PHYTOESTROGENS AND EARLY ONSET ANDROGINIC ALOPECIA: A STUDY IN NDOLA, ZAMBIA.

PERSPECTIVE

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Androgenic alopecia is the most common type of hair loss experienced in males, presenting in genetically susceptible males with high free testosterone levels. Early onset androgenic alopecia refers to androgenic alopecia with an onset before thirty years. Phytoestrogens are plant derived substances that exhibit estrogen like properties in the body. The aim of the study was to determine the association between phytoestrogen containing foods and early onset androgenic alopecia.

A retrograde case control study was conducted in Ndola, Zambia. The study was conducted from the 10th of September 2016 to the 22nd of January 2017.Control group comprised individuals with a positive familial susceptibility to androgenic alopecia, with no androgenic alopecia. Case group comprised individuals who had visible androgenic alopecia.

A total of 194 individual participated in this study of which 97 were Cases and 97 Controls. The high intake of Soy foods was found to be significantly associated with decreased early onset androgenic alopecia (OR=3.5, 95% CI [1.862-6.546], other food however showed no significance.

The study shows that individuals who develop early onset androgenic alopecia have a lower consumption of soya foods. The low consumption of soy foods is significantly associated with the presence of early onset androgenic alopecia. Other commonly consumed phytoestrogen containing foods in the study were not significantly associated with early onset androgenic alopecia.

Switching to a high Soya diet may prevent early onset androgenic alopecia in genetically susceptible individuals. Further research is required into other environmental factors associated with early onset androgenic alopecia.

Key Words:

Phytoestrogens, early onset Androgenic alopecia.

Introduction

Androgenic alopecia is the gradual patterned decrease in scalp hair density and loss of due to the transformation of terminal scalp hair to vellus hair in individuals with familial increased susceptible of hair follicles to androgen effects following puberty[1], it is the most common form of hair loss[2,3]. World-wide prevalence thought to be as high as 50%[3]. Early onset androgenic alopecia is that beginning before the age of thirty [4,]. Androgenic alopecia is assumed to be caused by a combination of genetic predisposition and sufficient circulating androgen levels [1]. The mode of inheritance of androgenic alopecia is complex and some have proposed that the genetic component is autosomal dominant while others argue its mode of inheritance is polygenic [1].

Regardless of the mode of inheritance it has been established that high circulating androgen levels are needed for androgenic alopecia expression [5,6]. Increased hair growth has been noted in estrogen treated hair obtained from the temporal region of balding men [7,8].

Phytoestrogens are plant derived estrogen like substances. They are thought to be hormonally active in the body. Numerous health benefits have been attributed to their consumption such as a lowered risk of osteoporosis, heart disease, breast cancer, prostate cancer and menopausal symptoms [9,10,11,12]. Phytoestrogens are also considered to be endocrine disruptors. Phytoestrogen containing foods include Soya and Soya products, Beans (black beans, white beans and mung beans), Nuts including peanut butter, lentils, peas, carrots and rice. [13]

Consuming phytoestrogen rich foods such as soya among others may act as an endocrine disruptor preventing the expression of androgenic alopecia in genetically susceptible individuals. Relatively little is known of the environmental factors relating to androgenic alopecia, though they may play act to slow, speed up or possibly prevent androgenic alopecia. Phytoestrogens are an important possible factor in androgenic alopecia. [14]

Methodology

Study Site: The study was done at Northern Technical College which is located in Ndola on the Copperbelt province of Zambia. The area was chosen as it has a collective large population of young adults who are known to consume a lot of phytoestrogen rich foods.

Study Design:

Study Site: The study was done at Northern Technical College which is located in Ndola on the Copperbelt province of Zambia. The area was chosen as it has a collective large population of young adults who are known to consume a lot of phytoestrogen rich foods.

Study Design: The study was a retrograde case-control study looking for association between a phytoestrogen rich diet and early onset androgenic alopecia. . With the aid of a Chart showing the Hamilton-Norwood scale students were asked to identify if any immediate family members had hair loss ,the scale was also used

Study population: Males aged 15years to 30years. The study included individuals who had consented to the study, individuals who did not give their consent were not included in the study. The controls were individuals with a familial susceptibility to androgenic alopecia but with no visible androgenic alopecia, while the cases were individuals with visible androgenic alopecia.

Study population: Total number of participants was 194 of which 97 were Cases and 97 were Controls. The sample size was computed from a pilot study .The pilot study had 30 cases and 30 controls. Parameter used to determine the sample size was the intake of Soy and Soya products association with androgenic alopecia were P1 case prevalence= 44% and P2 case prevalence= 25% f(αβ) was taken as 7.8% at power 80% and significant level at 5% and this gave a minimum sample size of 94.

Variables

The dependent variable for this study was perception androgenic alopecia, participants were classified as either visible hair loss (case) or no hair loss (control). Other domains considered in this study were the level of alopecia and the time taken to reach the level of alopecia .The independent variable was the intake of phytoestrogen rich foods.

Ethical considerations

Permission to conduct the study was obtained from the Tropical diseases research centre, the Copperbelt University School of Medicine and the Students at Northern Technical College who participated in the study.

Data Entry and analysis

The data obtained using the questionnaire was entered into SPSS version 20 for analysis. Descriptive statistics and logistic regression were used for the analysis. The chi square test was used to determine associations between phytoestrogen intake and early onset androgenic alopecia. A p value of less than 0.05 was considered to be statistically significant, 95% Confidence interval was used and the adjusted odds ratio was computed.

Results

A total of 194 respondents (97 cases and 97 controls) all aged between 15years and 30years.

Table 1 shows the association between commonly eaten phytoestrogen containing foods and the androgenic alopecia. There was a significant association between intake of Soy foods and androgenic alopecia however; other foods had no significance to androgenic alopecia.

Table1: Phytoestrogen food intake association with perception of androgenic alopecia

Phytoestrogen Food Intake		Perception Of Androgenic Alopecia		P - Value
		Hair Loss (Case)	No Hair Loss (control)	
Soy & Soya	Low	69(73.4)	42(44.7)	<0.001
	High	25(26.6)	52(55.3)	
Beans	Low	70(72.2)	66(68.8)	0.603
	High	27(27.8)	30(31.2)	
Nuts	Low	40(41.2)	48(52.2)	0.132
	High	57(58.8)	44(47.8)	
Peas	Low	84(86.6)	85(89.5)	0.540
	High	13(13.4)	10(10.5)	
Carrots	Low	78(80.4)	85(89.5)	0.080
	High	19(19.6)	10(10.5)	
Oats	Low	85(87.6)	82(85.4)	0.653
	High	12(12.4)	14(14.6)	
Lentils	Low	91(92.9)	84(87.5)	0.209
	High	7(7.1)	12(12.5)	
Rice	Low	21(21.6)	18(18.9)	0.642
	High	76(78.4)	77(81.1)	

Table 2 this shows the intake of soya to be independently significant to androgenic alopecia. Individuals with a high intake of soy were 3.5 (95% CI [1.862-6.546]) times less likely to have androgenic alopecia compared to those who had a low intake.

Table 2: Independently significant to androgenic alopecia

Factor	P-value	Model 1 AOR(95%CI)	Model 2 AOR(95%CI)
Soya intake	<0.001	3.511(1.870-6.591)	3.491(1.862-6.546)
Beans	0.525	1.259(0.618-2.563)	
Nuts	0.373	0.745(0.391-1.422)	
Peas	0.759	0.841(0.278-2.546)	
Carrots	0.223	0.530(0.191-1.472)	
Oats	0.475	1.445(0.527-3.963)	
Lentils	0.224	2.022(0.60-3.047)	
Rice	0.462	1.355(0.603-3.047)	

Discussion

The aim of this study was to investigate the association between commonly consumed phytoestrogen containing foods and early onset androgenic alopecia. The study showed a significant association between the consumption of soy foods and androgenic alopecia. Other foods (Rice, oats, carrots, beans, peas and nuts) were not found to have a significant association with androgenic alopecia.

A high consumption of soy foods was found to be significantly associated with the absence of androgenic alopecia and a low consumption with the presence of androgenic alopecia. This finding has been postulated and documented in other studies, none of which have been conducted in Zambia. [15, 16]

Despite been said to be phytoestrogen containing foods and been locally commonly consumed, food such as beans, nuts, lentils ,peas, oats ,carrots and rice showed no significant association with the presence of androgenic alopecia [13]. This finding can be explained by looking at the relative amounts of phytoestrogens that the foods contain. [13] It is easily evident that the levels of phytoestrogens that these foods contain relative to soya are very little; as such it is no surprise that were found to be insignificant in this study.

Study Limitation

The diet of individuals in tertiary education systems such as the one of this study does not necessarily reflect the diet patterns of the rest of the population. The students also have a break from the dieting pattern that was investigated for a period of about three months when they are on school break, however very few mentioned this. The food history taken was based on a weekly consumption which was taken as a reflection of chronic diet.

Conclusion

In this study two observations were made. It was found that individuals who had a diet rich in soya were less likely to have early onset androgenic alopecia despite been genetically susceptible and those with low soya intake more likely to have early onset androgenic alopecia.it was also found that other phytoestrogen containing foods did not have a significance on early onset androgenic alopecia.

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