

**PREVALENCE OF PAIN SYMPTOMS SUGGESTIVE OF ENDOMETRIOSIS AMONG
ADOLESCENTS IN KENYA**

PRINCIPAL INVESTIGATOR: DR. ALEX KAGIA

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OBSTETRICS & GYNECOLOGY

UNIVERSITY OF NAIROBI

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

SUPERVISORS:

PROFESSOR JOSEPH KARANJA

MBChB, MMed

DR. WANYOIKE GICHUHI

MBChB, MMed

THIS DISSERTATION IS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE IN MASTER OF MEDICINE IN OBSTETRICS
AND GYNAECOLOGY, UNIVERSITY OF NAIROBI.

DECLARATION

This is to certify that the thesis work presented here is going to be original and has not been presented in any other university for an award or Master’s degree. It was supervised by the aforementioned senior members of the Department of Obstetrics and Gynecology, University of Nairobi, College of Health Sciences, School of Medicine, Kenyatta National Hospital, Nairobi, Kenya.

Signature:.....

Date:.....

DR ALEX KAGIA

DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

UNIVERSITY OF NAIROBI

KENYATTA NATIONAL HOSPITAL

CERTIFICATE OF SUPERVISION

This is to certify that the thesis in this book by Dr. Alex Kagia has been researched under my supervision and that this book is submitted with my approval.

PROFESSOR JOSEPH KARANJA - MBChB, MMed
ASSOCIATE PROFESSOR
DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY
UNIVERSITY OF NAIROBI

Signature:

Date:

DR. WANYOIKE GICHUHI - MBChB, MMed
SENIOR LECTURER
DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY
UNIVERSITY OF NAIROBI

Signature:.....

Date:.....

This is to certify that this research study was undertaken and written by **Dr. Wanyoike Gichuhi** and supervised by faculty in the department of Obstetrics and Gynaecology, University of Nairobi.

PROFESSOR OMONDI OGUTU, MB,chB, M.Med (OBS & GYN), PGDRM

Professor and Consultant.

Chairperson,

Department of Obstetrics and Gynaecology

University of Nairobi

Signature: _____

Date: _____

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DEDICATION

I dedicate this book to my lovely wife Becky who has been my true inspiration and to my late son, Michael though missed but not forgotten. Also, my parents Mr. & Mrs. Kagia for their continual guidance and love. God bless you all.

LIST OF ABBREVIATIONS

A.E. A.....	American Endometriosis Association
GnRH.....	Gonadotrophin Releasing Hormone
K.N.H.....	Kenyatta National Hospital
P.I. D.....	Pelvic Inflammatory Disease
U.O.N.....	University of Nairobi
U. S.....	United States of America
NSAIDs.....	Non-steroidal anti-inflammatory
OCPS.....	Oral contraceptives
ESHRE.....	European Society of Human Reproduction & Embryology
PSD.....	Prospective study design
RSD.....	Retrospective study design
CCD.....	Comparative cohort design
CPP.....	Chronic pelvic pain

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ABSTRACT

Background: Endometriosis is a gynecological condition that accounts for 10% of chronic pelvic pain cases seen in the outpatient clinics in the U.S. It is more than just painful cramps as women & girls all over the world tend to suffer in silence because of its negative effect on every aspect of their lives i.e. unable to go to school, work, and social functions or go about her daily routine. Overall, it affects a woman's quality of life that is her biological, physical, psychological and emotional aspects. There are documented statistics in the developed countries on the prevalence and impact of endometriosis in the local population but none locally. This study aimed to initiate efforts to create awareness of endometriosis in the country and its effects on the local women so as to guide in development of intervention strategies of managing the condition locally.

Broad Objective: Prevalence of pain symptoms suggestive of Endometriosis among Adolescent Kenyans.

Study Site: Dual centered study at Githunguri Girls High School and Moi Girls High School Nairobi.

Study Design: Analytical Cross- sectional study

Sampling: Convenience sampling of schools then Stratified Sampling by age groups

Outcome Measure: The primary outcome measure was the prevalence of pain symptoms suggestive of endometriosis. The other outcome measures were school absenteeism during menses, impairment of daily activities and awareness of endometriosis.

Methodology: The study was conducted as a 2-day exercise in each of the specified study sites in the month of July 2016. The principal investigator, with the help of two research assistants, screened the female students and confirmed they met the eligibility criteria. Explanation on the purpose of the study was done and thereafter informed consent was obtained after obtaining permission from the principal and the school board. Data collection was done using structured questionnaires and data analysis performed in SPSS version 22.0.

Results: Dysmenorrhea was the most prevalent symptom at 72% with severe dysmenorrhea reported at 29%. Regular absenteeism was reported at 4% in those with dysmenorrhea, 1% was due to acyclic pelvic pain and 1% reported intermenstrual pain limiting their daily activities. Majority (94%) had never heard of endometriosis of which 70% were interested to know more about it.

Conclusions: Pain symptoms suggestive of endometriosis were quite common in the adolescent with prevalence rates similar to those in developed countries. However, the awareness of the disease was low among the adolescent population studied. The severity of symptoms was also noted to impact negatively on schoolwork and activities especially when on no form of treatment.

CHAPTER ONE

1.0 INTRODUCTION

Endometriosis is a chronic gynecological condition characterized by pathological growth of endometrial tissue outside the uterus. It is poorly recognized and understood locally(1).Retrospective studies have shown that majority of cases can have the symptoms traced back to the adolescent period. From the onset of symptoms to the actual diagnosis by laparoscopy shows an average delay of 6.7 yrs. in Norway(2),8yrs in the U.K & 11.7yrs in the U.S.A(3). There are no such documented studies in the African continent. The mean age at first surgery is 29-35yrs(4–6).

Endometriosis typically presents with severe menstrual pain. Primarily, it is considered as primary dysmenorrhea & initially treated with NSAIDS. If no improvement is noted, OCPs are then used (7).This has led to delay in its diagnosis. Therefore, it is prudent that if such treatment fails in this regard, a suspicion of endometriosis should be queried (8).

Primary medical therapy is often offered at health centers & dispensaries due to poor understanding of the disease & poorly defined referral channels for specialist care. This has led to adolescent girls waiting much longer compared to adults in seeking proper health care(4).Other contributory factors include lack of awareness, cultural practices that view painful cramps as normal and lack of diagnostic facilities & surgical expertise (9,10).

Endometriosis cases are there but under reporting tends to occur as a result of lack of research programs to document such cases and lack of interest in endometriosis as was noted in the first East African Scientific Conference on Endometriosis meeting held

in Kampala, Uganda in March 2006. It is also thought that some lifestyle factors confer protection among the African indigenous woman against endometriosis. These include parity at a younger age, multiparity and pelvic inflammatory disease with blocked fallopian tubes. This is well documented among women living in developed countries with few studies documented in the African continent(11). In the U.S.A, there are documented prevalence rates ranging from 0.7% to 45% in asymptomatic women(12), 20% to 40% in infertile women(13), 6% to 18% in women undergoing sterilization(14) and 15% to 70% in those with chronic pelvic pain(15).

In general, it is estimated to affect 10% of the female population with a documented annual incidence of 1.9% cases per 1000 women aged 15 to 49 years. This has led to the belief of its low prevalence among the Africans of indigenous origin. This however has been disputed by the realization of high statistical reports among the African-American population. Such data available has linked the African region with the African-American descent residing in the USA where endometriosis is one of the common indicators of major gynecological surgery. However, we cannot draw conclusions of similarity in these two groups due to the known fact of the latter group having genetic racemic mixture over time with the Caucasian gene line. Also, due to the current wave of globalization with change in lifestyle and economic wellbeing, the African indigenous woman is marrying later, having her first child at an older age and fewer children because of career development. This currently is exposing them to a longer duration of uninterrupted menstrual flow with retrograde menstruation thus increasing the risk of developing endometriosis.

Due to limitation in resources regionally to adequately diagnose endometriosis, this study focused on identification of those at risk of developing or having endometriosis targeting the adolescent population to allow proper referral for early intervention and care. A recent study was done that documented certain clinical parameters noted after menarche that gave a high probability of later diagnosis of deep infiltrating endometriosis in adulthood. These included a positive family history of endometriosis, absenteeism from school during menstruation & prolonged use of OCPs for treating primary dysmenorrhea (16). No prospective studies have been done in Africa to determine the prevalence of such symptoms among adolescent girls.

CHAPTER TWO

2.0 LITERATURE REVIEW

Endometriosis is a gynecological condition that occurs when endometrial cells similar to those of the endometrial lining in the uterus grow outside the uterus. This is usually seen in organs within the pelvis and abdomen. In extreme cases, it can be found in the pleura, lungs and brain.

Endometriosis is known to affect any menstruating woman regardless of race, ethnicity or socio-economic status. But it is rare after menopause.

The exact cause of endometriosis is not known but several theories have been postulated to provide a probable cause.

The retrograde menstrual flow theory coined by John Sampson suggested backflow of menstrual flow through the tubes contributed to pelvic endometriosis. Though this was shown to occur in menstruating women, it did not explain why the tissue survives in some and not in others.

Iwanoff claimed the transformation of coelomic epithelium into endometrial like tissue as the cause, which was supported by experimental data.

The induction theory also came up following experiments done on rabbits that suggested the presence of endogenous factors in peritoneal cells that can develop into endometrial like tissue.

The lymphatic/vascular theory supports evidence of endometriosis in distant sites i.e. the lung and brain by suggesting transportation through vascular/lymphatic channels of endometrial fragments to other areas of the body.

The genetic theory has too been favored following studies noting its propensity being greater in those with a first degree relative with the disease. It could either be inherited or due to chromosomal aberrations.

The immunological theory has also been used to explain pelvic endometriosis. It is thought that due to immunological abnormalities, the body's immunity fails to clear menstrual debris in the pelvic cavity facilitating its growth.

Other postulated theories have been the estrogen factor theoretically known to facilitate endometrial growth and environmental toxins, but these remain controversial(17).

Risk of endometriosis is seen to be higher in women whose reproductive health factors increase exposure to menstruation i.e. shorter cycle length, longer duration of flow and reduced parity(18).

Other studied contributory risk factors include young age at menarche(19), history of infertility(20) and a family history of endometriosis(21).

Endometriosis symptomatology mainly includes pelvic pain and infertility.

The most common symptom of endometriosis in adolescents is chronic pelvic pain. It can be either acyclical or cyclical i.e. dysmenorrhea. Such pain tends to be intense with poor response to NSAIDS leading to the use of OCPs (22). At times the latter does not work.

70% of such cases on follow up have later on shown evidence of pelvic endometriosis. These studies went further to demonstrate the onset of pelvic pain after menarche showing varying results i.e. Goldstein reported 10.5 years (23) while Davies reported 9.4 years (24). Such studies suggested that chronic pelvic pain with early onset at the time of menarche represents a risk factor for severe endometriosis during adolescence. A recent Meta-analysis done suggested that menarche at an early age is associated with a substantial risk of endometriosis in adolescence (19).

Other endometriosis like symptoms tends to be only noticeable during menses. These include chronic low back pain, dyschezia, hematochezia/melena stools, dysuria/hematuria and pain on the upper thighs. Less common but reported symptoms include constipation, diarrhea, nausea and vomiting (24). Acute abdomen was reported in about one-third of Chinese adolescents with endometriosis.(35)

The symptoms typically recur in a cyclic fashion and exacerbations occur during menstruation. ESHRE recommendations outline the need for diagnostic laparoscopy for such patients where medical therapy has failed(8).

Endometriosis has been documented in various forms with specific manifestations such as cervical, uterine, umbilical and ascites caused by endometriosis. This has been well observed in both the indigenous Africans and African-Americans' without adequate explanation.

Cervical endometriomas have been reported to cause intermenstrual, perimenopausal or postcoital bleeding. In a case series study of 570 African-indigenous patients

undergoing colposcopy evaluation of abnormal cervical smears, 16 were noted to have cervical endometriomas hence a prevalence of 2.4%(26).

Endometriosis related ascites is a rare refractory form of endometriosis mimicking ovarian cancer that presents with abdominal distension and chronic pelvic pain or dysmenorrhea. There is a documented case report of a 19 year old in Nigeria and a review paper reporting 20 cases of which 82% were nulliparous young black women(27). Pathogenesis is uncertain but since pelvic endometriosis is found in almost all cases, it is hypothesized that rupture of chocolate cysts in the abdominal cavity with release of endometrial cells and blood, causes peritoneal irritation leading to ascites.

Pulmonary endometriosis is also rare with a case report published by Margolis & colleagues of a 38 year old African-American woman who had initiated GnRH analogue treatment for pelvic endometriosis(28) but had associated pleuritic chest pains with menses. However, there is a confirmed case report with histology evidence of a 34 year old indigenous African woman who experienced unusual thoracic menstruation with signs of pleural effusion(29).

Umbilical endometriosis has also been documented with case reports of African indigenous women presenting with subcutaneous umbilical nodules enlarging during menstruation associated with occasional bleeding and pain(30).

It has been shown that the degree of pain does not equate to the severity of endometriosis involvement i.e. some show minimal or no pain with extensive involvement and vice versa.

The pathophysiology of pain is explained by the fact that the endometrial like tissue is not able to escape its ectopic site remaining stagnant and in the process undergoing chemical changes that leads to production of irritant substances that cause or mediate pain(31).

The prevalence of endometriosis worldwide is 8-15% based on studies done on outpatient gynecological visits. However in the U.K., the prevalence is 1.5% based on a 10 year study done that had a large sample size reflective of the total population(2).However we have no average documented statistics continentally and regionally but some isolated studies have been done.

There was a study done in Nigeria that reported a prevalence of 48.1% on infertile women who underwent laparoscopy(32).Regionally a study done in northern Uganda reported a prevalence of 0.4% of endometriosis (33).No studies have been done with regards to prevalence of endometriosis in asymptomatic adolescents.

The prevalence of endometriosis in symptomatic adolescents differs among the various studies done ranging from 19% in the 1940s to 73% currently.

Studies done in the early 1940s reported the rarity of endometriosis in adolescents due to the fact that diagnosis was only possible following laparotomy or as an incidental find on autopsy(34).

With the introduction of laparoscopy, the prevalence of the disease rose to 50% to 65% based on the documented studies (11).

Table 1: Summary of laparoscopic studies of endometriosis in adolescents

AUTHOR	SYMPTOM LEADING TO LAPAROSCOPY	AGE (years)	MENARCHE (years)≤	SAMPLE SIZE	STUDY DESIGN	CONFIRMED ENDOMETRIOSIS (%)
Goldstein 1980	CPP (chronic pelvic pain)	10-19	11.8	140	PSD	47%
Chatman 1982	Dysmenorrhea	12-19	—	43	PSD	65%
Vercellini 1989	Dysmenorrhea	11-19	—	47	RSD	38%
Davis 1993	Dysmenorrhea	13-20	—	36	RSD	100%
Reese 1996	Refractory CPP	11-19	12.5	67	RSD	73%
Laufer 1997	Refractory CPP	13-21	12-3	46	RSD	67%
Emmert 1998	CPP	11-19	12.2	105	RSD	35%
Kontoravdis 1999	CPP	16-19	—	98	PSD	25%
Bai 2002	CPP	14-21	14.2	39	RSD	100%
Stavroulis 2006	Refractory CPP	13-20	—	31	RSD	36%
Ventolini 2005	Refractory CPP	12-18	—	52	PSD	54%
Kalu 2008	Refractory CPP	15-21	—	28	RSD	100%
Doyle 2009	Refractory CPP	12-24	—	90	RSD	100%
Roman 2010	Dysmenorrhea	17.4	—	20	CCD	100%
Vicino 2010	CPP	10-21	—	38	PSD	100%

The prevalence rose further following the introduction of Trans vaginal ultrasound in the diagnosis of ovarian endometriomas in adolescents in the last two decades(35).

Apart from this biological aspect, endometriosis has a negative effect on the woman's psychological, economic and social wellbeing leading to a poor quality of life.

Some documented effects include inability to go to work/school, unable to attend social functions or to perform her daily household chores(36). A study done by the A.E.A reported that 81% of endometriosis patients in the U.S. were unable to go to work because of pelvic pain,27% were incapacitated for three or more days while 87% complained of fatigue.

Multicenter cross-sectional study in 16 clinical centers across 10 countries gave input on the impact of endometriosis on quality of life & work productivity. On average each affected woman lost 10.8 hrs of work weekly translating to significant costs per woman weekly from USD\$4 in Nigeria to USD\$456 in Italy(37).

There is no non-invasive test to diagnose endometriosis therefore we rely heavily on laparoscopy surgery as a diagnostic and therapeutic tool. Prior to the introduction of laparoscopy, endometriosis cases were mostly accounted for following hysterectomy.

However, in resource limited centers like our own, consideration should be put on use of progestins as first line treatment in those with symptoms suggestive of endometriosis. These are adolescents not responding to primary treatment of dysmenorrhea i.e. NSAIDS & OCPs. ESHRE consensus guidelines(38) approve use of medroxyprogesterone acetate(39),norethisterone(40) & dienogest(41).

Although the prevalence of endometriosis is well documented in the developed countries, research continentally is limited. The current myth is that it rarely affects the African woman but based on the studies described done in Africa, this has been

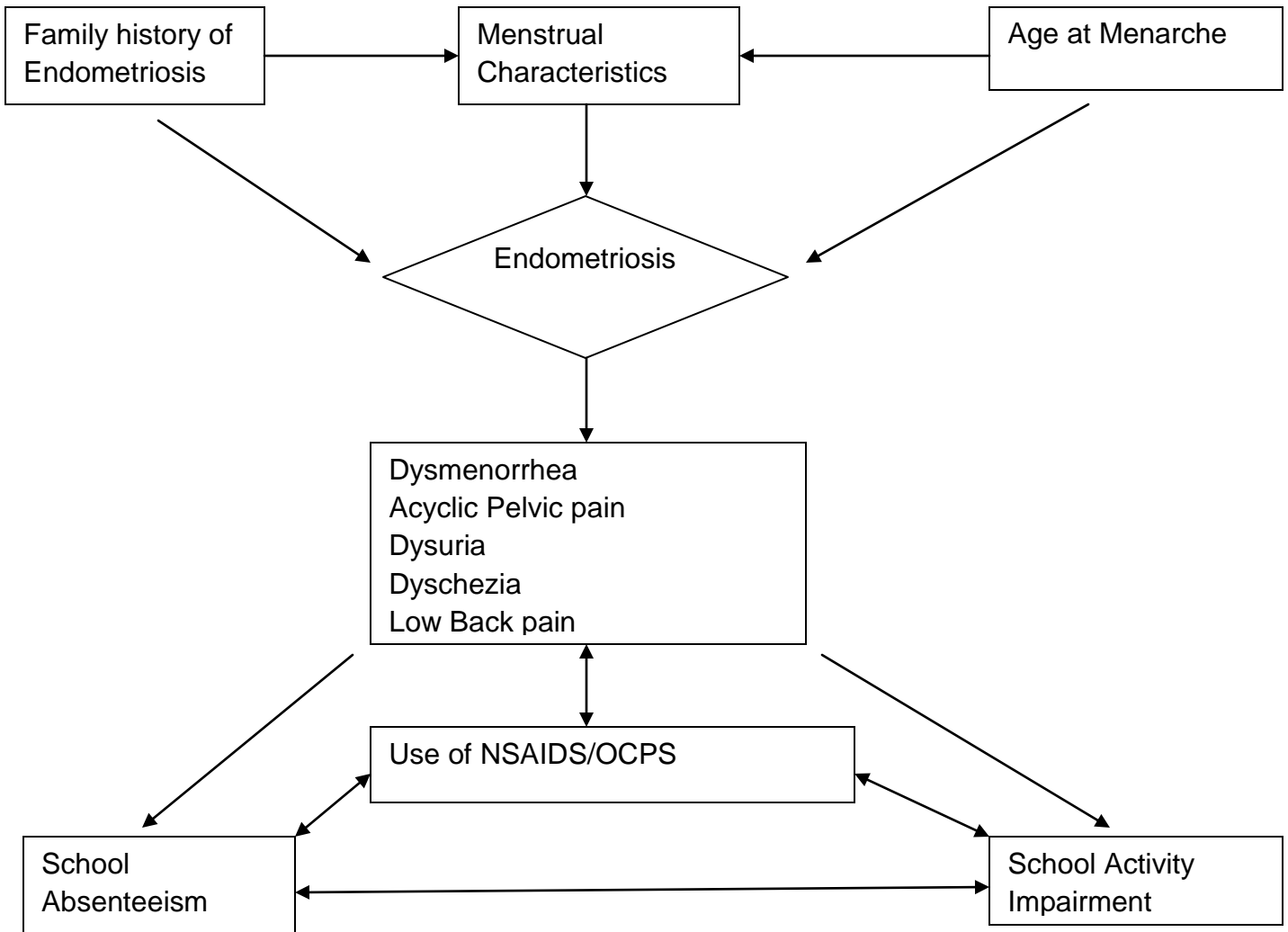
discredited(32,33). However, such lower prevalence rates are due to inadequate diagnostic facilities and the required training of our own gynecologists to diagnose and treat the disease. Also, the low prevalence among those infertile may be due to lifestyle changes i.e. low parity, increased risk of pelvic inflammatory disease and blocked fallopian tubes.

So, it is likely that the prevalence would increase if better facilities & training was offered, research programs undertaken, leading to increased reporting and documentation of endometriosis cases. With such data we would be able to increase awareness to reach all African women and draw attention to the impact & implications of the disease to the health care systems in the country.

In conclusion, majority of women with endometriosis report symptoms during adolescence yet it is a delayed diagnosis in our patient population. Given that endometriosis is felt to be a progressive disease with increasing morbidity over time.i.e. structural defects and infertility; the need of being aggressive in pursuing the diagnosis is warranted.

2.1 CONCEPTUAL FRAMEWORK

This study assessed pain symptoms that included dysmenorrhea, acyclic pelvic pain, dysuria, dyschezia and low back pain. The presence of these symptoms in school girls were indicators suggesting the possible presence of endometriosis. Occurrence of endometriosis have been associated with family history of endometriosis, menstrual characteristics of the girls and age at menarche and explored in this study to ascertain their association with the pain symptoms. The pain symptoms were hypothesized to be disruptive to school activities and hence absenteeism and school activity impairment was measured and associated with the symptoms. The following framework showed the inter-linkage between variables that were measured in this study.



2.3 STUDY JUSTIFICATION

Endometriosis is a disease noted to cause chronic pelvic pain responsible for 10% of outpatient gynecological visits in the U.S. It carries a negative effect on the social wellbeing of women and society in general. However, little information is available continentally and none in this country about its prevalence and affect in society. There are few studies of endometriosis in the indigenous African Adolescent. Most conclusions are drawn from studies done in African American women in the U.S.

It was initially thought to be low in the African setting due to limited awareness and specialty in diagnosis as well as limited research and lifestyle factors. However recent westernization of the African continent has disputed that fact especially with regards to change in lifestyle now with women having children at an older age due to career fulfillment and limiting the number to either one or two due to tough economic times.

Therefore, there is need for more studies to determine its prevalence and impact on the African Indigenous society especially among the adolescents. Such data can then in turn be used to raise awareness of the disease and gain support from Government & other interested parties to fund research programs, laparoscopic training as well as invest in diagnostic facilities for the same.

2.4 RESEARCH QUESTION

What is the prevalence of pain symptoms suggestive of endometriosis among adolescent Kenyans and their impact on quality of life?

2.5 STUDY OBJECTIVES

2.5.1 Broad objective

To determine the prevalence of pain symptoms suggestive of endometriosis among adolescent Kenyans and their impact on quality of life.

2.5.2 Specific objectives

1. To describe the pattern of pain symptoms suggestive of Endometriosis among Adolescent Kenyans in two Kenyan schools
2. To assess the impact of pain symptoms suggestive of Endometriosis on their daily social activities
3. To assess the level of awareness of endometriosis among the adolescent study population
4. To compare the prevalence of pain symptoms suggestive of Endometriosis between an urban and a rural school.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

Analytical Cross-Sectional Study

3.2 Study Area

The study was conducted within Moi Girls High School Nairobi and Githunguri Girls High School to see whether there are any attributable differences based on environment.

Moi Girls High school is a government sponsored girl's only boarding school located in dagoretti constituency in the Kenyatta/Golf course, Nairobi County along kangethe road. It is 7.4km from Nairobi city centre.

Githunguri Girls High school is a government sponsored girls only boarding school located in Kagunduni location, Kandara constituency in Muranga county along kabati-kariua road. It is 57.7km away from Nairobi city centre.

3.3 Study Population

Secondary school adolescent girls in a rural and urban setting.

3.4 Inclusion criteria

- a. Students attending the selected schools
- b. Age criteria:13-18 years
- c. Informed consent/assent

3.5 Exclusion criteria

- a. Those with amenorrhea (whether primary or secondary) > 3 months.

3.6 Sample size determination

It was done based on the formula for prevalence studies (42).

$$n = z^2 p (1-p) / d^2$$

Where n=desired minimum sample size

z=standard normal distribution value (1.96)

p=Known prevalence rate for the factor of interest under study

d=level of desired precision (0.05)

Based on similar prevalence studies done in Finland (60) that showed a prevalence of 2-10%, the upper value was incorporated hence the value of p instituted came to 0.1. Therefore the calculated sample size was 140. Non response rate of 10% added totaling to 154 students. However, we were able to obtain a minimum of 154 students from each school for the study.

3.7 Sampling method

Convenience sampling was done to select the two secondary schools to conduct the study. Stratified random sampling was then done to select the desired sample size of 154. First we categorized the students into age groups i.e. 13-14 years, 15-16 years & 17-18 years. The target in each group was 51. Therefore, depending on the total number per group, we assigned each student a random number from e.g. 1- 10. Then we randomly selected those with the number (n) to participate in the study. This was applied similarly in both schools.

3.8 Study variables

3.8.1 Exposure Variables-Age at menarche, menstrual characteristics (cycle length, duration of flow), use of analgesics/OCP & family history of endometriosis

3.8.2 Outcome variables-presence or absence of pelvic/ pain with menses; dysuria, dyschezia & low back pain with menses; school absenteeism, school activity impairment & awareness of endometriosis.

3.9 Study feasibility and administration

The study was conducted amongst the secondary school students from the specified study sites. Permission was sought from the respective principals and the school management boards in consultation with their parents. After approval, the principal investigator with the help of two research assistants screened the female students to confirm they met the eligibility criteria. They then explained the purpose of the study and thereafter administered a written informed consent to them. Those who gave consent were recruited into the study.

3.10 Study tools

Data collection was done using pre-designed questionnaires with close ended questions.

3.11 Data management

The data collected was checked for completeness before being entered into MS Excel for validation. Thereafter it was transferred to SPSS Version 22.0 for analysis with the help of a qualified statistician. All data was stored in a password protected laptop and backed up on a reliable external hard drive. All hardcopy documentations of the study were kept under lock and key in a secured drawer.

3.12 Data analysis

Descriptive statistics was used to describe the variables while inferential statistics was used to establish associations between endometriosis and the various explanatory factors using chi-square while logistic progression was used to determine the predictors of adolescents with endometriosis like pains. P value of <0.05 was considered significant.

3.13 Ethical considerations

The study was undertaken after approval from the Department of Obstetrics &Gynecology and the K.N.H/U.O.N Ethics & Research Committee.

Permission was obtained from the respective school management boards, their respective principals and class teachers. The study objectives and methodology was explained to them and the enrollment of participants was voluntary. Those who volunteered and were 18 years and above consented while those below 18 years who agreed to participate had their respective teachers assent for them on behalf of their parents.

It was a noninvasive study with no risks incurred by the participants. Each participant was interviewed using a random coded questionnaire to maintain neutrality. The information gathered was used with utmost confidentiality.

3.14 Study limitations

1. Unavailable follow up laparoscopic diagnosis and histological confirmation.
2. Use of symptomatology alone would lead to an overall over-estimation of the prevalence rate among the general population.
3. Sexual history was not obtained during the study therefore dyspareunia was not factored in as a symptom

CHAPTER FOUR

4.0 RESULTS

Three hundred and thirteen adolescents were interviewed with even distribution between rural (50.8%) and urban (49.2%) schools.

Table 2: Menstruation characteristics of the adolescents

Variable	Frequency (%), n=313
School location	
Rural	159 (50.8)
Urban	154 (49.2)
Mean age at first periods (SD)	13.3 (1.1)
Have regular periods	
Yes	173 (55.3)
No	140 (44.7)
Days of bleeding with each period	
Mean (SD)	4.3 (1.3)
How heavy is the menstrual flow routinely?	
Light	40 (12.8)
Moderate	228 (72.8)
Heavy	37 (11.8)
Can't remember	8 (2.5)
Days in between periods	
≤21	16 (5.1)
22-24	43 (13.7)
25-28	111 (35.5)
29-32	39 (12.5)
33-35	7 (2.2)
≥36	9 (2.9)
Too irregular to say	79 (25.2)
Missing	9 (2.9)

4.1 Menstruation characteristics of the adolescents

In reference to Table 2 above, the mean age of onset of menarche was 13.3 years (SD 1.1 years). More than a half (55.3%) reported regular periods with a mean duration of 4.3 days. Menstrual flow was routinely moderate for 72.8% and heavy for 11.8% of the

adolescents. The mean length of their menstrual cycles was 25-28 days reported in 35.5% of the students.

Table 3: Pattern of pain symptoms suggestive of endometriosis

Symptoms	Frequency {n, (%)}	Severity {n, (%)}		
		Mild	Moderate	Severe
Dysmenorrhea	226 (72.2)	61 (27.0)	99 (31.6)	66 (29.2)
Dyschezia	62 (19.8)	41 (66.1)	12 (19.4)	9 (14.5)
Dysuria	36 (11.5)	32 (88.9)	2 (5.6)	2 (5.6)
Low back pain	137 (43.8)	68 (49.6)	45 (32.8)	24 (17.5)
Pain on upper legs/thighs	46 (14.7)			
Acyclic abdominal pain	62 (19.8)			

4.2 Pattern of pain symptoms suggestive of endometriosis

In reference to Table 3 above, almost three quarters (72.2%) of the adolescents had dysmenorrhea; in 27% it was mild, 31.6% moderate and 29.2% severe dysmenorrhea. Dyschezia was diagnosed in 19.8% of the girls which was mainly mild in severity (66.1%). Fewer girls had dysuria (11.5%) which was mainly mild as reported in 88.9%. Lower back pain was reported by 42.8% of the girls while 14.7% reported pain on upper legs or thighs. Acyclic abdominal pain was reported in 19.8% of the girls.

Table 4: Use of contraceptive pills

Variable	Frequency (%)
Ever taken contraceptive pills (n=313)	
Yes	19 (6.1)
No	294 (93.9)
Reason for using contraceptive pills (n=19)	
Extremely painful periods	9 (47.4)
Heavy and/or prolonged periods	3 (15.8)
Irregular periods	3 (15.8)
None of the above	4 (21.1)
Currently taking contraceptive pills for painful periods (n=313)	
Yes	12 (3.8)
No	301 (96.2)

4.3 Use of contraceptive pills

In reference to Table 4, use of contraceptive pills ever in the past was reported by 6.1% of the girls. Those who had used the pills cited reasons that included extremely painful periods (40.9%), heavy and/ or prolonged periods (13.6%) and irregular periods (13.6%). There was a proportion of 31.8% who used the pills for other reasons not related to their periods. Current use of contraceptive pills for their painful periods was reported in 3.8% of girls.

Table 5: Impact of pain symptoms suggestive of endometriosis on the daily social activities

Variable	Frequency (%)
Frequency of pelvic pains during periods (n=226)	
Occasionally (1 in every 3 periods)	71 (31.4)
Often (2 in every 3 periods)	45 (19.9)
Always (with every period)	110 (48.7)
Impact of pelvic pains with periods on daily activities (n=226)	
Very painful that even though I take painkillers, I can't perform my daily activities	27 (11.9)
Very painful but am able to perform my daily activities after taking painkillers	69 (30.5)
Mild but bearable and subsides after 2 nd day of menses	130 (57.5)
Miss attending classes more often during periods because of pain (n=226)	
Yes, I miss attending classes once or more times during that period	8 (3.5)
No, I attend but only after taking painkillers	71 (31.4)
Never miss class	147 (65.1)
Impact of acyclic abdominal pains on school activities (n=62)	
Yes, and it makes me take painkillers	44 (14.1)
Yes, and I miss school during such occasion	3 (1.0)
Yes, and I miss school game activities	15 (4.8)
No	235 (75.1)
Feel pain in the lower belly exercising or engaging in school sport activity (n=313)	
Yes	84 (26.8)
No	229 (73.2)

4.4 Impact of pain symptoms suggestive of endometriosis on the daily social activities

In reference to Table 5, majority (48.7%) of the girls who experienced dysmenorrhea got the pelvic pains always with every period while 31.4% experienced it occasionally. Most of the cases (57.5%) of dysmenorrhea were bearable. However, 30.5% of the girls had disruption of their daily activities until they used pain killers and 11.9% reported inability to perform daily activities even after taking pain killers. Though school activities were not disrupted in 65.1% of the girls who had dysmenorrhea, 3.5% missed classes at least once during their periods.

Acyclic abdominal pain disrupted school activities in 5.8% of the girls interviewed while 14.1% were forced to take pain killers to relieve their pain. In addition, 26.8% feel pain in the lower belly during exercise or while engaging in school sport activity.

Table 6: Awareness of endometriosis among adolescent study

Variable	Frequency (%)
Ever heard endometriosis before (n=313)	
Yes	20 (6.4)
No	293 (93.6)
Any family history of endometriosis (n=313)	
Yes	12 (3.8)
No	198 (63.3)
I don't know	103 (32.9)
Wish to receive more information about endometriosis (n=313)	
Yes	220 (70.3)
No	93 (29.7)

4.5 Awareness of endometriosis

In reference to Table 6, a small proportion (6.4%) had heard of endometriosis and 3.8% had family history of endometriosis. Majority (70.3%) wished to receive more information on endometriosis.

Table 7: Relationship between dysmenorrhea and other pain symptoms

	Dysmenorrhea		OR (95% CI)	P value
	Yes (%)	No (%)		
Dyschezia				
Yes	51 (22.6)	11 (12.6)	2.0 (1.0-4.1)	0.048
No	175 (77.4)	76 (87.4)	1.0	
Dysuria				
Yes	35 (15.5)	1 (1.1)	15.8 (2.1-116.9)	<0.001
No	191 (84.5)	86 (98.9)	1.0	
Low back pain				
Yes	95 (42.0)	42 (48.3)	0.8 (0.5-1.3)	0.319
No	131 (58.0)	45 (51.7)	1.0	
Pain on upper legs or thighs				
Yes	36 (15.9)	10 (11.5)	1.5 (0.7-3.1)	0.321
No	190 (84.1)	77 (88.5)	1.0	
Acyclic abdominal pain				
Yes	52 (23.0)	10 (11.5)	2.3 (1.1-4.8)	0.022
No	174 (77.0)	77 (88.5)	1.0	

4.6 Relationship between dysmenorrhea and other pain symptoms

In reference to Table 7 above, the adolescent girls who had dysmenorrhea were more likely to report dyschezia (22.6%) compared to those without dysmenorrhea (12.6%), OR 2.0 (95% CI 1.0-4.1), p=0.048. Similarly, 15.5% of the girls with dysmenorrhea reported dysuria, OR 15.8 (95% CI 2.1-116.9), p<0.001. Those with acyclic abdominal pain were higher in the dysmenorrhea group (23%) compared to non-dysmenorrhea group (11.5%), OR 2.3 (95% 1.1-4.8), p=0.022.

Table 8: Association between pain symptoms and severity of dysmenorrhea

Symptoms	Severity of dysmenorrhea			P value
	Mild	Moderate	Severe	
Dyschezia	16 (31.4)	13 (25.5)	22 (43.1)	0.007
Dysuria	12 (34.3)	8 (22.9)	15 (42.9)	0.022
Low back pain	23 (24.2)	39 (41.1)	33 (34.7)	0.291
Pain on upper legs/thighs	2 (5.6)	19 (52.8)	15 (41.7)	0.006
Acyclic abdominal pain	7 (13.5)	18 (34.6)	27 (51.9)	<0.001

4.7 Pain symptoms associated with severity of dysmenorrhea

In reference to Table 8, girls with severe dysmenorrhea reported significantly higher proportions of dyschezia (43.1%), dysuria (42.9%) and acyclic abdominal pain (51.9%). Similarly, pain on upper legs/ thighs was reported more by girls who had moderate (52.8%) and severe (41.7%) dysmenorrhea.

Table 9: Comparison between girls in the rural versus urban in relation to pain symptoms

Variable	Rural	Urban	OR (95% CI)	P value
Dysmenorrhea				
Yes	114 (70.0)	112 (70.4)	1.2 (0.7-2.0)	0.479
No	40 (30.0)	47 (29.6)	1.0	
Dyschezia				
Yes	42 (27.3)	20 (12.6)	2.6 (1.4-4.7)	0.001
No	112 (72.7)	139 (87.4)	1.0	
Dysuria				
Yes	30 (19.5)	6 (3.8)	6.2 (2.5-15.3)	<0.001
No	124 (80.5)	153 (96.2)	1.0	
Lower back pain				
Yes	70 (45.5)	67 (42.1)	1.1 (0.7-1.8)	0.554
No	84 (54.5)	92 (57.9)	1.0	
Upper thigh/leg pains				
Yes	23 (14.9)	23 (14.5)	1.0 (0.6-1.9)	0.907
No	131 (85.1)	136 (85.5)	1.0	
Acyclic abdominal pain				
Yes	40 (26.0)	22 (13.8)	2.2 (1.2-3.9)	0.007
No	114 (74.0)	137 (86.2)	1.0	

4.8 Pain symptoms in relation to rural versus urban population

In reference to Table 9 above, dyschezia was more frequent in girls in the rural school (67.7%) compared to the urban (p=0.001). Similarly, dysuria was reported more in the rural (83.3%) compared to 44.8% in the urban schools (p<0.001). The girls that reported acyclic abdominal pain were more likely to be from rural school (64.5%) than urban (45.4%), p=0.007. Dysmenorrhea, lower back pain and upper thighs and leg pains were not significantly different between the two groups.

Table 10: Factors associated with dysmenorrhea

Variable	Dysmenorrhea		P value
	Yes (%)	No (%)	
Mean age at first period (SD)	13.2 (1.1)	13.4 (1.0)	0.272
Are your periods regular			
Yes	125 (55.3)	48 (55.2)	0.983
No	101 (44.7)	39 (44.8)	
Mean days of bleeding with each period (SD)	4.3 (1.3)	4.1 (1.1)	0.246
How heavy menstrual flow is routinely			
Light	21 (9.3)	19 (22.1)	0.003
Moderate	168 (74.3)	60 (69.8)	
Heavy	32 (14.2)	5 (5.8)	
Can't remember	5 (2.2)	2 (2.3)	
Number of days in-between periods			
Less than 21days	11 (5.0)	5 (5.9)	0.107
022-24days	24 (11.0)	19 (22.4)	
025-28days	84 (38.4)	27 (31.8)	
029-32days	30 (13.7)	9 (10.6)	
033-35days	5 (2.3)	2 (2.4)	
More than 36days	9 (4.1)	0	
Too irregular to say	56 (25.6)	23 (27.1)	
Ever taken contraceptives			
Yes	13 (5.8)	6 (6.9)	0.704
No	213 (94.2)	81 (93.1)	
Currently taking contraceptives			
Yes	8 (3.5)	2 (2.3)	0.576
No	218 (96.5)	85 (97.7)	
Ever taken contraceptive pills for painful periods			
Yes	21 (9.3)	5 (5.7)	0.309
No	205 (90.7)	82 (94.3)	
Currently taking contraceptives for painful periods			
Yes	10 (4.4)	2 (2.3)	0.380
No	216 (95.6)	85 (97.7)	
Miss school often due to painful periods			
Yes	7 (3.1)	1 (1.1)	0.002
No, I attend but after taking painkillers	62 (27.4)	9 (10.3)	
No	157 (69.5)	77 (88.5)	
Ever heard endometriosis before			
Yes	14 (6.2)	6 (6.9)	0.820
No	212 (93.8)	81 (93.1)	
History of endometriosis in the family			
Yes	10 (4.4)	2 (2.3)	0.692
No	169 (74.8)	29 (33.3)	

4.9 Factors associated with dysmenorrhea

In reference to Table 10, heavy menstrual flow was more likely to be reported by girls with dysmenorrhea [(14.5%), $p=0.003$] while light flow was reported more by those without dysmenorrhea (22.6%). Also, those with dysmenorrhea were more likely to miss school (3.2%) or to attend after taking pain killers (27.6%), $p=0.002$.

Table 11: Factors associated with dyschezia

Variable	Dyschezia		P value
	Yes (%)	No (%)	
Rural	42 (67.7)	112 (44.6)	0.001
Urban	20 (32.3)	139 (55.4)	
Mean age at first period (SD)	13.1 (1.1)	13.3 (1.1)	0.307
Are your periods regular			0.764
Yes	33 (54.2)	140 (55.8)	
No	29 (46.8)	111 (44.2)	
Mean days of bleeding with each period (SD)	4.5 (1.3)	4.2 (1.3)	0.228
How heavy menstrual flow is routinely			0.229
Light	8 (12.9)	32 (12.8)	
Moderate	41 (66.1)	187 (74.8)	
Heavy	12 (19.4)	25 (10.0)	
Can't remember	1 (1.6)	6 (2.4)	
Number of days in-between periods			0.336
Less than 21days	2 (3.4)	14 (5.7)	
022-24days	7 (11.9)	36 (14.7)	
025-28days	24 (40.7)	87 (35.5)	
029-32days	6 (10.2)	33 (13.5)	
033-35days	0	7 (2.9)	
More than 36days	4 (6.8)	5 (2.0)	
Too irregular to say	16 (27.1)	63 (25.7)	
Ever taken contraceptives			0.012
Yes	8 (12.9)	11 (4.4)	
No	54 (87.1)	240 (95.6)	
Currently taking contraceptives for painful periods			0.231
Yes	4 (6.5)	8 (3.2)	
No	58 (93.5)	243 (96.8)	

Miss school often due to painful periods			
Yes	4 (6.5)	4 (1.6)	0.066
No, I attend but after taking painkillers	16 (25.8)	55 (21.9)	
No	42 (67.7)	192 (76.5)	
Ever heard endometriosis before			
Yes	6 (9.7)	14 (5.6)	0.237
No	56 (90.3)	237 (94.4)	
History of endometriosis in the family			
Yes	5 (11.4)	7 (4.2)	0.134
No	39 (88.6)	159 (95.8)	

4.10 Factors associated with dyschezia

In reference to Table 11, girls with dyschezia were more likely to report ever using contraceptive pills (12.9%) compared to those without dyschezia (4.4%).

Table 12: Factors associated with dysuria

Variable	Dysuria		P value
	Yes (%)	No (%)	
Mean age at first period (SD)	13.2 (1.1)	13.3 (1.1)	0.737
Have regular periods			
Yes	16 (44.4)	157 (56.7)	0.165
No	20 (55.6)	120 (43.3)	
Mean days of bleeding with each period (SD)	4.2 (1.1)	4.3 (1.3)	0.885
How heavy menstrual flow is routinely			
Light	6 (16.7)	34 (12.3)	0.118
Moderate	22 (61.1)	206 (74.6)	
Heavy	8 (22.2)	29 (10.5)	
Can't remember	0	7 (2.5)	
Number of days in-between periods			
Less than 21days	2 (5.7)	14 (5.2)	0.220
022-24days	2 (5.7)	41 (15.2)	
025-28days	14 (40.0)	97 (36.1)	
029-32days	3 (8.6)	36 (13.4)	
033-35days	0	7 (2.6)	
More than 36days	3 (8.6)	6 (2.2)	
Too irregular to say	11 (31.4)	68 (25.3)	
Ever taken contraceptives			
Yes	3 (8.3)	16 (5.8)	0.546
No	33 (91.7)	261 (94.2)	

Currently taking contraceptives for painful periods			
Yes	2 (5.6)	10 (3.6)	0.567
No	34 (94.4)	267 (96.4)	
Miss school often due to painful periods			
Yes	4 (11.1)	4 (1.4)	0.002
No, I attend but after taking painkillers	9 (25.0)	62 (22.4)	
No	23 (63.9)	211 (76.2)	
Ever heard endometriosis before			
Yes	2 (5.6)	18 (6.5)	0.828
No	34 (94.4)	259 (93.5)	
History of endometriosis in the family			
Yes	2 (8.0)	10 (5.4)	0.640
No	23 (92.0)	175 (94.6)	

4.11 Factors associated with dysuria

In reference to Table 12, girls with dysuria were more likely to miss classes (11.4%) compared to those with no reported dysuria (1.4%), $p=0.002$.

Table 13: Factors associated with lower back pain

Variable	Lower back pain		P value
	Yes (%)	No (%)	
Mean age at first period (SD)	13.2 (1.0)	13.3 (1.1)	0.553
Have regular periods			
Yes	72 (52.6)	101 (57.4)	0.394
No	65 (47.4)	75 (42.6)	
Mean days of bleeding with each period (SD)	4.4 (1.4)	4.2 (1.2)	0.165
How heavy menstrual flow is routinely			
Light	18 (13.1)	22 (12.6)	0.397
Moderate	95 (46.3)	133 (76.0)	
Heavy	21 (15.3)	16 (59.1)	
Can't remember	3 (2.2)	4 (2.3)	
Number of days in-between periods			
Less than 21days	5 (3.7)	11 (6.5)	0.569
022-24days	20 (14.9)	23 (13.5)	
025-28days	48 (35.8)	63 (37.1)	
029-32days	14 (10.4)	25 (14.7)	
033-35days	2 (1.5)	5 (2.9)	
More than 36days	5 (3.7)	4 (2.4)	
Too irregular to say	40 (29.9)	39 (22.9)	

Ever taken contraceptives			
Yes	9 (6.6)	10 (5.7)	0.744
No	128 (93.4)	166 (94.3)	
Currently taking contraceptives for painful periods			0.881
Yes	5 (3.6)	7 (4.0)	
No	132 (96.4)	169 (96.0)	
Miss school often due to painful periods			0.156
Yes	6 (4.4)	2 (1.1)	
No, I attend but after taking painkillers	33 (24.1)	38 (21.6)	
No	98 (71.5)	136 (77.3)	
Ever heard endometriosis before			0.725
Yes	8 (5.8)	12 (6.8)	
No	129 (94.2)	164 (93.2)	
History of endometriosis in the family			0.235
Yes	7 (8.0)	5 (4.1)	
No	81 (92.0)	117 (95.9)	

Table 14: Factors associated with upper thigh/leg pains

Variable	Upper thigh/leg pains		P value
	Yes (%)	No (%)	
Mean age at first period (SD)	13.3 (1.1)	13.2 (1.1)	0.723
Have regular periods			0.591
Yes	24 (13.9)	149 (86.1)	
No	22 (16.1)	115 (83.9)	
Mean days of bleeding with each period (SD)	4.5 (1.1)	4.2 (1.3)	0.304
How heavy menstrual flow is routinely			0.04
Light	6 (15.0)	34 (85.0)	
Moderate	28 (12.3)	200 (87.7)	
Heavy	9 (24.3)	28 (75.7)	
Can't remember	3 (42.9)	4 (57.1)	
Number of days in-between periods			0.291
Less than 21days	1 (6.3)	15 (93.8)	
022-24days	3 (7.0)	40 (93.0)	
025-28days	19 (17.1)	92 (82.9)	
029-32days	6 (15.4)	33 (8.6)	
033-35days	0	7 (100.0)	
More than 36days	3 (33.3)	6 (66.7)	
Too irregular to say	13 (16.5)	66 (83.5)	
Ever taken contraceptives			0.140
Yes	5 (26.3)	14 (73.7)	
No	41 (13.9)	253 (86.1)	

Currently taking contraceptives for painful periods			
Yes	2 (16.7)	10 (83.3)	0.844
No	44 (14.6)	257 (85.4)	
Miss school often due to painful periods			
Yes	3 (6.5)	5 (1.9)	0.002
No, I attend but after taking painkillers	18 (39.1)	53 (19.9)	
No	25 (54.3)	209 (78.3)	
Ever heard endometriosis before			
Yes	4 (20.0)	16 (80.0)	0.489
No	42 (14.3)	251 (85.7)	
History of endometriosis in the family			
Yes	3 (9.7)	9 (5.0)	0.392
No	28 (90.3)	170 (95.0)	

4.13 Factors associated with upper thigh/leg pains

In reference to Table 14, pain in the upper thighs and legs was associated with higher likelihood of missing school (6.5%) or attending while on pain killers (39.1%) compared to those who had no such symptoms ($p=0.002$).

Table 15: Factors associated with acyclic abdominal pain

Variable	Acyclic abdominal pain		P value
	Yes (%)	No (%)	
Mean age at first period (SD)	12.9 (1.1)	13.3 (1.1)	0.009
Have regular periods			
Yes	25 (40.3)	148 (59.0)	0.008
No	37 (59.7)	103 (41.0)	
Mean days of bleeding with each period (SD)	4.5 (1.4)	4.2 (1.2)	0.121
How heavy menstrual flow is routinely			
Light	4 (6.5)	36 (14.3)	0.019
Moderate	42 (67.7)	186 (74.1)	
Heavy	13 (21.0)	24 (9.6)	
Can't remember	3 (4.8)	5 (2.0)	

Number of days in-between periods			
Less than 21days	0	16 (6.6)	0.072
022-24days	8 (13.1)	35 (14.4)	
025-28days	24 (39.3)	87 (35.8)	
029-32days	7 (11.5)	32 (13.2)	
033-35days	1 (1.6)	6 (2.5)	
More than 36days	5 (8.2)	4 (1.6)	
Too irregular to say	16 (26.2)	63 (25.9)	
Ever taken contraceptives			
Yes	8 (12.9)	11 (4.4)	0.032
No	54 (87.1)	240 (95.6)	
Currently taking contraceptives for painful periods			
Yes	6 (9.7)	6 (2.4)	0.017
No	56 (90.3)	245 (97.6)	
Miss school often due to painful periods			
Yes	4 (6.5)	4 (1.6)	<0.001
No, I attend but after taking painkillers	27 (43.5)	44 (17.5)	
No	31 (50.0)	203 (80.9)	
Ever heard endometriosis before			
Yes	8 (12.9)	12 (4.8)	0.036
No	54 (87.1)	239 (95.2)	
History of endometriosis in the family			
Yes	6 (12.2)	6 (3.7)	0.035
No	43 (87.8)	155 (96.3)	

4.14 Factors associated with acyclic abdominal pain

In reference to Table 15, mean age at first period was significantly lower (12.9 years) for those with acyclic abdominal pain than their counterparts (13.3 years), $p=0.009$. Those with acyclic abdominal pain were more likely to have irregular periods (59%) and reported heavier menstrual flow routinely (21%). History of use of contraceptive pills was reported more frequently in those with acyclic abdominal pain with 12.9% having used contraceptive pills ever in the past and 9.7% used the contraceptives currently for the painful periods. Acyclic abdominal pain made the girls to miss school more often (6.5%) as compared to their counterparts (1.6%), $p<0.001$. In addition, they were more

likely to be aware of endometriosis (12.9%) ($p=0.036$) and a higher proportion (12.2%) reported family history of endometriosis ($p=0.035$).

CHAPTER FIVE

5.1 DISCUSSION

Pain symptoms suggestive of endometriosis were very common among the adolescent girls. The prevalence of dysmenorrhea was found to be very high with more than 70% of the girls experiencing the pains. This prevalence was comparable to the magnitude reported in a study among Finnish girls which showed that 68% of them had dysmenorrhea (43). About a third of dysmenorrhea in this study was reported as severe which was comparable to those reported in other studies elsewhere(44–46).

One prior Australian study reported the rates of dysmenorrhea, dyschezia and dysuria in an adolescent population with rates almost similar to our study i.e. 68% vs. 72%, 12% vs. 19% and 10% vs. 11% respectively(47). Dysmenorrhea was associated significantly with other pain symptoms. The girls with dysmenorrhea had two-fold risk of experiencing dyschezia and acyclic abdominal pain; and more than 15 times odds of dysuria. In addition, dysmenorrhea was associated with heavy menstrual flows. A study in Nigeria showed that women with dysmenorrhea had a higher risk of being diagnosed with endometriosis compared to those who did not report dysmenorrhea (32). Dyschezia was found in a fifth of the girls with about two thirds having mild symptoms. Dysuria was reported in 11.5% of the girls. Both symptoms were higher than 8% and 4.6% reported among Finnish girls respectively (43). On the other hand, acyclic abdominal pain reported in a fifth of the girls was comparable to 19.1% that was found in Finnish girls (43). Dyschezia, dysuria and acyclic abdominal pain were more prevalent among girls with the rural schools than the urban ones. In addition, acyclic abdominal pains occurred in girls with younger age at menarche and were more likely to report

irregular and heavy periods. Other studies have reported young age at menarche to be a contributory risk factors associated with endometriosis (19). Low prevalence of pain symptoms has been shown in populations with high fertility rates, high occurrence of teenage pregnancies and protracted breastfeeding (48).

Use of contraceptive pills was reported among 6.1% of the girls and their main reason of use cited by 40.9% was to relieve the extremely painful periods. Furthermore, history of use of contraceptive pills was reported more frequently in those with acyclic abdominal pain and the current users who used it because of the painful periods. Also, girls with dyschezia were more likely to have ever used contraceptive pills. Finnish girls showed a higher use of contraceptive pills with 30.5% of the girls reporting current OC use and dysmenorrhea was the indication for 61.4% of the users (43).

Pain symptoms impacted negatively on the daily school work and activities of the girls. Studies on endometriosis have documented effects that include inability to go to work or school, hindrance to participation in social functions (36). In this study, about a third of the girls who had dysmenorrhea had their daily activities disrupted due to the painful periods. Dysmenorrhea was significantly associated with increased risk of missing school and for some they would attend classes after taking pain killers. The other symptoms that included dysuria, pain in the upper thighs and legs and acyclic abdominal pain were associated with higher likelihood of missing school. Absenteeism from school was less severe in this study as compared to Finnish study that reported a half of those with dysmenorrhea missing school (43).

Endometriosis awareness was very low with 6.4% having heard about and 3.8% reporting family history. Girls who had acyclic abdominal pain were more likely to be aware and also a higher proportion reported family history. Family history of endometriosis has been reported in previous studies to be associated with diagnosis of the condition (21).

5.2 Conclusions

1. Pain symptoms suggestive of endometriosis were quite common in the adolescent with prevalence rates similar to those in developed countries.
2. These symptoms according to recent studies have a high index of being endometriosis but the awareness of the disease is low among the adolescent population studied.
3. The severity of symptoms has been noted to impact negatively on schoolwork & activities especially when on no form of treatment

5.3 Recommendations

1. Rolling out of a national program to create awareness among school nurses about these pain symptoms experienced by their girls monthly so as to put measures in place to mitigate their severity.
2. More resources should be invested into the active detection of endometriosis in girls with notable symptoms and professional evaluation and proper care should be offered when required.
3. Further local research on how well these symptoms correlate with presence of endometriosis and formulation of a symptomatology criteria of diagnosis by the Kenya Obstetrics and Gynecology society.
4. Further studies should be designed to ascertain the exact differences in rural and urban girls in relation these pain symptoms and the factors contributing to the differences.

STUDY TIME FRAME

Activity	2015		2016		
	Sep	Oct-Dec	Jan-Apr	May-Aug	Sep-Oct
Protocol presentation					
Submission of protocol					
School closure					
Data collection and analysis					
Presentation and write up					

BUDGET

Research Assistants	60,000
Statistician	50,000
Stationary & printing	5,000
Ethics	2,000
Contingency	10,000
Total	127,000

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APPENDIX 1: QUESTIONNAIRE

1. How old were you when you got your first period? ...years.

2. Are your periods regular?NO YES

3. How many days of bleeding do you usually have with each period?

.....days too irregular to say

4. How heavy is your menstrual flow routinely?

.... light Moderateheavy Can't

remember

5. How many days are there in-between your periods?

.... less than 21 days ...33-35 days

....22-24 days ...more than 36 days

....25-28 days ...too irregular to say

....29-32 days

6. Have you ever taken contraceptive pills?

...Yes ...No

7. Are you currently taking contraceptive pills?

...Yes ...No)

8. What is the reason of using the contraceptive pills?

.....Extremely painful menstrual periods

.....Heavy and/or prolonged menstrual periods

..... Irregular menstrual periods

..... None of the above

9. Do you get any of the following symptoms when you have a period?

.... pelvic pain (pain on the lower part of your belly)

.... pain on opening bowels/passing stool

.... pain on passing urine

.... low back pain

.... pain on upper legs or thighs

10. If you answered yes to any of the options given in Q10; Using a scale of 0 to 10 with (0) meaning no pain to (10) meaning severe pain, indicate how severe the symptoms is/ are during your menses.

.... pelvic pain (pain on the lower part of your belly)

.... pain on opening bowels/passing stool

.... pain on passing urine

.... low back pain

11. Do you get pelvic pain (pain at your lower belly) at other times other than during your period?

.... Yes, and it makes me take painkillers

.... Yes, and I miss school during such occasions

.... Yes, and I miss school game activities

.... No

12. Do you get pelvic pains with your periods?

...Yes, very painful that even though I take painkillers, I can't perform my daily activities

...Yes, very painful but am able to perform my daily activities after taking painkillers

...Yes, mild but bearable and subsides after the 2nd day of menses.

...No

APPENDIX 2: STUDY PARTICIPANT CONSENT EXPLANATION FORM

Study Title: Prevalence of pain symptoms suggestive of Endometriosis among Adolescents in secondary schools

Principal Investigator: Dr Alex Kagia

Supervisors: Prof Joseph Karanja and Dr Wanyoike Gichuhi from the department of Obstetrics & Gynecology, University of Nairobi

Introduction

My name is Dr Alex Kagia, postgraduate student in the University of Nairobi, Department of Obstetrics & Gynecology. The purpose of this form is to give you an outline of my study to enable you make a decision whether to be a willing participant or not.

Purpose of the study

The aim of this study is to determine the number of adolescents who suffer from pain during or in between their menses, how the pains present in different ladies and overall, how it negatively affects their lives in school.

You have been selected to participate in this study because you fit the desired criteria required.

Benefits for participants

No money payments will be paid to you for participating. It is voluntary. Rather the information will be used by the University and Department for publication and policy formulation and suggest referral for clinical follow up in warranted cases.

Risks

No risks are anticipated following participation for this study.

Procedure

Once you agree to participate in this study, you will be enrolled and interviewed by me the researcher or any one of the assistants. The interview will be guided by a questionnaire with close ended questions that you will be required to answer.

The duration of interview will take 10-15 minutes.

Confidentiality

All information gathered will be treated with utmost trust. Your name will not appear anywhere in the questionnaire as it will have a preceded 4-digit number.

Reassurance

Participation in this study is voluntary. You can decline to participate. No coercion will be used.

Ethical consideration

This study has been approved by the University of Nairobi/Kenyatta National Hospital Ethics Research Committee and deemed fit to be carried out respecting the participant's rights and wishes. The study findings will be presented to the Department of Obstetrics & Gynecology for publication.

In case of any ethical concerns; please contact: -

The Chairman, K.N.H/U.O.N-Ethics & Research committee; K.N.H Hospital road; along Ngong road

P.O.BOX 20723-00200, Nairobi; Tel no 726300; Fax 725272

If you have any queries regarding the study, contact: -

Dr. Kagia through Tel no: 0721837208

APPENDIX 3: CONSENT FORM

Consent to participate in the study

I volunteer to participate in this research study
having read the consent information above and understood clearly the purpose of the
study. I thereby give my written informed consent to participate.

Signed:

Date:

Witness:

Date: