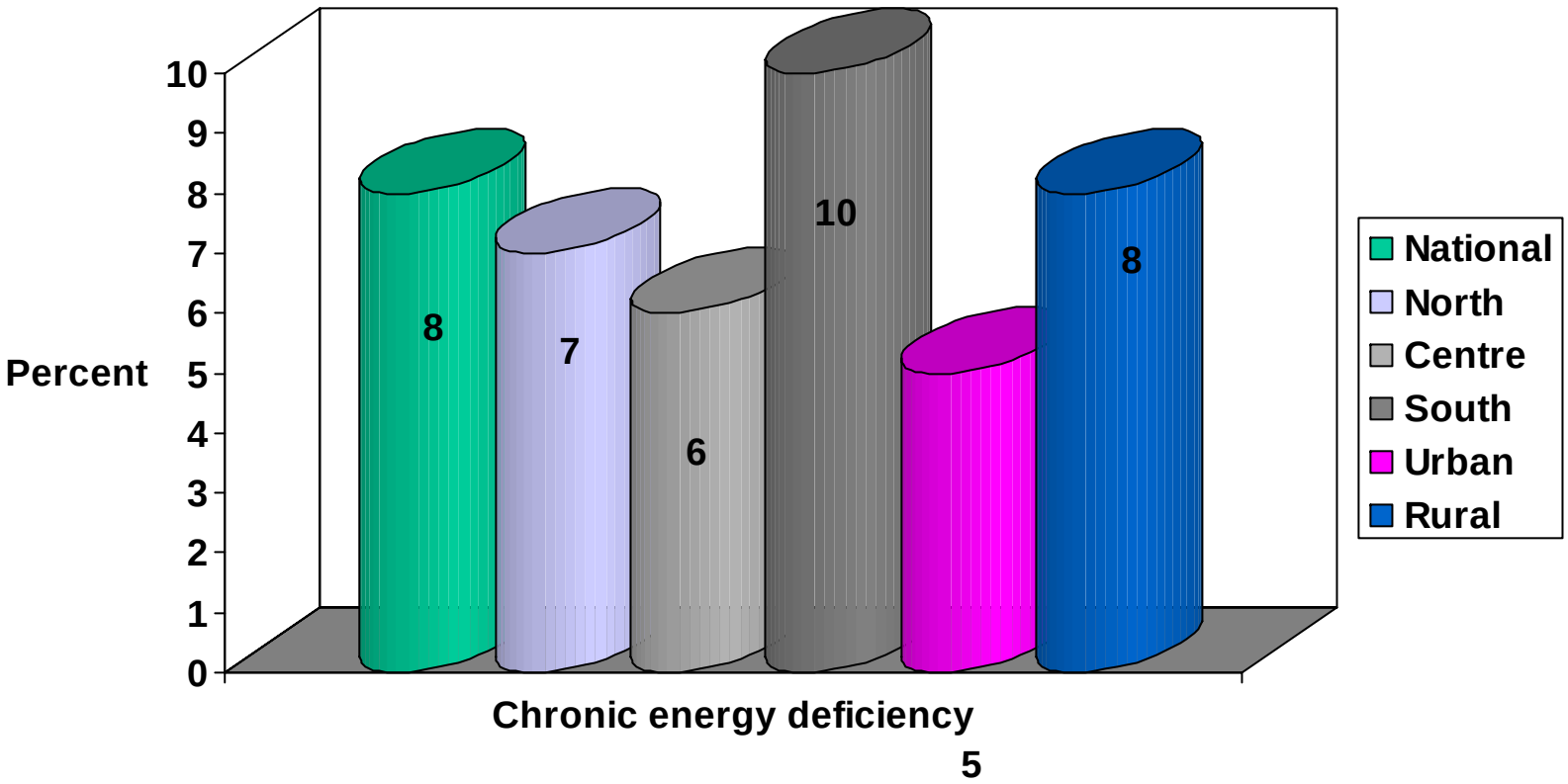
Group	Anaemia (%)	WHO class.	VAD (%)	WHO Class.
Preschool	79.7	Severe	59.2	Severe
School age	22.3	Moderate	38.3	Moderate
Women	27.0	Moderate	57.4	Severe
Men	17.4	Mild	36.9	Severe

Only 36% of households consume adequately iodised salt (≥25 ppm)

Summary of anthropometry results



Prevalence of chronic energy deficiency (CED – BMI<18.5)



Prevalence of chronic energy deficiency (CED – BMI<18.5)

PARAMETER	1992 MDHS %	2000 MDHS %	2004 MDHS %
National CED	9.8	8.8	9.2
Regional CED			
•North	7.2	7.5	8.8
•Centre	7.3	7.7	7.2
•South	12.4	9.9	11.0
Residential CED			
•Urban	7.1	5.5	5.5
•Rural	10.1	9.4	10.0

Possible Interventions

- Short term

  -Biannual vitamin A supplementation, deworming

  -Targeted food supplementation
- Long-term measures

  -Promotion of food production diversity

  -Dietary diversification and modification

  -Fortification of centrally processed flour, oil and salt

Importance of fish

Directly:

1. Adds variety to diet
2. Provide essential nutrients

- Protein of high biological value with high sulphur containing amino acids
- Good source of thiamin, niacin, riboflavin, iron
- Small fish that are eaten together with bones provide more calcium and fluorine
- Fish, liver and fish oils are rich in vitamin A and vitamin D although amounts vary with age and species of fish

Importance of fish continued

Indirectly

Valuable source of income that can be used to acquire of other basic household necessities

Objective of Ntchisi research

- Contribution of fish to the household diets
- types of fish commonly consumed by households and why
- Nutritive value of different fish products

Methodology

- A baseline survey to establish the food and nutrition indicators for entire area
- Interactive 24 hour dietary recall as outlined by Gibson and Ferguson (2008)

Study area

- Tradition Authority Nthondo area in Ntchisi district –located in north east of Lilongwe in central Malawi
- World Vision Malawi working in the area for over a decade – food security, nutrition and HIV and AIDS mitigation.

Area has potential for fish farming – undulating hills with valleys

Sampling

- All the 90 households that had registered to start fish farming

Food Consumption Tool

- The interactive dietary recall (Gibson and Ferguson, 2008)

The method is easier, faster, and less expensive to use than the weighed method, and it is less invasive; therefore, respondent compliance is enhanced

Requirements

1. Local artist to draw and label a food picture chart (pre-tested before finalization)
2. A local artisan to make food models of varying sizes.
3. Real food items similar in size to determine weight.
4. Local utensils (bowls, cups, graduated jugs, a set of standard measuring cups and spoons) to enhance amounts.

- Cups were used for volume of any liquids e.g. tea, sweet bear.
- Bowls were used to measure porridge, relishes and other mixed dishes.

5. Salted samples of the staple food (Nsima of varying sizes)
6. Dietary recall forms

Training of enumerators

- Two teams of 4 enumerators and a team supervisor – Comprehensive training for 10 days including field pre-testing.

Data collection

- Day 1 – Research Assistant visit the household
- Day 2 – actual food consumption
- Day 3 - Research Assistant revisits the household to verify and quantify foods consumed

Data analysis

- Data was analyzed using Nutrisurvey 2007 developed by WHO.
- The programme allows for addition of other foods to the database

RESULTS and DISCUSSIONS

Sample size for interactive 24 hour recall by age grouping

Age category	n	Mean WT	Mean Ht
1 - 3 years	34	12.1	84.7
4 – 6 years	30	16.7	96.9
19 – 24 years	16	55.5	-
25 – 50 years	50	58.4	-
51 – 65 years	19	57.9	-
>65 years	4		-
Total	153	na	na

Main meal frequency per day

Frequency/day	**Percent**
One main meal	12.9
Two main meals	42.6
Three main meals	42.6
Four main meals	1.9

Major relish eaten with Nsima

Relish type	**1-3 year olds %**	4-6 year olds %	Women %
Vegetables	54.7	38.5	51.2
Animal food*	20.8	23.1	23.9
Fish	20.8	34.6	20.5
Legumes	3.8	3.8	4.3

* Inclusive of meats, mice and other game, insects

Mean amount of *Nsima* eaten by type of relish

Relish type	**1-3 year olds %**	4-6 year olds %	Women %
Vegetable	237	333	850
Animal*	293	399	1031
Fish	355	399	1117
Legume	243	366	599

* Inclusive of meats, mice and other game, insects

Over five frequency of eating fish

Frequency	%
Once /week	7.6
Twice/week	12.6
Once per month	25.2
Twice per month	35.3
Once/year	4.7
Twice/year	12.9
10 times/year	1.4
20 times/year	0.4

Mean amount of *Nsima* eaten by type of relish

Relish	**1-3 year g**	**4-6 year g**	**Women g**
Vegetable	237	333	850
Animal	293	399	1031
Fish	355	399	1117
Legume	243	366	599

Major type of fish consumed

Type of fish	%
Usipa	27.7
Chilinguni	21.9
Utaka	16.9
Makumba	13.7
Chambo(dried)	5.4
Mlamba	4.7
Matemba	4.3

Sources of fish

Source	%
Buy from lake	57.6
Own dam	40.3
Buy from Dam	1.4
Kapenta (Zambia)	0.7

Frequency of fish consumption

Levels of consumption (2009)	n	%
Eating more frequently than 2008	128	46
Eating less frequently than 2008	111	39.9
Same as 2008	39	14.0

Reasons for eating less fish

Reasons	%
No money to buy	18.3
Otter (Katumbu)	3.6
Following rules for catching	1.8
inadequate nets	1.1
The dam have been recently stocked	0.4
Dam washed away	0.4
Water dried	0.4

Reasons for eating more fish

- Ownership of their own dam
- Having the money to buy fish

Sources of money of buying fish

- Sell of agriculture produce (23.6%)
- Petty trading (3.5%)

Contribution of fish to some nutrients from animal foods at baseline and follow-up for children

Nutrient	Baseline	Follow-up
Protein	36.1	65.7
Calcium	94.4	96.3
Iron	33.3	44.4
Carotene	43.3	71.2
Children 4-6 years		
Protein	51.1	91.3
Calcium	92.5	100
Iron	45.5	100
Carotene	56.6	88.1

Use of harvested fish

Amount Kg	Amount ate	Amount sold	Income
15	4	11	1,850
12	6	6	1,100
6	4	2	2,000
10	10	0	0
10	3	7	2,300
7	7	0	0
10	2	8	3,000
7	0	7	2,000
5	2	3	1,000
2	0	2	150
10	0	10	1,600
25			7,000
10			5,800

Contribution of fish to some nutrients from animal foods at baseline and follow-up For Women 19-50

Nutrient	Baseline	Follow-up
Protein	37.1	73.9
Calcium	90.1	98.4
Iron	25.3	71.4
Carotene	87.7	92.5
Women 25-50 years		
Protein	48.5	53.3
Calcium	94.8	95.3
Iron	50.0	38.7
Carotene	9.7	72.3

Contribution of fish to some nutrients from animal foods for only those who actually ate fish -women

Nutrient	Baseline	Follow-up
Protein	34.0	74.1
Calcium	89.7	98.8
Iron	22.4	77.8
Carotene	85.6	92.6
Women 25-50 years		
Protein	37.4	53.1
Calcium	94.9	95.1
Iron	32.0	41.9
Carotene	47.8	72.9

Contribution of fish to some nutrients from animal foods at baseline and follow-up For Women 51- >65

Nutrient	Baseline	Follow-up
Protein	52.7	80.1
Calcium	96.3	98.0
Iron	55.5	100
Carotene	75.1	41
Women >65 years		
Protein	80.4	100
Calcium	99.0	100
Iron	73.1	80
Carotene	100	100

Contribution of fish to some nutrients from animal foods for only those who actually ate fish -women.

Nutrient	Baseline	Follow-up
Protein	34.9	81
Calcium	94.2	98.9
Iron	43.3	86.7
Carotene	44.5	40.9
Women >65 years		
Protein	80.2	100
Calcium	99.3	100
Iron	76.0	100
Carotene	100	100

Contribution of fish to some nutrients from animal foods for only those who actually ate fish

Nutrient	Baseline	Follow-up
Protein	26.3	36
Calcium	89.9	94.4
Iron	25.8	33.3
Carotene	32	43.3
Children 4-6 years		
Protein	32.3	51.1
Calcium	90.8	91.8
Iron	25.8	36.4
Carotene	36	56.6

CONCLUSION

Although implemented for only one year the following observations can e made:

- There is high preference for fish in the area.
- In all the groups of participants, contribution of fish to nutrients provided by animal foods increased.
- Preparation of fish necessitates addition of other foods hence enhance nutritive value of diet.

CONCLUSION continued

- Nutrients such as protein (high biological value); calcium and iron (bio-availability high)
- Fish farming has potential in the area
- Income used to buy fish, other foods, other household necessities hence indirectly contributing to food and nutrition security
- One fishing net per entire area is problematic
- High losses of fish due to mainly otter and other predators

Challenges

- Nutrient analysis
- Food composition tables for converting foods consumed to nutrients. None exists in region. Conversion based on raw foods – nutrient losses could be significant (ascorbic acid, thiamin, riboflavin, niacin)