

DOES SOY CONSUMPTION HAVE AN EFFECT ON HYPERTENSION IN LOW-INCOME RURAL SOUTH AFRICAN WOMEN?

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A cross-sectional baseline survey found poverty, poor dietary intake behaviour and hypertension (56%) in women in a rural community in South Africa. The aim of the study was to plan and implement a community participatory project with appropriate food and nutrition intervention studies (soy gardening and food preparation skills training) to address the prevalence of hypertension of the women. The study design was an experimental 18-month intervention study with pre- and post measurements in a hypertensive ($n=30$) and non-hypertensive ($n=24$) group. A random sample of 54 women gave consent to participate in the soy gardening programme ($n=162$). Blood pressure measurements were taken before and after the intervention. Dietary intake patterns were measured by 24-hour recall questionnaires. Compliance of soy planting, harvesting and consumption was tested through ongoing monitoring and questionnaires. Data were analysed on SPSS, version 19.0 for descriptive statistics (mean $\pm$ SD, frequencies). Paired t-tests were done to determine the significant impact of the intervention.

No significant difference was observed between the soy consumption patterns of the two groups. The mean systolic blood pressure was significantly ($p=0.000$) reduced from 150.6 ± 23.8 mm Hg to 133.8 ± 22.6 mm Hg in the hypertensive group after the intervention. Similarly, the diastolic blood pressure was significantly ($p=0.001$) reduced from 99.9 ± 13.5 mm Hg before to 89.4 ± 14.8 mm Hg after the intervention. No significant changes were observed in the blood pressure of the non-hypertensive group.

It was concluded that the usual intake of soy foods resulted in having a beneficial effect on both systolic and systolic blood pressure in low-income rural women.

CONSUMPTION OF SOY ON ANTHROPOMETRIC PARAMETERS IN WOMEN IN QWA-QWA, SOUTH AFRICA

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A cross-sectional baseline survey found poverty, poor dietary intake behaviour, over weight (30%) and obesity (52%) in women in a rural community in South Africa. The objective of the study was to plan and implement a community participatory project with appropriate food and nutrition intervention studies (soy gardening and food preparation skills training) to address the prevalence in over weight and obesity among the respondents. The study design consisted of an experimental 18-month intervention study with pre- and post-measurements in normal (n=10), over weight (n=16) and obese (n=28) groups. A random sample of 54 women gave consent to participate in the soy gardening programme (n=162).

Dietary intake patterns were measured by 24-hour recall questionnaires. Compliance of soy planting, harvesting and consumption were tested through ongoing monitoring and questionnaires. Data were analysed on SPSS, version 19.0 for descriptive statistics (mean $\pm$ SD, frequencies). Paired t-tests were done to determine the significant impact of the intervention.

All four measurements (weight, body mass index {BMI}, weight/height ratio & waist) were highly correlated. Though not significant, the mean weight and BMI differences between all groups after intervention were 0.787 ± 6.11 and 0.291 ± 2.46 , respectively. Weight/height ratio as well as waist measurements of all three groups made positive improvements ($p < 0.00$). The same trend was observed in each of the three groups except the obese group with little (waist) or no significant improvements.

The inclusion of soy in both household gardening and into the diet of the respondents ameliorated both the observed pre-intervention poor nutritional status and food insecurity.

DOES SOY CONSUMPTION HAVE AN IMPACT ON CVD RISK FACTORS IN LOW- INCOME RURAL SOUTH AFRICAN WOMEN?

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BACKGROUND

- In SA factors like poverty, violence, lack of education and inadequate services contribute to the increasing incidence of non-communicable diseases (NCD) amongst adults.
- NCD account for 40% of all women deaths in SA.

BACKGROUND

Risk factor	% total deaths	Attributable burden			
		Stroke	IHD	Other CVD	Hyper-tensive disease
Hypertension	9.0	50.0	42.0	22.0	72.0
Overweight and obesity	7.0	45.0	38.0		68.0
High serum cholesterol	4.6	29.0	59.0		(Senekal <i>et al.</i> , 2008:387)

COMMUNITY BACKGROUND

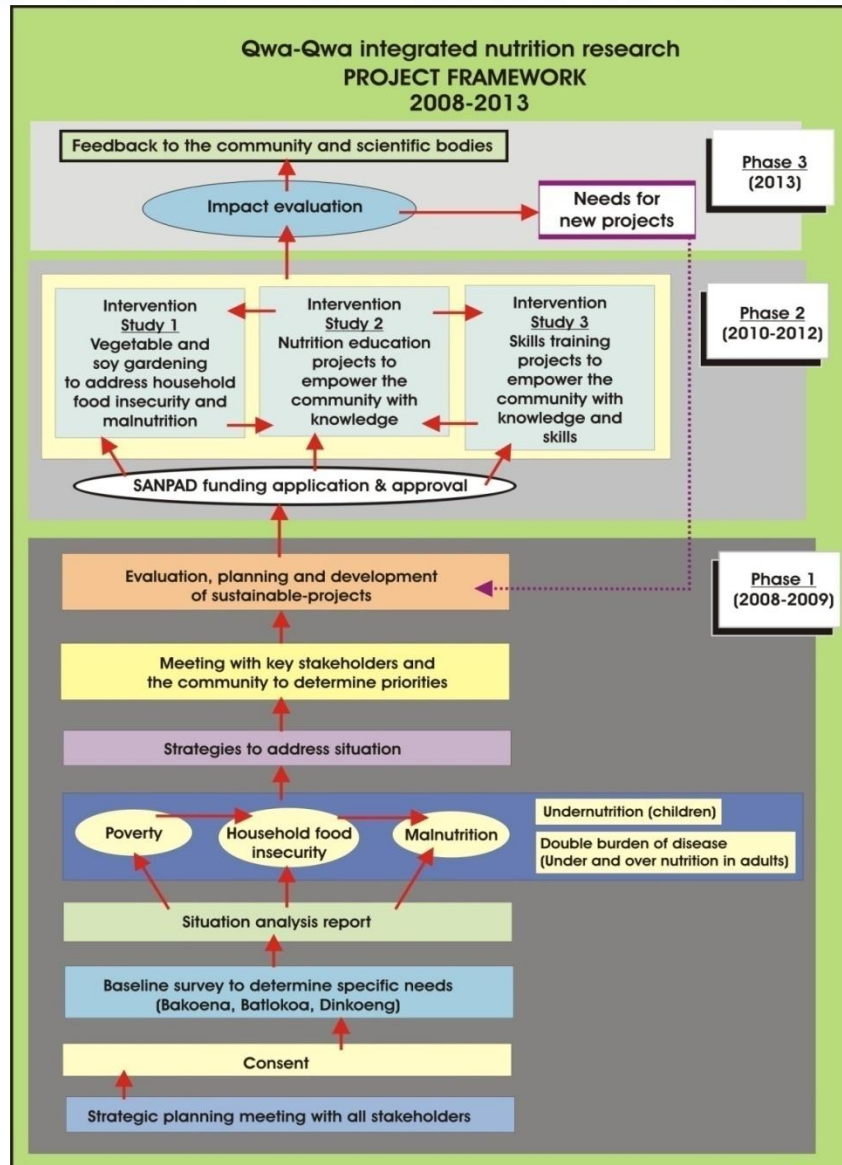
- **Qwa-Qwa**, situated in the Free State province
- Urban and rural areas
- Population of 766 754
- 724 031 Africans (94.4%)
- 73% living below the poverty line for SA (Punt *et al.*, 2005).



COMMUNITY BACKGROUND

- Baseline survey (n=300 households) in 2008 –2009 in three tribal areas: Bakoena, Batlokoa and Dinkoeng community
- 13.3% employed
- Monthly household income < R 1500 (US\$170) (82.6%)
- Poor dietary intake habits
- Poor nutritional status
- 56% hypertension
- 26.0% and 41.9% overweight and obese respectively

PROJECT FRAMEWORK



OBJECTIVE

The objective of this study was to plan and implement a community participatory project with appropriate food and nutrition intervention studies to address the prevalence of malnutrition and NCD in women.

The focus of this paper was on the consumption of 25 g of soy protein daily on CVD risk factors (HT, obesity, chol).

STUDY DESIGN

- Experimental 18-month intervention study.
- Random sample of 90 women who gave consent (n=160).
- Pre- and post measurements:
 - Blood pressure
 - Weight, height, waist
 - Serum lipid profile

INTERVENTION

Soy sensitisation



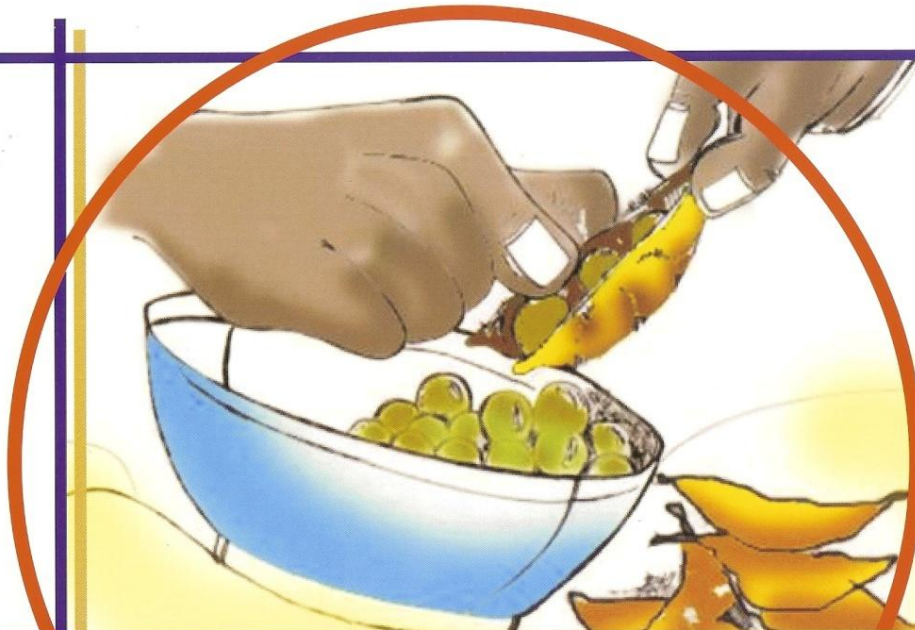
Soy & vegetable gardening



Recipe development



INTERVENTION



Healthy Cooking with Soy



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DATA COLLECTION & ANALYSES

- Blood pressure (HT classification SA guidelines)
- Dietary intake patterns (24-hour recall)
- Anthropometric measurements (BMI & W:H)
- Serum lipids (NCEP classification)
- Compliance testing

- SPSS, version 21 (descriptive analyses)
- Paired and independent t-tests to determine the significant impact of the intervention

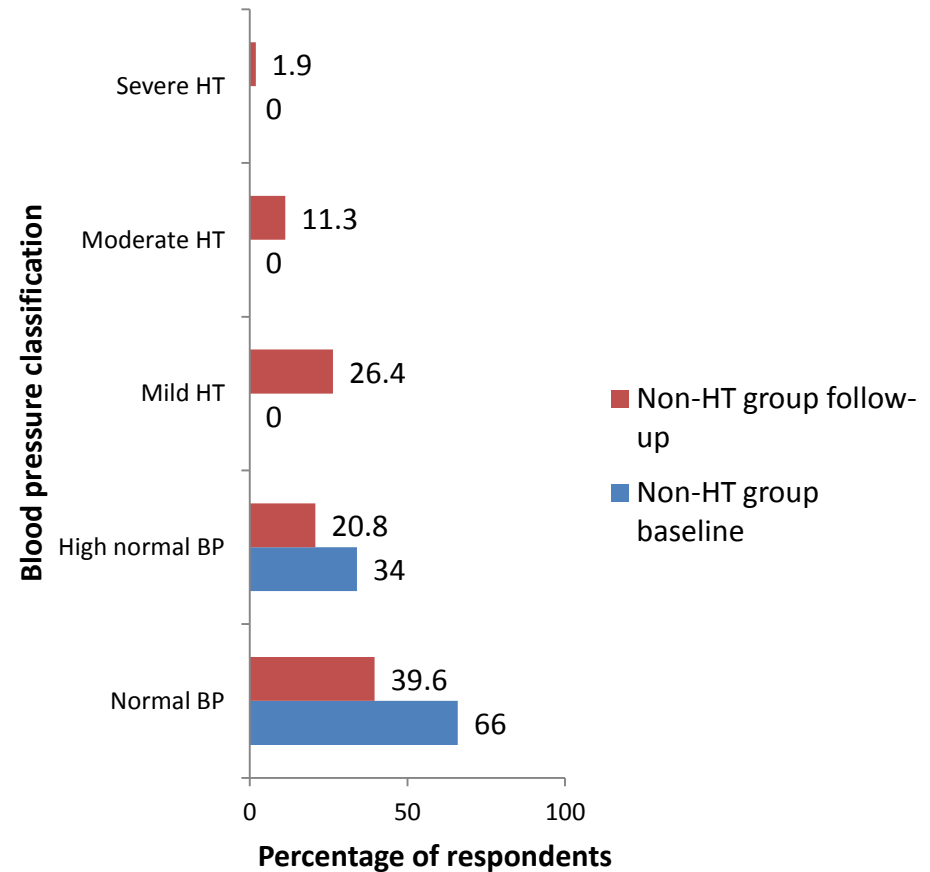
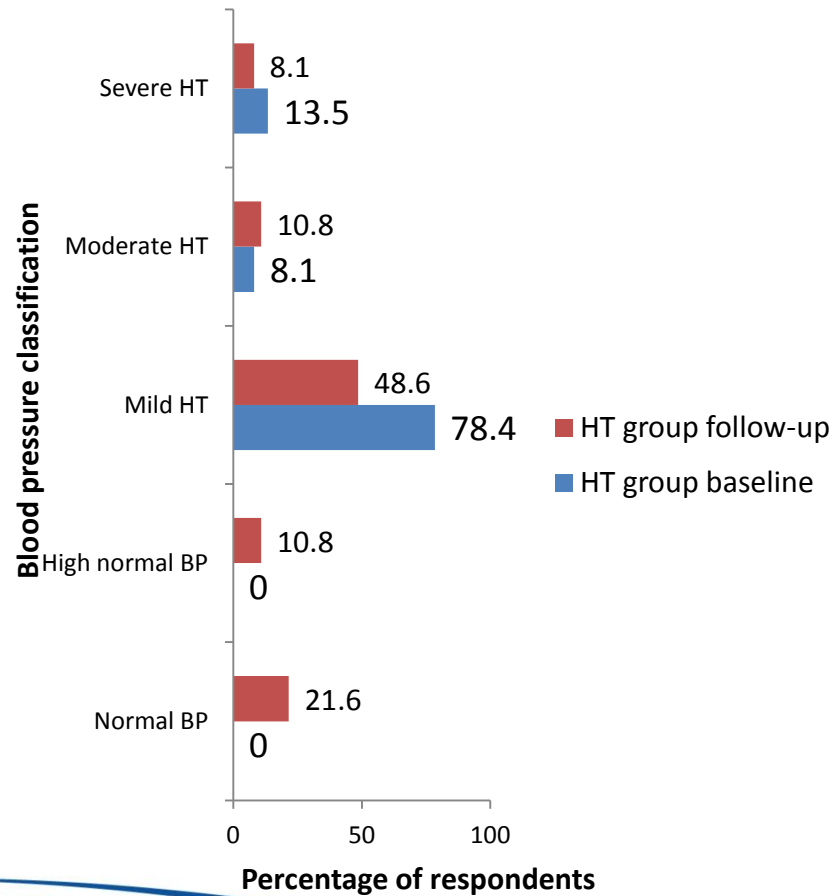
RESULTS: BASELINE

- Mean age 46.5 ± 12.9 years
- 41.1 % hypertensive
- 31.1% overweight and 46.6% obese
- 40% (n=36) of the women were hypercholesterolaemic, based on LDL-C

RESULTS: HYPERTENSION

	Hypertensive group			Non-hypertensive group		
	(n=37, 51%)			(n=53, 49%)		
	Before (mean SD)	After (mean SD)	Signifi- cance <i>P</i>	Before (mean SD)	After (mean SD)	
Systolic BP	137.7 19.2	138.7 26.5	0.811	116.2 12.2	128.5 18.6	0.000
Diastolic BP	95.8 9.7	90.1 19.9	0.067	77.7 8.4	85.0 14.4	0.002

RESULTS: HYPERTENSION



RESULTS: ANTHROPOMETRIC PARAMETERS

Variable	Normal weight group (n=20, 22.2%)	Overweight group (n=28, 31.1%)	Obese group (n=42, 46.7%)
Baseline			
BMI (kg/m ²)	21.8±1.9	27.7±1.4	30.±6.4
WtHR	0.46±0.05	0.52±0.12	0.53±0.15
Follow-up			
BMI (kg/m ²)	25.0±5.3	29.6±3.8	30.7±6.5
WtHR	0.52±0.08	0.59±0.04	0.58±0.07

RESULTS: LIPID PROFILE

			Cholesterolaemic group (n=36, 40%)		Normo-cholesterolaemic group (n=54, 60%)	
Variable	Unit of measure	Normal range	Baseline Mean±SD	Follow-up Mean±SD	Baseline Mean±SD	Follow-up Mean±SD
Serum cholesterol	mmol/L	<5.2 mmol/L ²³	6.8±1.9 ^a	7.2±2.2 ^c	4.4±1.5 ^{a,b}	7.4±2.6 ^{b,c}
HDL-cholesterol	mmol/L	>1.68 mmol/L normal ²³	0.8±0.5 ^{a,b}	1.4±0.5 ^a	0.9±0.6 ^b	1.4±0.6
LDL-cholesterol	mmol/L	<3.3 mmol/L normal ²³	5.4±1.8 ^a	3.9±1.9 ^{a,c}	3.0±1.3 ^{a,b}	2.0±1.9 ^{b,c}
Serum triglycerides	mmol/L	<1.7 mmol/L normal ²³	2.7±0.9 ^{a,b}	2.0±1.0 ^a	2.3±0.8 ^b	2.2±1.2
HDL:LDL ratio		>0.4 ²²	0.18±0.14 ^{a,b}	0.27±0.1 ^a	0.37±0.33 ^b	0.39 0.8

CONCLUSIONS

- Hypercholesterolaemia, hypertension and obesity were prevalent among this group of women.
- Consumption of 25g soy protein per day led to significant:
 - Reduction in diastolic blood pressure in the hypertensive group
 - Increase in BMI in the normal weight and overweight groups
 - Increase in the WtHR in the normal and overweight and obese groups
 - Reduction in LDL-C in the cholesterolaemic and normo-cholesterolaemic groups.

CONCLUSIONS

- The intervention had a beneficial effect on lipid profile.
- The anthropometric, hypertension and TC findings were not consistent with the literature.

LIMITATIONS

- Urinary/blood samples were not analysed for isoflavones during the intervention to measure compliance.
- Several confounding factors, such as daily consumption dose, timing between the last dose and fasting blood collection, method of soy processing and intestinal bioavailability, could be responsible for the lack of effect.

LIMITATIONS

- Only baseline and follow-up data collection was done and the researchers can thus not assess the variability of HT and lipid parameters over time.

RECOMMENDATIONS

- Confounding factors to be analysed and measured.
- A case-controlled intervention study with a combination of cholesterol-lowering foods, including soy protein, should be implemented in this community to address the prevalence of CVD risk factors.
- Other interventions – lifestyle and dietary changes

***THANK
YOU!***

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