

## Original Article

## Quail eggs consumption and the levels of sex hormones in healthy students of Nnamdi Azikiwe University, Nnewi

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### Abstract

**Aim:** The present study was design to determine the serum levels of sex hormones (estradiol, progesterone, follicle stimulating hormone, lutenizing hormone, prolactin, and testosterone) following the consumption of cooked quail eggs by apparently healthy students.

**Materials and Method:** This is an experimental study comprising 37 volunteered students, out of which are 20 females and 17 males within the age of 18±35years respectively. They were fed with three cooked quail eggs every morning for 21 days. 3ml of fasting blood were collected before the intake of cooked quail eggs for baseline, 10<sup>th</sup> day, and 21<sup>st</sup> day respectively.

**Result:** The serum levels of estradiol, progesterone, follicle stimulating hormone, lutenizing hormone, prolactin, and testosterone were determined using standard methods. The result showed that the serum testosterone levels increased significantly while prolactin levels decreased significantly at 10<sup>th</sup> and 21<sup>st</sup> day compared with the baseline level (p=0.01). However, the levels of progesterone and estradiol increased significantly at 21<sup>st</sup> day only compared with their baseline (p=0.01). The mean levels of FSH, and LH at baseline, 10<sup>th</sup> and 21<sup>st</sup> day did not differ significantly following consumption of cooked quail eggs.

**Conclusion:** The probably suggest that regular consumption of cooked quail egg may prevent miscarriage due to low progesterone levels because of its ability to increase progesterone level after consumption. It might as well as cause improvement on male and female fertility.

## 1. Introduction

Quail eggs are highly nutritious, containing essential minerals and vitamins and antioxidants. The average egg from mature female weighs about 11.05 grams. Even with their small size, the nutritional value of quail eggs is 3 - 4 times greater than chicken eggs [1]. The nutritional values of quail eggs are much higher than those offered by other eggs [2]. Unlike chicken eggs, quail eggs have not been known to cause allergy [3]. Foods are not intended to only satisfy hunger and provide necessary nutrients for humans. It is also required for the prevention of nutrition-related diseases, body maintenance and mental wellbeing of its consumers [4]. Chinese traditional doctors use quail eggs in treatment of various diseases [1]. Sex hormones influence the development, maturation, activation and death of immune cells [5]. The most sex hormone of whole quail eggs was progesterone, which was both high in egg white and egg yolk and testosterone was high in egg yolk [1]. The onset of puberty is believed to occur as a consequence of a change in the steady state of the prepubescent pituitary-gonadal system. The FSH, LH and estradiol are essential for the complete development of the mature ovum, which involves both follicular and oocyte maturation.

Worldwide, infertility affects about 8-12% of couples [6]. However, the incidence varies from one region of the world to the other, being highest in the so-called infertility belt of Africa that includes Nigeria [6,7]. One of the major causes of infertility in both male and female is hormonal imbalance and the identification of foods or supplements that can correct this imbalance will be of great help to those populations affected. It is in the light of this that the effects of consumption of cooked quail eggs on sex hormones were evaluated in some students of Nnamdi Azikiwe University, Nnewi Campus, Anambra State.

## 2. Materials and Methods

### 2.1 Study Areas

This work was carried out in the College of Health Sciences, Nnamdi Azikiwe University, Nnewi Campus, located in Okofia Nnewi,

Anambra State, while the biochemical analysis was done in Chemical Pathology Laboratory, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State and Springboard Research Laboratories, Awka, Anambra State.

### 2.2 Study Population

Thirty- seven (37) apparently healthy subjects, within the age range of 18-35 years were recruited for the study. They are within the age range of 18-35 years. Maximum compliance was ensured by marking attendants of my subjects every morning in my office and by going to their hostel during weekends. Subjects were recruited from the students of the College of Health Sciences, Nnamdi Azikiwe University, Nnewi Campus. Only those that gave their informed consent after the due explanation of the study were recruited for the study. This study was approved by the Ethics Committee of Faculty of Basic Medical Sciences, College Health Sciences, Nnamdi Azikiwe University, Nnewi Campus.

### 2.3 Preparation and administration of quail eggs

Quail eggs were bought from Chuks Agro Business Ventures, at No 10 Nwafor Orizu Avenue, Obinuo Otolo, Nnewi. A Zoologist properly certified the quail eggs. The quail eggs were cooked for one hour. The cooked quail eggs (3pieces) were given to each subject between 8a.m-9.30a.m every morning for 21days. Only the egg yolk and egg white was consumed.

### 2.4 Sample collection

Three (3) ml of fasting blood was collected from each subject at baseline, 10<sup>th</sup> day and 21<sup>st</sup> day following the consumption of quail eggs. It was dispensed into plain bottles and allowed to clot, retracted and centrifuged for 5 minutes at 3000 rpm. The serum was then collected into another sterile plain container and stored frozen at -20 °C until analysis of biochemical parameters.

### 2.5 Analytical methods

The determination of follicle stimulating hormone, lutenizing hormone, prolactin, estradiol (E2), progesterone and testosterone was done by Enzyme linked Immunoassay [8].

**2.6 Statistical analysis**

Statistical analysis was done using Statistical Package for the Social Sciences (SPSS) version 21. The values are presented as mean ±

SD, and paired t- test was used to analyze two related variables while independent t-test was used to analyze two independent variables. P<0.05 was taken as level of significance.

**3. Results**

**Table 1.1: Levels of sex hormones (FSH, LH, prolactin, testosterone (male only), estradiol (female only) and progesterone (female only) at baseline, 10<sup>th</sup> and 21<sup>st</sup> day following the consumption of cooked quail eggs (mean ± S.D; n =37; male = 20; female = 17).**

Parameters	FSH (mIU/ml)	LH (mIU/ml)	Prolactin (mIU/ml)	Testosterone (mIU/ml)	Progesterone (mIU/ml)	Estradiol (mIU/ml)
Baseline (A)	13.08±3.55	12.20±3.42	17.86±5.71	5.24±2.82	94.31±12.68	1.11±0.18
10 <sup>th</sup> day (B)	13.91±3.47	12.95±2.83	14.63±6.06	7.04±1.94	112.27±66.61	1.17±0.30
21 <sup>st</sup> day (C)	12.96±3.09	12.04±2.08	13.89±4.57	7.72±1.97	128.94±20.54	1.30±0.26
P-values	AvB=0.25	0.30	0.00	0.01	0.10	0.25
	AvC=0.87	0.79	0.00	0.01	0.00	0.00
	BvC=0.29	0.07	0.42	0.29	0.14	0.06

**KEY:** Testosterone levels increased significantly while prolactin levels decreased significantly at 10<sup>th</sup> and 21<sup>st</sup> day compared with the baseline level (p=0.01). However, the levels of progesterone and estradiol increased significantly at 21<sup>st</sup> day only compared with their baseline (p=0.01). The mean levels of FSH, and LH at baseline, 10<sup>th</sup> and 21<sup>st</sup> day did not differ significantly.

**4. Discussion**

This study revealed increased progesterone and testosterone in female and male respectively, and decreased prolactin levels in both sexes at 21<sup>st</sup> day following consumption of cooked quail egg consumption. This collaborates with the findings that most sex hormone of whole quail eggs was progesterone, which was both high in egg white and egg yolk [1]. Progesterone is the hormone that sustains pregnancy and its rise at the luteal phase of the female cycle suggests that ovulation occurred. Regular consumption of quail eggs may prevent miscarriage due to low progesterone levels because of its ability to increase progesterone level after consumption.

Increased testosterone level after consumption of cooked quail eggs in these male subjects may be due to raised levels of Zn and Se found in this subjects. This also collaborates with the findings that most sex hormone of whole quail eggs is testosterone and high in egg yolk [1]. For instance, zinc is necessary to maintain normal serum testosterone. Inadequate zinc levels prevent the pituitary gland from releasing luteinizing and follicle stimulating hormones, which stimulate testosterone production. Zinc also inhibits the aromatase enzyme that converts testosterone into excess estrogen.

Krsnjavi *et al* reported that serum selenium was significantly lower in men with oligospermia and azoospermia than in controls (fertile men). They also observed a significant difference in serum selenium levels in men with oligospermia and azoospermia, being higher in men with oligospermia than azoospermia [9].

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