

**AGE AT MENARCHE IN NIGERIAN ADOLESCENT GIRLS CASE STUDY: (IGBO, YORUBA, HAUSA AND ENGENNI TRIBES OF NIGERIA)****Tarimobo Michael Otobo<sup>1</sup>, John Nwolim Paul<sup>2\*</sup> and Osah Onyemauche Isikaku<sup>2</sup>**<sup>1</sup>Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria.<sup>2</sup>Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Port Harcourt, Rivers State, Nigeria.**\*Corresponding Author: John Nwolim Paul**

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**ABSTRACT**

**Background:** Menarche the commencement of menstruation with physical, physiological and mental changes associated with puberty. The age of menarche was studied among 600 subjects from the Ibo, Yoruba Hausa and Engenni tribes of Nigeria. The studied age was between 18-22 years. The aim and objectives of this study were to estimate the distribution of age of menarche as well as to determine the mean age of menarche among the adolescents also to find the factors that could affect the age at menarche. **Methods:** The menarcheal age was determined by a retrospective and simple random sampling method conducted through the use of structured close-ended questionnaires distributed randomly and retrieved. **Results:** Data revealed that 100% of the populations studied were menstruating and on analysis showed the mean age of menarche to be  $13.1 \pm 0.08$  with a median of 12. The range of their menarche age is 10-17 years. The mean length of period was found to be  $4.51 \pm 0.05$  with a median of 3, the length of period was found to vary among the subjects; 14.5% menstruate for 3 days, 43.7% for 4 days, 25.8% for 5 days, 7.5% for 6 days and 8.5% for 7 days. **Conclusions:** It was found that 54.5% of the subjects had 28 days cycle while others had less than or more than 28 days. The mean age at menarche was  $13.1 \pm 0.08$ . Menarche age was found to occur earlier in subjects from the Yoruba tribe thus menarcheal age is associated with nutritional availability and improved diet.

**KEYWORDS:** Menarche, Adolescent Girls, Tribes, Nigeria.**INTRODUCTION**

Menarche is a Greek word “men” – moon and “arche”-beginning. It is the onset or commencement of menstruation as well as physical, physiological and mental changes associated with puberty. The age of menarche therefore means the actual age when this, occurs in girls. Menarche is an important landmark in sexual maturity. It occurs when the reproductive organs become functionally active and may take place at any time between the ages of 9 – 17 years.

Girls experience menarche at different ages. The timing of menarche is influenced by female biology, as well as genetic and environmental factors. The average age of menarche has declined over the last century but the magnitude of the decline and the factors responsible remain subjects of contention. The worldwide average age of menarche is very difficult to estimate accurately, and it varies significantly by geographical region, race, ethnicity and other characteristics.<sup>[1, 15]</sup> Various estimates have placed it at 13.0; some suggest that the median age of menarche worldwide is 14 years, and that there is a

later age of onset in Asian populations compared to the west. The average age of menarche is about 12.5 years in the United States, 12.72 years in Canada, 12.9 years in the United Kingdom and  $13.06 \pm 0.10$  years in Iceland.

When Menarche occurs, it confirms that the girl has had a gradual estrogen – Induced growth of the uterus, especially the endometrium, and that the “outflow tract” from the uterus, through the cervix to the vagina is open<sup>[2]</sup>. In very rare instances, menarche may occur at an unusually early age, preceding thelarche and other signs of puberty. This is termed isolated premature menarche, but other causes of bleeding must be investigated and excluded. Growth is usually normal. Isolated premature menarche, is rarely the first manifestation of precocious puberty.

When menarche has failed to occur for more than 3 years after thelarche or beyond 16 years of age, the delay is referred to as Primary Amenorrhea.

The study of age of menarche therefore is of paramount importance because it gives an account of the level of development in girls. The study also seeks to find the age at menarche, patterns of menstruation among adolescent girls and also to find the various factors that can cause variation in the age of menarche. Such factors could be socio-economic, environmental, genetic, nutritional hormonal, chemical agents and stress (Childhood stress). Other factors include seasonality, diseases, physical activities and altitude level.<sup>[3]</sup>

The rate and level of secretion of various hormones like follicle stimulating hormone (FSH), Lutenizing hormone (LH,) Oestrogen as well as progesterone level have been implicated to be responsible for the attainment of the age of menarche.<sup>[3]</sup> The above mentioned hormones act on the various reproductive organs, such as ovaries and uterus, to cause maturation of the ova and preparation of the endometrial lining of the uterus, which subsequently sheds off if implantation does not occur.

Menstruation is however physiological processes that may give rise to various discomforts in some females, most of them appear in the late premenstrual phase and persists to the first day of menstruation. These discomforts are feelings of heaviness in the pelvic, lower abdomen and in the back, fullness in the breasts, feelings of pricking frequent urination and constipation, irritability and headache. These discomforts do not interfere with usual activity of most normal women.<sup>[15]</sup>

**Table 1: Age at Menarche in various countries around the world.**

COUNTRY	DATE	AGE
Italy	1995	12.0
India	1998	12.1
Greece	1999	12.3
Hong Kong	1997	12.4
Thailand	2007	12.5
USA	2001	12.5
France	2006	12.6
Japan	2002	12.6
Denmark	2008	13.6
UK	2009	13.0
Cameroon	1999	13.2
South Africa	2000	13.2
Belgium	2005	13.1

#### MENARCHE AS PART OF PUBERTY

Menarche is the culmination of a series of physiological and anatomic processes of puberty which are;

- Attainment of a sufficient body mass (typically 17% body fat).
- Disinhibition of GnRH pulse generator in the acute nucleus of the hypothalamus
- Secretion of estrogen by the ovaries, in response to pituitary hormones.
- Over an interval of about 2 to 3 years, estrogen stimulates growth of the uterus (as well as height,

breast, widening of the pelvis, and increased regional adipose tissue)

- Oestrogen stimulates growth and vascularity of the endometrium, (the lining of the uterus).
- Fluctuations of hormone levels can result in changes of adequacy of blood supply to parts of the endometrium.
- Death of some of the endometrial tissue from these hormone or blood supply fluctuations leads to decidual shedding, a sloughing of part of the lining with some blood flow from the vagina.

A specific hormonal signal for menarche is not known yet, menarche as a discrete event is thought to be the relatively chance result of the gradual thickening of the endometrium induced by rising but fluctuating pubertal estrogen.

The menstruum or “flow” consists of a combination of fresh and clotted blood with endometrial tissue. The initial flow of menarche is usually brighter red than mature menstrual flow. It is often scanty in amount and may be very brief, even a single instance of “spotting”. Like other menses, menarche may be accompanied by abdominal cramping.<sup>[11]</sup>

#### MENARCHE AND FERTILITY

In most girls, menarche does not signal that ovulation has occurred. In post menarcheal girls, about 80% of the cycles were anovulatory in the first year after menarche, 80% in the third and 10% in the sixth year. Regular ovulation is usually indicated by predictable and consistent intervals between menses, predictable and consistent durations of menses, and predictable and consistent patterns of flow (e.g. heaviness or cramping). Continuing ovulation typically requires a body fat content of at least 22%. An anthropological term for this state of potential fertility is nobility.<sup>[12]</sup>

On the other hand, not every girl follows the typical pattern and some girls ovulate before the first menstruation. Although unlikely, it is possible for a girl who has engaged in sexual intercourse shortly before her menarche to conceive and become pregnant, which would delay her menarche until after birth. This goes against the widely held assumption that a woman cannot become pregnant until after menarche.

#### EFFECTS OF STRESS AND SOCIAL ENVIRONMENT ON TIMING OF MENARCHE

The most important part of a child’s psychosocial environment is the family. Some of the aspects of family structure and function reported to be independently associated with menarche:

- The increased incidence of obesity (reaching a body weight of 45kg appears to be an important “trigger” for the very young reaching menarche- both oestrogen and progesterone molecules are derived from cholesterol).
- Absence of father from home from early childhood

- High conflict relationships
- Living in an urban environment
- Some of the aspects of family structure and function related to be independently associated with later menarche;
- Larger family size
- Warmer, closer or more positive relationship with biological father
- Having a number of older sisters.

#### **EFFECT OF CHILDHOOD STRESS ON TIMING OF PUBERTY**

Stress is a vague term and studies have examined conditions ranging from family tensions or conflict to wartime refugee status with threat to physical survival. The more dire social conditions have been found to be associated with delay of menstruation, an effect that may be compounded by dietary inadequacy. There is more uncertainty and mixed evidence as to whether milder degrees of stress or early-life under nutrition can accelerate puberty in girls (Morris *et al.*, 2009).

#### **CULTURAL ASPECTS OF MENARCHE**

Menarche is celebrated in many cultures around the world as a rite of passage, a time to recognize that a girl is moving into womanhood.

#### **rites of passage**

Some cultures have in past centuries had rites of passage for a girl experiencing menarche.

#### **AFRICA**

In the TIV tribe in Nigeria, four lines were cut in the girls abdomen, the practice of which was thought to make her a woman and more fertile.

#### **ASIA, AUSTRALIA AND PACIFIC ISLANDS**

In Australia, the aborigines treat a girl to love magic. The women teach her of the female powers and the physical changes marking womanhood.

When a Japanese girl has her first period, the family celebrates by eating red-colored rice and beans. (Sekihan).

The Ulithi tribe of Micronesia call a girl's menarche Kufar; she goes to a menstrual house, where the women bathe her and recite spells. The girl then returns to the menstrual house when her next period comes.

#### **NORTH AMERICA**

In the United States, rites of passage are rare, since girls are usually taught to keep aspects of sexual development private. Some families celebrate by giving the girl a card of congratulations, or even a candle light ceremony.

#### **FEMALE HORMONAL SYSTEM**

This system consists of hormones produced at different parts of the body....they are:

- The hypothalamus

- The Anterior pituitary gland
- The ovary

From the hypothalamus, Gonadotropin Releasing Hormone (GnRH) is released.

The Anterior pituitary gland secretes Luteinizing Hormone (LH) and Follicle stimulating Hormone (FSH) in response to release of Gonadotropin Releasing Hormone (GnRH) from the hypothalamus.

The ovary causes the release of oestrogen and progesterone in response to the release of LH and FSH. These hormones are secreted in different quantities during different part of the female reproductive cycle by the negative feedback Mechanism. In the absence of these hormones, the ovaries remain inactive, which is the case throughout childhood when almost no pituitary gonadotropic hormones are secreted.

#### **PHYSIOLOGY OF THE FEMALE HORMONE**

Gonadotropin Releasing Hormone (GnRH) is a peptide hormone released from the hypothalamus, which stimulates gonadotrope cells pituitary hormone.

Luteinizing Hormone (LH) is a larger protein hormone secreted into a general circulation by the gonadotrope in the anterior pituitary. Its main target is the theca cells of the ovary. It initiates puberty in 25 – folds with its onset.

Follicle-stimulating Hormone (FSH) is secreted 2-5 folds compared to luteinizing Hormone (LH). It is a protein hormone secreted into the blood circulation. It acts on ovarian follicles.

Oestrogen is a steroid hormone produced in the granulosa cells of the ovaries. It promotes the growth of breast and uterus (MacCillivary, 1998). This hormone induces bone maturation, body fat distribution, cervical, mucus secretion, vaginal cell cornification and proliferative endometrium present on biopsy (Tanner, 1978).

Progesterone is the hormone for the final preparation of the uterus for pregnancy. It transforms the endometrium to its secretory phase and inhibits the electrical activity of the myometrium. It promotes increase in basal body temperature after ovulation.

These hormones regulates, the menstrual cycle by increase or decrease in either follicular phase or luteal phase.

#### **MENSTRUAL CYCLE**

Menstrual cycle is a reoccurring cycle of physiological changes that occurs in reproductive age females. This menstrual cycle is under the control of the hormone system and is necessary for reproduction. The hormones are oestrogen and progesterone, which are regulated by the hypothalamus. The average length of the menstrual

cycle is 28 days. There are two types of cycle known as the long and short cycle. A woman who experiences variation of less than eight days between her longest and shortest cycle is considered having a regular cycle. There are several phases of menstrual cycle, which are controlled by the hormonal cycle.

#### **MENSTRUAL PHASE**

The menstrual phase is called menstruation: It is a process whereby the uterus sheds its endometrium lining which flows as blood from the uterus to the vagina and then to the outside. This occurs because the level of progesterone that maintains the uterine wall (endometrium) is decreased, since the corpus luteum which produces it has become atretic. When this phase occurs, it is a sign of no pregnancy. The average blood loss during menstruation is 35ml, 10-80ml is considered normal (David, 2004).

#### **FOLLICULAR PHASE**

This is the phase at which the ovarian follicles begin to mature by the process of folliculogenesis and compete with each other for dominance. This occurs because 5-7 tertiary stage ovarian follicles are recruited for entry into the next menstrual cycle by the hormone called Follicle Stimulating Hormone (FSH). Different hormones influence the maturity of the follicle. As they mature, these follicles secrete increased amount of estrogen (estradiol) which initiate the formation of the endometrium of the uterus. It also stimulates crypts in the cervix to produce fertile cervical mucus. This phase occurs between 5-13 days of menstrual cycle.

#### **OVULATION**

This is the release of ovum from the Graafian follicle. During the menstrual cycle, it occurs on the 14<sup>th</sup> day of the cycle. The secretion of oestrogen triggers the luteinizing hormone, which helps to mature the eggs and weakens the wall of the follicle in the ovary. This process causes ovulation. Ovulation is necessary for fertility but may or may not accompany early menses (Marshall, 2006).

#### **LUTEAL (SECRETORY) PHASE**

This phase parallels the formation, function and growth of corpus Luteum. It lasts about 13 days. The progesterone secreted by the corpus stimulates the glandular epithelium to secrete glycogen – rich materials and the endometrium thickens, if fertilization does not occur, the corpus luteum degenerates, estrogen and progesterone level falls and shedding of the functional layer of the endometrium marks the beginning of the menstrual phase of the cycle.

However, if fertilization occurs, the endometrium assists in implantation and contributes to the formation of the placenta.

#### **ISCHEMIC PHASE**

This is between the 27<sup>th</sup> – 28<sup>th</sup> day of menstruation. It occurs due to decrease in progesterone because of lack of Human chorionic Gonadotropin (HCG). This HCG nourishes the corpus luteum. The fall in oestrogen and progesterone set next stage for menstruation.

#### **FACTORS AFFECTING AGE OF MENARCHE**

Puberty is a process with a gradual onset beginning with changes of neuronal function in the hypothalamus resulting in rising hormonal signals between the brain and the gonad proceeding to the gonadal growth and production of sex steroids, which in turn induce changes in responsive part of the body.

A number of factors have been implicated to affect the age of menarche. Some of the factors include: Socio-economic, environmental, nutritional, Hormonal, stress, Genetic, Chemical agents, physical activities, Exercise and illness.

#### **SOCIO-ECONOMIC VARIABLES**

There has been a wider range of variation in the socio-economic class of individuals which is known to affect menarche. Some of higher, others middle and some others lower class. The higher socio- economic class are those from well off and educated families, the middle class are those civil servants while the lower class are the subsistent farmers who are not too handy.

Those from the higher class tend to see their menarche earlier than those from the lower class. Attributed probably to their high standard of living which causes faster growth and relative overweight compared to their middle and lower class counter parts.

#### **ENVIRONMENTAL FACTORS**

These are basically explained by the degree of urbanization where the social and psychological factors predominates, although least understood. The most important part of a child's psychological environment is the family and most of the social influence research has investigated features of family structure and function in relation to earlier or later female puberty and menarche.<sup>[3]</sup>

#### **NUTRITIONAL FACTORS**

This is one of the strongest and most obvious factors influencing menarche. Girls are especially sensitive to nutritional regulations due to their contribution to the nutritional support to a growing foetus. Excess calories are reflected for body fat, which signals the brain of the availability of resources for initiation of puberty, menarche and fertility.

The quality of diet also plays a role, in that lower protein intakes and higher plant fibre intake as occurs with typical vegetarian diet are associated with later onset and slower progression of female puberty and hence menarche.

Also from studies, lack of calcium ion or deficiency is a cause of late menarche, irregular and painful cramping during menstruation with excessive blood loss and lowered immune response to infections in young girls.<sup>[4]</sup>

It is important also to point out those girls with faster physical growth and those that were relatively overweight had faster onset of menarche.<sup>[4]</sup>

### HORMONAL FACTORS

The attainment of menarche is the resultant effect of what happens to the level of female sexual hormones secretion ranging from those produced in the hypothalamus, anterior pituitary gland to the female gonads – ovaries. If these hormones are produced in a normal quantity as they ought to be, the age of menarche will not shift from the mean age of 13 years but where there is an under or over secretion, One begins to notice a delay in the onset of menarche. Oestrogen is the hormone responsible for inducing ovulation. Administration of this hormone or their analogue to an individual below the normal age can cause a precocious puberty and rapid onset of menarche.<sup>[5]</sup>

### STRESS FACTOR

Recent researches done on age of menarche showed that childhood stress may be one of the culprits behind an alarming phenomenon of girls reaching puberty at an early age.<sup>[6]</sup>

A girl who has virtually domestic responsibility at home e.g. farming etc, have early age of menarche, girls who experience trauma in childhood tend to expect a short life than those who do not because it triggers the pituitary gland and hurries puberty.<sup>[6]</sup>

Girls who live with their stepfather during their childhood also have early puberty.<sup>[7]</sup>

### GENETIC FACTOR

This is another factor that has been suggested and studied to influence menarcheal age. Human leukocyte antigen (HLA) - linked gene have been noted to play important role in determining the age of menarche. However there is no significant association between age of menarche and genetic markers such as ABO blood group, Rhesus factor, haptoglobulins, esterase D and phosphoglucomutase.<sup>[8]</sup>

There have been various studies which found direct genetic effect to account for at least 50% of the variation of timing of puberty and menarche in well-nourished populations.

The genetic association of timing is strongest between mothers and daughters though the specific genes affecting the timing are not defined yet. Among the candidates are androgen and luteinizing hormone receptor genes.

### CHEMICAL AGENTS

A number of chemical agents have also been implicated to affect the age of menarche. An example of this chemical is dichlorodiphenyl Trichloroethane (DDT), first found endocrine disruptor whose exposure is known to affect human endocrine function.

Previous studies have investigated the effect of DDT exposure on age of menarche or menstrual cycle length, the result suggested that DDT exposure was associated with earlier age of menarche and increase risk of experiencing a shortened cycle.<sup>[8]</sup>

Other chemical agents includes: polychlorinated biphenyl (PCB's), Biphenols and phthalates.

### PHYSICAL ACTIVITIES, EXERCISE AND ILLNESS

In the Western world, inflammatory bowel disease and tuberculosis have been notorious and chronic parasite infections known to have dropped the menarche age of girls in under developed countries.<sup>[9]</sup>

Girls who undergo physical exercise have slow puberty because it reduces energy calories needed for production.<sup>[10]</sup>

### ABNORMALITIES OF MENARCHE

#### Menstrual Symptoms

The unpleasant symptoms caused by hormones and by cramping of the uterus can accompany menstrual pain (Dysmenorrhea), annovulation, metrorrhagia dysfunctional uterine bleeding, oligomenorrhea or Amenorrhea, Precocious puberty, migraine headache, abdominal cramp, depression and irritability. Some women encounter pre-menstrual syndrome. The list of symptoms experienced varies from person to person. Individual severity of the symptoms may vary from cycle to cycle.<sup>[11]</sup>

#### Annovulation

Menstruation occurring without ovulation preceding it, is known as Annovulation. In some women follicular development may start but not be completed, never the less, oestrogen will form and stimulate the uterine lining. Annovulation bleeding results from a very thick endometrium caused by prolonged continued high oestrogen levels resulting in breakthrough bleeding.

Annovulatory bleeding triggered by a sudden drop in oestrogen levels is called "withdrawal bleeding".<sup>[12]</sup> Annovulatory bleeding may occur on regular basis but more in irregular frequency. Annovulatory bleeding commonly occurs prior to menopause (Premenopause) or in women with polycystic ovary syndrome<sup>[13]</sup>. Infrequent or irregular ovulation is called oligovulation.

## CYCLE ABNORMALITIES

### Flow

The normal menstrual flow amount is 50ml. Sudden heavy flow or amounts in excess of 80ml are called hypermenorrhea (This is not normal) Hypomenorrhea (bleeding of < 10ml of blood). There are some people with prolonged bleeding (i.e. mitrorrhagia).

Dysfunctional uterine bleeding refers to hormonal caused bleeding abnormalities (anovulation). These abnormalities of flow may indicate hormonal imbalances, uterine fibroid or other problems.<sup>[15]</sup>

### Frequency (Cycle Length)

The normal cycle length of menstruation is 28 days but it varies in different individuals depending on the physiological state of the individual. For instance girls with low fat content (e.g. Athletes) may cease to menstruate. Amenorrhea refers to a prolonged absence of menses during the reproductive years of a woman with interval of 180 days. Primary amenorrhea occurs where menarche has failed to occur for more than 3 years after thelarche.

Polymenorrhea is a cycle length with interval of 21 days or fewer while oligomenorrhea is a cycle length with intervals exceeding 35 days.

### Premenstrual Syndrome

This occurs two weeks before menstruation. It includes discomforts such as breast swelling, bloating and temporary waist pain, headache and fatigue. It can also cause emotional changes such as depression, irritability and mood swing. Girls normally have cramps during 1-2 days of each period. Cramps are caused by contraction of the uterus, chemicals called prostaglandin produced in the lining of the uterus, causes the muscles of the uterus to contract.<sup>[16]</sup>

Mean ages of menarche (years) in various population groups. All data refer to period between 1965 and 1985. Sources of data are by Marshat and Tanner (1986) and Eveleth and Tanner (1990).

Countries	Mean ages of menarche (years)
Oslo	13.2
Sweden	13.0
Brussels	13.1
Athens	12.6
Singapore	12.5
Chile	12.6
Argentina	13.3
Jerusalem	13.3
Madras	12.9
London	13.1

There have been several works by different researchers on menarche in diverse populations though not indigenous Nigerian populations.<sup>[1-15]</sup>

### AIM

This study was aimed at determining the mean age of menarche among adolescent females among four tribes in Nigeria (Igbo, Yoruba, Hausa, Engenni).

## MATERIALS AND METHODS

### Research Design

Research Design: The study was non-experimental and analytical.

### Data Collection

Consent was obtained from the Heads of departments and also from the volunteer subjects recruited to participate in the study. The aim of the study was made known to the subjects and the questionnaires distributed to as many females that fitted into the studied tribe. A simple structured questionnaire was used to obtain information from the girls such as age, tribe, height, weight, family background, religion etc.

### Sampling Method

A random sampling method was used in the study so that individuals who were eligible to participate in the study were gotten.

### Sample Size

A total number of 600 adolescent females formed the sample size of the study.

### Studied Population

This study was carried out amongst four tribes in Nigeria which are Ibo, Yoruba, Hausa and Engenni. The study was then delimited to the University of Port Harcourt and the Rivers State University (RSU). This was because of the easy accessibility of getting the required tribes for the study, since traveling to the various states of the tribes seemed difficult.

A hundred and fifty (150) questionnaires were administered to girls amongst each tribe bringing it to a total of six hundred (600) that were being distributed.

## RESULTS

Below is the frequency distribution of age of subjects, age of menarche, length of period, length of cycle and family size of 600 subjects from Igbo, Yoruba, Hausa and Engenni tribes in Nigeria.

**Table 10: Summary statistics of the four tribes showing subject age, menarche age, length of period, length of cycle and family size.**

		Mean	Variance	Standard Deviation	Mode	Range
Age of subjects	Total	20.1±0.05	1.119975	1.05205	21	7
	Igbo	20.3±0.05	1.3523	1.1629	21	7
	Yoruba	20.6±0.05	1.3076	1.1435	21	7
	Hausa	19.7±0.04	1.0549	1.0271	20	7
	Engenni	19.8±0.04	0.7651	0.8747	20	7
Age of menarche	Total	13.1±0.08	3.4599	1.85225	13	7
	Igbo	13.6±0.08	3.8107	1.9521	12	7
	Yoruba	12.7±0.07	3.2931	1.8147	12	7
	Hausa	13.2±0.08	4.1999	2.0447	14	7
	Engenni	13.0±0.07	2.5362	1.5925	14	7
Length of period	Total	4.51±0.05	1.16425	1.04822	4	4
	Igbo	4.36±0.4	0.8762	0.9361	4	4
	Yoruba	4.45±0.04	0.7596	0.8715	4	4
	Hausa	4.87±0.06	2.8025	1.4895	3	4
	Engenni	4.38±0.04	0.8025	0.8958	4	4
Length of Cycle	Total	26.6±0.33	7.4575	2.7066	28	13
	Igbo	27.0±0.11	7.3550	2.7120	28	13
	Yoruba	27.0±0.98	5.7865	2.4055	28	13
	Hausa	26.6±0.10	5.7421	2.3963	28	13
	Engenni	25.8±0.14	10.9737	3.3126	28	13
Family Size	Total	4.7±0.09	4.0464	1.9886	5	9
	Igbo	5.10±0.08	4.0825	2.0205	4	9
	Yoruba	4.57±0.09	4.2731	2.0672	3	9
	Hausa	5.94±0.09	4.5937	2.0672	7	9
	Engenni	4.04±0.08	3.2364	1.7998	4	9

The above table shows the summary statistics of the ages of the subjects, menarche age, length of period, length of cycle of the 600 subjects from the four tribes.

From the table, the mean age of total subjects is seen as 20.1±0.05; 20.3±0.05 from the Igbo tribe, 20.6±0.05 from Yoruba, 19.7±0.04 from Hausa and 19.8±0.04 from Engenni. Also, the mean menarcheal age of the total subjects (600) is gotten as 13.1 ± from the Igbo tribe had a mean menarcheal age of 13.6±0.08. Yoruba tribe had 12.7±0.07, Hausa tribe had 13.2±0.08 and finally the Engenni tribe had 13.0±0.07 as their mean menarcheal age. This shows that environmental, socio-economic and nutritional factors have a great influence on age of menarche as reported in the chapters above.

The length of period observed in the total subject was about 4 days; i.e. the mean total was 4.51±0.05. Subjects from Igbo and Yoruba tribes had 4.36±0.04 and 4.45±0.05 while from the Hausa and Engenni tribes, 4.87±0.06 and 4.38±0.04 were gotten respectively.

The mean cycle length was 26.6±0.33 for the total sampled subjects. 27.0±11 and 27.0± 0.98 for the Igbo and Yoruba subjects while 26.6±0.10 and 25.8±0.14 was gotten for the Hausa and Engenni subjects.

The mode of the length of cycle from the total sampled subjects was 28 days, while the mode for the length of period was 4 days.

The mean family size of the total subjects was found to be 4.7±0.09.

## DISCUSSION

The mean menarche age from the studied population was found to be 13.1±0.08, this however agrees with the study done by Tanner<sup>[19]</sup> and Zeraati<sup>[23]</sup>

From the results shown in the tables, table 2 showed that 21.7% of the subjects sampled has their menarche at age 12 (twelve) years, 7.8% at 19 years, 12.5% at 11 years, 12% at fifteen (15) years. While 7.5% and 5% had theirs' at sixteen (16) and seventeen (17) years respectively.

It is important to know that menarche varies from individuals therefore from the result analysis gotten, it is seen that subjects from the Yoruba tribe had an earlier onset of menarche. This is attributed to some factors that were being implicated in this study which are, socio-economic class, parent's occupation, nutritional status, Environmental factor; which we agree has a great influence on age of menarche. The Yoruba tribe in Nigeria is the most socially active and highly educated tribe in the country which thus had a great effect on the menarche age of subjects from this tribe.

The length of period observed from this study (table 3) showed that 262 subjects (43.7%) menstruate for 4 days while 115 (25.8%), 45 (7.5%), 8.5% of the subjects menstruate for 3 days, 6 days and 7 days respectively.

As stated earlier, because girls from the Yoruba tribe had an earlier menarcheal age, their parents can ensure that they eat balanced diets, of course improved diets and increase in body fatness contributes to an early onset of menarche.<sup>[20]</sup> Menarche is known to be one of the numerous achievements of growth, thus girls who have an early growth spurt will tend to have an early menarcheal age. Early exposure to romantic novels and movies influences these girls to have an early onset of menarche.<sup>[21]</sup>

In addition to the above reports from the tables, table 4 showed that 54.5% of the subjects had their menstrual cycle for 28 days while others had either less or more than the 28 days.

Tables 6,7,8,9 showed the mean statistics of the subject from the four different tribes. It shows the differences in their mean age, menarche age, cycle length and length of period.

The mean age of the subjects from Igbo and Yoruba tribes and were  $20.3 \pm 0.05$  and  $20.6 \pm 0.05$  while Hausa and Engenni tribes were  $19.7 \pm 0.04$  and  $19.8 \pm 0.04$ . For menarche, the mean age was  $13.6 \pm 0.08$  and  $12.7 \pm 0.07$  for the Igbo and Yoruba tribe while  $13.2 \pm 0.08$  and  $13.0 \pm 0.07$  for the Hausa and Engenni tribe.

For length of period, Igbo and Yoruba tribes were  $4.36 \pm 0.04$  and  $4.45 \pm 0.04$  while Hausa and Engenni tribes were  $4.87 \pm 0.0b$  and  $4.38 \pm 0.04$ . For the cycle length, the mean cycle length for the Igbo and Yoruba tribe was  $27.0 \pm 0.11$  and  $27.0 \pm 0.98$  while the Hausa and Engenni tribe were  $26.6 \pm 0.10$  and  $25.8 \pm 0.14$ .

This reveals that there are differences on the age of menarche, length of period and cycle length between the four tribes which agrees with Thomas *et al*<sup>[20]</sup> that menarche age varies significantly by geographical region, race, ethnicity and other characteristics.

Regression analysis revealed that socio-Economic class and Environmental status influences age of menarche negatively and positively. In other words, the age of menarche drops with increase in class.<sup>[15]</sup> found out that the age of menarche is delayed in families with substandard nutrition. This may be due to the type of food and environmental influence.<sup>[12]</sup> It was also found out that age of menarche is affected by the family size.

## CONCLUSION

This study showed that the mean age at menarche was  $13.1 \pm 0.08$ . It also showed that the Yoruba tribe had a mean age of  $12.7 \pm 0.07$  which was significantly lower

than other tribes. The result of this study affirms the fact that there is a falling trend of the age at menarche worldwide.

This falling trend could be attributed to the improved socio-economic class of individuals; good environmental factor, improved nutritional status and lots more.

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## CONFLICT OF INTEREST

The authors declare that there is no Conflict of interest.

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