Impact of a Soy Nutrition Education Intervention on Knowledge of Smallholder South African Soy Farmers

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Introduction

In South Africa (SA), the estimated number of smallholder farmers are four million[1]. Smallholder farmers mainly engage in agriculture to procure an extra source of food for household use[1], thus the ability to feed themselves[2], and also to sell surpluses at the local markets to gain income to purchase other food items[1]. A recent study found 45% food insecurity among soy farmers in SA[3]. Although these farmers produce mainly maize and soy, soy was not regularly used in their households as it was considered animal feed[3]. Many benefits are associated with the regular consumption of soy, in combination with a diversified diet[4,5]. Education has an important role in combating food insecurity[1] and researchers suggested that sufficient education and training is important for all farmers[6].

Purpose & Objectives

The purpose of this study was thus to assess farmers' knowledge and perceptions of soy before and after participating in a soy nutrition training workshop. The objectives that guided this study were to (1) describe farmers' current use of soy, (2) determine the change in farmers' soy and Food-Based Dietary Guidelines for South Africa (FBDG-SA) nutrition knowledge, and (3) determine the perceptions of soy after the intervention.

Methods & Data Analysis

- Study protocol was approved by the Research and Innovation Committee, VUT (ECN58-2017) and the Institutional Research Board, TTU (IRB2018-596)
- One-group pretest-posttest design was used
- Convenience sample of 78 smallholder male farmers from KwaZulu-Natal, participating in a one-day soy nutritional education training program during August 2017
- Six hour soy and nutrition education program (SNEP), informed by the Social Cognitive Theory, implemented
- Measurements included demographic variables, soy and nutrition knowledge questionnaire[4], Lickert scale for soy perception and taste
- Data were analyzed using IBM SPSS, version 23.0 and $p<0.05$ considered significant
  - Descriptive statistics (means±SD, frequencies)
  - Paired sample t-tests (continuous nominal data), Chi-Square tests (categorical data) to determine change in perceptions and knowledge after the training
  - McNemar test to determine the in the preparation of soy foods after the training (easy versus difficult)

Table 1 The major constructs of the SCT and application in the NEP

Lesson topics	Objectives	Format	SCT constructs addressed
Health	1.Understand the definition of health 2.Know the signs of malnutrition	• Lesson • Group discussions and feedback by groups	Behavioral capability Environment
FFBDGs	1.Familiarize with the SA Food-Based Dietary Guidelines (FBDGs) and guide for healthy eating 2.Identify food groups 3.Learn to select different foods for a balanced meal 4.Learn about appropriate portion sizes	• Lesson • Small groups planning meals with the assistance of food models • FBDG pamphlets to take home	Behavioral capability Environment Self-regulation
Health benefits of soy	1.Familiarize with the health benefits of soy in terms of under- and over nutrition	• Lesson	Behavioral capability
Commercial soy food products	1.Identify soy-based commercial food products 2.Learn how to read food labels	• Lesson • Show examples of commercial foods • Small groups reading and identifying soy on food labels	Behavioral capability Expectations Self-efficacy Reinforcement Environment
Use and preparation of soy	1.Learn how to soak soy 2.Learn about the different ways of preparing soy 3.Learn how to replace meat/chicken with soy in recipes	• Lesson • Cooking demonstration (soy milk, yoghurt, bread and nuts) • Food tasting • Soy recipe book to take home	Self-efficacy Reinforcement Expectations Behavioral capability Observational learning Environment

Results

- Only 41% of the farmers used soy for household food preparation
- Soy was mainly used for cooking and adding to meat stews in the households
- The mean±SD score of taste preference changed significantly ($p=0.002$) from 4.60±0.84 before to 4.93±0.13 after the training ($p=0.002$)
- The majority of the participants perceived it was easy to prepare soy foods 82.1% and 88.5% before and after the training respectively ($p=0.0013$).




Table 2 Knowledge of soy and nutrition (n=78)

Knowledge Variables	Pre-Test mean±SD (% participants with correct answers)	Post-Test mean±SD (% participants with correct answers)	Change Score mean±SD (change in overall correct answers by participants)	Significant difference between pre- and post p
FBDG	7.79±1.80 (59.9)	7.55±3.05 (58.1)	0.24±3.04 (-1.85)	0.481
Soy uses	9.00±2.32 (64.3)	13.86±3.73 (99.0)	4.86±3.65 (34.71)	<0.001
Soy foods	5.27±2.11 (58.6)	6.14±1.63 (68.2)	0.87±2.45 (9.67)	0.002
Soy health benefits	3.69±1.24 (73.8)	3.90±1.59 (78.0)	0.21±1.89 (4.20)	0.340
Overall soy knowledge	18.54±4.39 (66.2)	24.45±6.77 (87.3)	5.91±6.73 (20.25)	<0.001
Overall soy and FBDG knowledge	26.33±5.06 (64.2)	32.00±9.46 (78.0)	5.67±9.11 (13.83)	<0.001

Conclusions & Recommendations

- This study demonstrated that a short-term theory-based, interactive soy and nutrition training, including multiple supportive food-based strategies, can significantly and positively influence soy and nutrition knowledge as well as soy perceptions of smallholder farmers.
- Need exists for nutrition education among food insecure smallholder farmers, especially education about the SA FBDGs, use of available produce in household diets, as well as food preparation skills training.
- Further research should include a case-controlled longer term education program to observe and analyze the impact of the education program on long-term knowledge retention and behavior change.

Acknowledgements

- Oilseeds Advisory Committee in SA for funding
- Grain SA for arranging the venue and farmers to participate in the training
- Farmer participants
- Fieldworkers for assistance with data collection

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