KNOWLEDGE OF PHYSICAL EXERCISE AS A DYSMENORRHEA PREVENTION METHOD AMONG FEMALE UNDERGRADUATES IN UNIVERSITY OF IBADAN, IBADAN, NIGERIA

BY

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ABSTRACT

Dysmenorrhea is a common gynaecologic complaint among young girls and women. Depending on its duration and severity, it has negative impacts on normal daily activities and quality of life of women. The manner in which females attempt to manage the problem is of less concern in Nigeria. This study therefore investigated the knowledge of physical exercise as an effective dysmenorrhea prevention method among female undergraduates residing in University of Ibadan female halls.

A descriptive cross-sectional survey was conducted among 320 consenting female students aged 16-29 years that were residents of the four female undergraduate halls within the campus, namely; Queen Elizabeth II hall, Queen Idia hall, Obafemi Awolowo hall and Alexander Brown hall. A four stage sampling technique which involved simple random selection of students from each hall was used. A semi-structured self-administered questionnaire with six (6) sections and items was used to elicit information from the participants. Knowledge was measured on a 10-point scale; score ≥8 was classified as good, ≥4.5-8 as fair and <4 as poor. Level of participation in physical exercise was measured on 3-point scale; <1.5 was classified as low, ≥1.2-2.5 as fair and ≥2.5 high. Data collected was analysed using descriptive and inferential statistics at $p<0.05$ level of significance.

The mean age of the respondent were 20.3±2.3 years. Majority (24.5%) of the respondents were in 100 level. Most of the respondents were Christians (84.1%). Yoruba constituted the majority of the respondents (74.1%). Majority of the respondents (87.8%) reported lower abdomen as their site of pain while just a few (12.2%) did not report or indicate it as their site of pain. In terms of prevention method adopted by respondents majority 192 (60.0%) make use of modern medicines in managing dysmenorrhea. Aside the use of medicines as a means of managing dysmenorrhea, the respondents reported employing the following management patterns: about 33.8% reported adopting massage on the waist and lower back as a management pattern of dysmenorrhea, 17.8% use heating pads and hot water bottles while 31.9% adopt hot showers during periods to reduce dysmenorrhea, 4.1% use traditional herbs in form of tea while 30.9% take hot fluids. However, only 25.3% of respondents confirmed adopting exercise as their own management pattern. Overall level of knowlede of physical exercise as a dysmnorrhea prevention method was determined to be poor with a mean score of 3.78±1.6. Respondents, (13.8%) had good knowledge of physical exercise as a dysmenorrhea prevention method while 28.1% of the respondents had fair knowledge and

58.1% poor knowledge. Also, level of participation in physical exercise to relief dysmenorrhea was determined to be low (57.8%).

From the study, poor knowledge of physical exercise as a dysmenorrhea prevention method was documented among the study population. Health education can be used to motivate female students on the benefits of regular exercise to reduce the burden of dysmenorrhea to ensure the health of women.

Key words: Dysmenorrhea, prevention method, physical exercise.

Word count: 482

DEDICATION

This work is dedicated to Almighty God for his love, mercy and abundant blessings bestowed on me throughout this programme, in him alone my hope is found.

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CERTIFICATION

I hereby certify that this study was carried out by ONUH Gloria Ochanya under my supervision in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan.

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LIST OF ABBREVIATIONS

ACOG: American College of Obstetrics and Gynecology

COC: Combined Oral Contraceptive

IUD: Intrauterine Device

NSAIDs: Non-Steroidal Anti-Inflammatory Drugs

OCs: Oral Contraceptives

OTCD: Over-the-Counter Drugs

PE: Physical Exercise

PGs: Production of Prostaglandins

TENS: Transcutaneous Electrical Nerve Stimulation

UIHC: University of Iowa Health Care

WHO: World Health Organization

DEFINITION OF TERMS

Dysmenorrhea: Dysmenorrhea is defined as difficult menstrual flow or painful menstruation

Menstruation: A periodic discharge of blood from the uterus occurring more or less at regular monthly intervals throughout the active productive life of a woman (Titilayo, Ogunbiade, Banjo and Lawani, 2009)

Prostaglandins: Molecules in human production that play an important role in the rupture of follicle during menstruation and also in myometrial contraction

Physical exercise: Exercise is a subcategory of physical activity that is planned, structured, repetitive, and purposeful in the improvement or maintenance of physical fitness. (WHO, 2018)

Endorphins: Group of hormones in the brain that help to relieve pain or stress and boost happiness.

CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND TO THE STUDY

The female menstrual cycle is one of the most important indicators of reproductive health and endocrine functions (Wijesiri and Suresh, 2012). Menstruation is a natural phenomenon which is an important indicator of women's health. Dysmenorrhea to the lay man means painful menstrual period. According to American College of Obstetrics and Gynecology (ACOG), it is defined as a medical condition of pain during menstruation that interferes with daily activities (ACOG 2015).

Dysmenorrhea is the most common gynecologic complaints among adolescent girls and women of reproductive age (Tangchai, Vittaya, Dittakarn (2004); Polat, Celik, Gurates, Nalbant, Kayak (2009); Parveen, Rehana, Nishat, Aftab (2009). It is characterized with cramp-like pain in the lower abdomen that potentially could radiate to the back and thigh regions at the onset of menstruation without any identifiable pelvic pathology (Polat 2009; Smelter, Bare, Hinkle and Cheever 2009). This pain may be associated with symptoms such as back pain, nausea, vomiting, headache, dizziness and diarrhea (Tangchai *et al*, 2004; Polat *et al* 2008). Dysmenorrhea has direct effect on the individual involved, the pain usually begins just before or as menstrual bleeding begins, and gradually diminishes over one to three days and it usually occurs intermittently, resulting in psychological problems like mood swings, inactive participation in different social activities and subsequent low quality of life (Smith and Kaunitz, 2007; Smelter *et al* 2009).

Physical exercise according to the World Health Organisation, is a subcategory of physical activity that is planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective (WHO 2018). Physical activity includes exercise as well as other activities which involve bodily movement and are done as part of playing, working, active transportation, house chores and recreational activities. Exercise has been shown to decrease duration and severity of dysmenorrhea and also the use of sedative in adolescent girls (Rostami, Abbapour and Najja 2008). Exercise is the most accessible and convenient form of pain relief for women with dysmenorrhea (Downey, 2011). Exercise is known to promote blood flow and release of endorphins hormones (the body's natural painkiller) in brain that raise the pain threshold and

is also shown to improve mood of exercising subjects, (Keefer, 2011) . Female athletes had also been shown to report less than painful menstruation than their non-athletes counterpart (University of Iowa Health Care [UIHC], 2006). Regular exercise has analgesic effects that act in a non-specific way, it can also alleviate other symptoms such as fatigue and abdominal bloating in females with primary dysmenorrhea (UIHC, 2006).

Exercising before and during the menstrual period is especially important since exercise can improve muscle tone, increase pelvic circulation and correct posture and thus may likely reduce the concentrations of uterine prostaglandins and induce vasodilatation in the arterioles. Exercises in different postures can help eliminate pain and discomfort (Keefer, 2011) and has been routinely prescribed for the management of menstrual pain (Daley, 2009). Behavioural intervention such as exercise may not only reduce dysmenorrea, but also eliminate or reduce the need for medication (UIHC 2006; Smith and Kaunitz 2007; Daley 2009; Rostami et al, 2008; Smelter *et al* 2009; Downey 2010 and Keefer 2011). However, the knowledge and practice of it among adolescents and young women is low (Hillen, Grbavac, Johnson, Straton and Keogh 1999; Ogunfowokan and Babatunde (2010) instead, they resort to self-medication and abuse (Tangchai *et al*, 2004).

1.1 Statement of the problem

Dysmenorrhea is a very common gynecological problem it remains poorly understood and is rarely taken into consideration when assessing female health and life experiences. It can be debilitating and psychologically tasking for some women (Holder, Edmundson and Erogul 2009). Besides being a gynecological problem, it is a significant public health problem as it affects both the quality of life and the national economy due to frequent school absenteeism, lack of concentration in class and inactive participation in social activities, also loss labour in work place (Tangchai *et al*, 2004; Polat *et al,* 2008).

The prevalence of dysmenorrhea is high among female students and has been estimated to vary greatly between 43-90% among adolescent girls (Tangchai et al, 2004; Polat *et al*, 2008; Holder *et al*, 2009; Parveen *et al*, 2009 and Smelter *et al*, 2009). However, incidence falls with increasing age and with increasing parity (Tangchai *et al,* 2004; Polat *et al*, 2008; Holder *et al*, 2009; Parveen *et al*, 2009 and Smelter *et al*, 2009). Dysmenorrhea results from excessive production of prostaglandins, which cause painful contraction of the uterus and arteriolar vasospasm (Wenzoff and Shimp 2006; Smith and Kaunitz 2007 and Smelter et al,

2009). Psychological factor, such as anxiety and tension can precipitate and exacerbate dysmenorrhea (Smelter *et al*, 2009)

The experiences of dysmenorrhea and the manner in which females attempt to manage it as a problem are given little or no concern in most developing countries, including Nigeria. Management usually involves the use of analgesics, combined oestrogen/progestin oral contraceptive pills, with non-steroidal anti-inflammatory drugs (NSAIDs) being the most commonly used some of which have no response in some individuals, (Smelter et al 2009). The non-pharmacologic treatment include exercise, complementary or alternative medicine, transcutaneous electrical nerve stimulation (TENS), and heat therapy (Smith and Kaunitz 2007; Smelter *et al*, 2009 and Brown and Brown, 2010).

In spite of the recommendation for physical exercise as a means of preventing and reducing the burden of dysmenorrhea, there is still a low level of participation in regular exercise and sedentary life style among females. Several misconceptions about physical exercise further limits the full adoption of it as remedy for reducing the burden of dysmenorrhea or even eliminating it. Some of these misconceptions include; it is not feminine and safe for females to exercise especially during their menstrual period, it makes the breasts sag, that female students who participate in physical exercise may develop masculine outlook. Also, females do not perceive themselves to be strong enough to indulge in physical exercise (Oyewole,Oyesegun, Oshiname and Ola, 2013).

1.2 Justification of the study

Physical exercise as an effective dysmenorrhea prevention method is a basic requirements for promoting a satisfied life and personal esteem in a woman. Physical exercise is essential for the health and dignity of all females. Information on regular exercise as a means of prevention and/or management dysmenorrhea will enhance their self- esteem, boost mood, reduce pain, reduce intake of painkillers during periods and positively improve quality of life in general

There are review studies that found strong evidence for the benefit of exercise in reducing or even eliminating dysmenorrhea and its associated symptoms among young women. Similarly, there is inadequate data on the extent to which females engage in physical exercise as a method of pain reduction with associated symptoms.

In a study by Shavandi *et al*, (2009) on exercise and dysmenorrhea, he reported that intensity and duration of pain-induced by primary dysmenorrhea are reduced and less painkillers are taken. Similarly, women who train intensively have been found to experience fewer symptoms than women who take part in physical exercise occasionally or not taking part at all support the positive effect of physical activities on dysmenorrhea (Shavandi *et al*, 2009).

Therefore the findings of this study will provide key information to policy actors on the need for sensitization programs to help female students adopt and increase physical exercise activities in dysmenorrhea prevention and reduce intake of painkillers. This is essential to reduce the burden of dysmenorrhea and inevitable reduction in school absenteeism.

1.3 Research questions

The study will answer the following questions:

i. What is the level of knowledge of female undergraduate on physical exercise as a dysmenorrhea prevention method?
ii. What are the dysmenorrhea experiences of female undergraduates in University of Ibadan?
iii. What are the dysmenorrhea prevention methods adopted by the female undergraduates?
iv. What is the level of participation in physical exercise by female undergraduates?
v. What are the factors associated with participation in physical exercise as a means of relief of dysmenorrhea?

1.4 General objective:

The overall objective of this study is to determine the knowledge of female undergraduates of University of Ibadan, Nigeria on physical exercise as a dysmenorrhea prevention method.

1.5 Specific objectives:

The study will be guided by the following specific objectives:

1. To assess the level of knowledge of female undergraduates on physical exercise as a dysmenorrhea prevention method

2. To assess the dysmenorrhea experiences of female undergraduates in University of Ibadan
3. To identify dysmenorrhea prevention method adopted by female undergraduates
4. To determine the level of participation in physical exercise by female undergraduates
5. To identify the factors associated with participation in physical exercise as a means of relief of dysmenorrhea.

1.6 Research hypotheses

The null hypotheses for this study are:

HO1: There is a statistically significant difference in the knowledge of physical exercise as a dysmenorrhea and age of the respondents.

HO2: There is a significant difference between knowledge and level of participation in physical exercise as a dysmenorrhea prevention method by respondents

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of dysmenorrhea

Dysmenorrhea refers to the pain or discomfort associated with menstruation and the most common gynecological disorder in women of reproductive age. It is a painful or cramping sensation in the lower abdomen often accompanied by other biologic symptoms, including fatigue, dizziness, sweating, headaches, backache, nausea, vomiting, diarrhea, all occurring just before or during the menses. Dysmenorrhea can be classified into two subtypes. Primary dysmenorrhea occurs when there is no identifiable pelvic disease and tends to occur within 12 months of menarche, it occurs just before or during menstruation. Women with primary dysmenorrhea have increased production of prostaglandin resulting in increased uterine tone and stronger contractions. Secondary dysmenorrhea is associated with an existing condition and can occur many years after menarche and is associated with identifiable pelvic pathology, for example endometriosis. Other causes include ovarian cyst, pelvic congestion and infection.

The incidence and epidemiology of dysmenorrhea is difficult to establish due to the variety of criteria used to diagnose dysmenorrhea and the subjective nature of the symptoms. However, available studies demonstrate that it is a significant health problem affecting a broad range of women. Non-steroidal anti-inflammatory drugs such as ibuprofen are commonly used, warm/hot water compress, diet therapy, yoga and exercise are also used to relieve symptoms. Although not a serious medical problem, the term describes a woman adolescent girl with menstrual symptoms severe enough to keep her from functioning for a day or two each month (Jones *et al*, 2014).

2.2 TYPES OF DYSMENORRHEA

Dysmenorrhea is the medical term for pain with menstruation. There are two types of dysmenorrhea: "primary" and "secondary" (Cleveland Clinic, 2017).

2.2.1 Primary Dysmenorrhea

Primary dysmenorrhea is defined as pain during menses in the absence of an identifiable pathologic lesion (Brown and Brown 2010). This menstrual pain can be associated with nausea, vomiting, diarrhea, and headache. Dysmenorrhea is highly prevalent among female

students in tertiary institutions and has been identified as a leading cause of school absence and nonparticipation in social activities. Behavioural risk factors, such as smoking, alcohol consumption, poor dietary intake and low physical activities like exercise levels have been associated with having primary dysmenorrhea. Other risk factors for primary dysmenorrhea include heavy menstrual flow, lengthy periods, and psychological symptoms, underweight among others.

Combined oral contraceptives (COC) are a widely used treatment for primary dysmenorrhea in women. Primary dysmenorrhea refers to pain with no obvious pathological pelvic disease and almost always first occurs in women 20 years or younger after their ovulatory cycles become established. Primary dysmenorrhea is thought to be caused by excessive levels of prostaglandins, hormones that make your uterus contract during menstruation and childbirth. Its pain probably results from contractions of the uterus that occur when the blood supply to its lining (endometrium) is reduced (Parker, 2006). Other factors that may make the pain of primary dysmenorrhea even worse include a uterus that tilts backward (retroverted uterus) instead of forward. Primary dysmenorrhea is common menstrual cramps that are recurrent (come back) and are not due to other diseases. Pain usually begins 1 or 2 days before, or when menstrual bleeding starts, and is felt in the lower abdomen, back, or thighs. Pain can range from mild to severe, can typically last 12 to 72 hours, and can be accompanied by nausea-and-vomiting, fatigue, and even diarrhea. Common menstrual cramps usually become less painful as a woman ages and may stop entirely if the woman has a baby (Medbroadcast, 2017).

2.2.2 Secondary Dysmenorrhea

It is menstrual pain that is generally related to some kind of gynecologic disorder. Secondary dysmenorrhea is pain that is caused by a disorder in the woman's reproductive organs, such as endometriosis, adenomyosis, uterine fibroids, ovarian cyst, infection, and use of an intrauterine device (IUD) a birth control method (Cleveland Clinic, 2017). Pain from secondary dysmenorrhea usually begins earlier in the menstrual cycle and lasts longer than common menstrual cramps. The pain is not typically accompanied by nausea, vomiting, fatigue, or diarrhea. Most of these disorders can be easily treated with medications or surgery. It is more likely to affect women during adulthood. Secondary dysmenorrhea usually develops in women who have previously had abnormal periods. The pain from secondary dysmenorrhea lasts longer than primary dysmenorrhea pain. This pain may start later during

the period and get worse as the period progresses. It also may not decrease or diminish when a woman's period ends (Medbroadcast, 2017).

2.3 Dysmenorrhea symptoms

Dysmenorrhea, as a general term has been described as by Parker (2006) as a syndrome of symptoms associated with menstruation: "Severe cramping in the lower abdomen that occurs during and or prior to menses. Pain may also occur in the lower back and upper back and may be associated with nausea, vomiting and headache".

Other symptoms cited with menstrual pain are diarrhea, altered appetite, backache, fatigue, headache, dizziness, anxiety, breast tenderness, mood swing and depression. Women with secondary dysmenorrhea often have chronic pelvic pain associated with structural abnormality

Anandha, Priy, Saraswahi, Saravanan and Ramanchandran, (2011) reported that it is unusual for symptoms to start within the first few months after menarche and that affected women, they experience sharp, intermittent spasm of pain usually concentrated in the supra pubic. Pain may radiate to the back of the legs or the lower back. Systemic symptoms of nausea, vomiting, diarrhea, fatigue, mild fever and headache or lightheadedness are fairly common. Other symptoms include decrease in concentration, loss of appetite, dizziness, fainting and sweating. Pain usually develops within hours of menstruation and peaks as the flow becomes heaviest during the first day or two of the cycle. The defining symptom of dysmenorrhea is crampy midline lower abdominal pain that begins with the menstrual flow or a short time before. Typically, the cramps are most intense on the first or second day or flow and resolve before the end of the menstrual flow. The pain may be referred and experienced as low back and anterior thigh pain. Nausea or vomiting may occur in some individuals (Paula, 2013).

Secondary dysmenorrhea on the other hand is more likely to begin several days or even 1 to 2 weeks prior to the onset of bleeding and to persist through the end of menstrual flow. Associated symptoms, including heavy bleeding may suggest uterine fibroids as a cause (Paula, 2013). The main factor associated with dysmenorrhea is the increased production of prostaglandins by the endometrium, which are released during the menstrual flow causing uterine contractions and pain. In addition, vasopressin also increases uterine contractility and causes ischemic pain as result of vasoconstriction.

2.4 Prevalence of dysmenorrhea

Over 50% of women in reproductive ages suffer from painful menstruation; among them 10% have severe dysmenorrhea and 1 to 3 days of their life is impaired each month. Reported prevalence rates as high as 90%. Paula (2013) stated that dysmenorrhea is that most common gynecologic disorder among female adolescents with a prevalence of 80% to 93%. A systematic review of 1998 of chronic pelvic pain in the UK concluded that the prevalence of dysmenorrhea was between 45% to 97% while a review of primary dysmenorrhea in adolescent found the prevalence to range from 20% to 90% with 15% describing their symptoms as severe. Brown and Brown (2010) also reported in another systematic review of studies in developed countries that 25% to 50% of adult women and 75% of adolescents experienced dysmenorrhea and that participation in usual activities was adversely affected in 5% to 20% of these women.

Mohammed, Azam, Hossein and Mehdi (2012) reported that the data on a research on prevalence of primary dysmenorrhea in different parts of the world from 1981-2006 showed the increasing prevalence of dysmenorrhea. He further stated that the results of studies in different parts of Iran showed the prevalence of primary dysmenorrhea in female students to be 85.5% in Rafsanjan, 71% in Tehran and 73.2% in Gilan. This prevalence in other parts of the world was 40.75 in Delhi, 14% in Gambia, 73% in USA, 42.2 in Thailand, 58% in Nigeria and 52.2 in Mexico (Mohammed et al, 2012).

According to Titilayo, Agunbiade, Banjo and Lawani (2009), the prevalence of dysmenorrhea among young women varies widely from country to country. Studies of University female students showed its prevalence to be 64% in Nigeria and Mexico, 84% in Thailand, 88% in Turkey, and 95% in Taiwan. Studies in high school students revealed diverse dysmenorrhea rates, being 48% in Mexico, 72% in Ethiopia and 93% in Australia. In a local study on secondary school girls, its prevalence was 69% (Titilayo *et al*, 2009).

A recent prospective study of college students based on diaries kept for one year found that 72% of monitored periods were painful, most commonly during the first few days of menses. Sixty percent of women studied reported at least one episode of severe pain. It has also been reported that some women experienced pain on the first day of menstruation only, majority in this study reported that they experience pain on the second, third or throughout period of menstruation. This indicates that most students maybe incapacitated in one way or the other as a result of dysmenorrhea.

According to United State statistics, dysmenorrhea may affect 50% of menstruating women, and its reported prevalence has been highly variable. A survey of 113 patients in a family practice setting showed a prevalence of 29%-44%, but figures as high as 90% in women aged 18-45 years have been reported. The use of oral contraceptives (OCs) and non-steroidal anti-inflammatory drugs (NSAIDs), both of which are effective in ameliorating symptoms primary dysmenorrhea, may hinder accurate assessment of prevalence.

Dawood, (2006) according to international statistics reported that the prevalence of dysmenorrhea worldwide is similar to that in the United States. Reported prevalence have ranged from 15.8% to 89.5% with higher rates reported in adolescents

A study of young Italian women found that the prevalence of dysmenorrhea was 84.1% when only menstrual pain was considered, 55.2% when menstrual was associated with a need for medication, 31.9% when menstrual pain was associated with absenteeism, and 25.3% when menstrual pain was associated with both a need for medication and absenteeism (Giovanni, Serena and Angelo, 2012). The prevalence of primary dysmenorrhea decreases with increasing age: prevalence is highest in the 20-40 years of age group and decreases progressively thereafter. There appears to be no relationship with parity when age is factored in (Dawood, 2006)

Latte et.al (2011) conducted a cross sectional study on prevalence of dysmenorrhea among college students to determine the effect on health related quality of life and the prevalence was found to be 68.07 %(Latte, 2011).

2.5 Prevention method

No matter the pin, women affected by dysmenorrhea experience discomfort, distress and suffering and will do anything within their reach to eradicate or reduce the pain. For many women, dysmenorrhea have significant impact on the quality of life at least a portion of each month.

The preventive practices of primary dysmenorrhea involves the use of Non-Steroidal Anti-inflammatory Drugs (NSAIDs), which are cyclooxygenase inhibitors that reduce the production of prostaglandins (PGs). Some NSAIDs, in particular meclofenamic acid, inhibit both cyclooxygenase and lipoxygenase pathways, inhibiting the production of leukotrienes as well. This theoretical advantage has not been shown to resulting a clear-cut advantage of one NSAID over another. In addition, Harel (2006) reported that the most common

pharmacological treatments for dysmenorrhea are NSAIDs. NSAIDs inhibit cyclooxygenase, leading to a reduction in prostaglandins production. The resulting lower level of prostaglandins leads to less vigorous contractions of the uterus, and, therefore, to less discomfort.

Over-the counter pain medications frequently are also being used for dysmenorrhea; such use has been reported in 30% to 70% of adolescents. However, many adolescents are unaware of the differences in the mechanism of action of over-the counter analgesics and often do not distinguish between those that have effective components and those that do not. A Cohrane systematic review concluded that 'NSAIDs are an effective treatment for dysmenorrhea, although women using them need to be aware of the significant risk of adverse effects' and that' there is insufficient evidence to determine which (if any) individual NSAID is the most safe and effective for the treatment of dysmenorrhea (Paula, 2006).

2.5.1 Non- Pharmacological Therapies

Some non-pharmacologic therapies have been shown in small series to be effective for dysmenorrhea. Two of these therapies, transcutaneous electrical nerve stimulation (TENS) and spinal manipulation, have been included in a Cohrane systematic review of efficacy with conclusions of efficacy for primary dysmenorrhea.

2.5.2 Transcutaneous electrical nerve stimulation

Transcutaneous electrical nerve stimulation (TENS) involves stimulation of the skin using current at various pulse rates (frequencies) and intensities to provide pain relief. TENS appears to work by blocking efferent pain stimuli.

Also, topical heat, in the form of either a hot water bottle or heating pad or newer chemical heat-producing adherent pads, may be effective and is associated with minimal risks. Other methods include:

2.5.3 Oral Contraceptives

Combination of oral contraceptives have been prescribed widely in the last 40years for dysmenorrhea in those who have not experienced sufficient relief with NSAIDs or who also require contraception. Oral contraceptive reduces prostaglandin release by inhibiting

ovulation and, thus, decreasing the progesterone-induced increase in prostaglandin synthesis. Decreases in both prostaglandins and leukotriene have been noted in the menstrual fluid of women taking oral contraceptives compared with controls. Paula, (2006) stated that adolescents who experience relief of dysmenorrhea are more likely to use oral contraceptive and correctly and that combination oral contraceptives for management of dysmenorrhea are an appropriate therapy if no significant medical or family history precludes their use.

2.5.4 Herbal and dietary

The evidence on herbal and dietary supplements is limited by poor quality studies and small sample sizes in that the efficacy and its safety have not really been considered when advising women about herbal and dietary supplements for dysmenorrhea. Herbal preparations such as black cohosh, oil of fennel and evening primrose oil have been suggested, but the data to support their use and safety are also sparse. Paula, (2006) studies of fish oils and the Japanese herbal remedy toki-shakuyaku-san, are too small to draw meaningful conclusions.

There is some evidence that both magnesium and vitamin B6 may provide pain relief, however a disparity of dosing and high dropout rates make it difficult to draw from conclusions. There is also some evidence that vitamin E may be effective in relieving dysmenorrhea.

Harel, (2006) reported that a low-fat vegetarian diet was also associated with a decrease in dysmenorrhea duration and intensity in young adult women. He further reported that dietary supplementation with omega-3 fatty acids had a beneficial effect on dysmenorrhea symptoms in adolescents in one study. Increasing dietary omega-3 fatty acids intake leads to production of less potent prostaglandins and less potent leukotrienes, which may have accounted for the reduction in menstrual symptoms observed in adolescent girls in that study.

Approaches to deal with dysmenorrhea differ in different cultures. Young women cope with their dysmenorrhea using different approaches. According to the study from Mexico, 62% of University students with dysmenorrhea self-medicated while 26% consulted physicians. A US study showed that apart from medication, all adolescent girls used non-pharmacological remedies such as sleeping and heat application to soothe pains due to dysmenorrhea. Some of the strategies used in the management of pain among women in Taiwan include bed rest, paracetamol, heat, exercise, ginger tea, brown sugar and low fat.

According to a study on pain relief strategies among a cohort of undergraduates in Nigeria by Emmanuel, Achema, Gimba and Mafuyai (2013), it was discovered that strategies used by female undergraduates for pain relief are drugs, relaxation/rest, warm baths and exercise were the most used strategies adopted in managing menstrual pain among female undergraduates. Ezekwu, Elochukwu and Ojukwu (2014) reported that treatments for primary dysmenorrhea vary across different world population and include lifestyle modification, complementary and alternative modalities, over-the-counter and prescription of analgesics and hormonal contraceptives.

A study carried out among female students of University of Enugu, Nigeria also revealed that rest was mostly preferred as a means for pain relief, pharmacological methods which included paracetamol, aspirin, NSAIDS (Non-steroidal anti-inflammatory drugs) such as Ibuprofen, Feldene, Cataflamete. Other means included avoidance of sweet foods like coke was followed by rest then exercise was also a moderately preferred means of pain relief. Some females or young adults with dysmenorrhea self-medicate with the over-the-counter preparations; as few consult health care providers. Heat packs also presented as a preferred means of pain relief by the participants of the study. Consumption of fruits, vegetables and decreasing salt consumption during menstruation period has also been identified by some studies as means of managing dysmenorrhea.

Brown and Brown (2010) suggested physical exercise as a non-medical approach to the management of dysmenorrhea. Ogunfowokan and Babatunde (2010) found in her study that physical activities and positioning such as walking around and prone positioning was effective in managing primary dysmenorrhea.

A multidisciplinary approach involving a combination of life style modification and allied health services should be used to limit the impact of dysmenorrhea on activities of daily living. Use of non-steroidal anti-inflammatory drugs is the most common dysmenorrhea prevention method among women today.

2.6 Physical exercise as a dysmenorrhea prevention method

The idea that various type of active or passive exercise might help in alleviating pain in primary dysmenorrhea is not a new issue. It is widely thought that exercise reduces the frequency and / or the severity of dysmenorrhea syndrome. Exercise is known to cause the release of endorphines, substances produced by the brain that raise the pain threshold

(Abbaspour 2006) but some current reviews ask whether exercise is an effective treatment for dysmenorrhea. This question matters as non-pharmacologic interventions avoid the risk of side effects and complications associated with medication. Moreover, not all women are able to or choose to use anti-inflammatory medications or contraceptives. Yet, the data on exercise and dysmenorrhea are quite limited, and only one clinical trial met review standards, exercise was found to prove the effectiveness of exercise in the treatment of dysmenorrhea. Given the prevalence of this problem, a broad range of treatment options is ideal. However, more studies are needed to know whether exercise can be included as a proven treatment

Dysmenorrhea is also known as painful periods which occurs less often in those who exercise regularly, it can also boost your mood and fight fatigue. To get these benefits you must exercise regularly, not just when premenstrual syndrome symptoms appear, aim for 30 minutes of moderate exercise on most days of the week. Physical exercise has been advocated as a non-medical intervention for the relief of dysmenorrhea (Fernandez, 1991; Metheny 1989). Gregory Boyle (2004) stated that, physical exercise has been suggested as a non-medical approach for managing the symptoms of dysmenorrhea. It has been found useful to affect menstruation on many ways.

Zlem Onur (2012) in a study on impact of home-based exercise on quality of life of women with primary dysmenorrhea proved that there is evidence that exercise has a positive effect in the treatment of dysmenorrhea, although further randomised controlled trials may be needed for a definitive conclusion. In addition to the many health benefits of exercise, because of its potential positive effect in reducing a number of other symptoms and complaints that are often associated with primary dysmenorrhea, it can be recommended for all affected women

Noorbakhsh, Eidy, Mehdi, Zahra, Mani and Shahla (2012) studied effect of exercise on primary dysmenorrhea of female university students. The results shows that performing a regular exercise activity significantly reduced pain intensity in experimental group when comparing with control group. It is concluded that participating in physical activity programs like exercise is likely an approach to reduce the detrimental effect of primary dysmenorrhea symptoms in young females (Noorbakhsh *et al*, 2012)

Pattison (2009) conducted an experimental study among 69 technical college female students in Taiwan to assess the effects of exercise on dysmenorrhea. Five tools were used to collect pretest and post test data in each section. Thirty one of the experimental participants reported

that exercise was helpful, a thirty three were satisfied with exercise and concluded that exercise was effective to reduce pain and anxiety during menstruation

Blakey *et al*, (2008) conducted the study on 654 university students aged between 18 and 25 at College of Medical and Dental Sciences. The participants were evaluated for their age, height, weight, ethnicity, and current smoking behaviour through the Women's Health and Lifestyle Questionnaire. The researchers also used a modified version of the Godin Leisure-Time Exercise questionnaire to analyze the exercising pattern of the study participants. The response rate noted during the study was 91.3%. Menstrual pain rating using a visual analogue scale (VAS) and the verbal multidimensional pain score (VMPS) demonstrated that participating in physical exercise would confirmed reduction in primary dysmenorrhea (Blakey *et al*, 2008).

Israel *et al,* (1985) conducted an experimental study comparing dysmenorrhea symptoms between a physical training group of women (30 minutes continuous walk or jog programme three days a week at an intensity of 70% to 85 % of the heart rate range) and a sedentary control group (no activity during the experimental period). The results showed a significant decrease in symptoms in the training group during the menstrual phase of the cycle. Gannon et al, (1989) reported that the duration that women had been exercising for significantly correlated with reduced menstrual symptoms. A decrease in menstrual symptoms has also been reported in female runners (as a non-elite sporting activity) (Schwartz 1981). In a non-randomised study, Aganoff and Boyle (1994) compared regularly exercising women recruited from health and fitness clubs with non-exercisers (recruited from community sources). They reported significant effects of exercise on negative mood states and physical symptoms with significant effects on all measures across the menstrual cycle phase.

The role exercise improves dysmenorrhea (Roger Smith, 2018). A systematic review on the use of exercise for relief documented improvement also most observational studies have reported decrease prevalence of dysmenorrhea and/or improved associated symptoms with exercise. According to Melissa Conrad (2017) many women find that exercising helps relieve menstrual cramps. Exercise release endorphins which are brain chemicals that promotes wellbeing. Whether you are walking, running or swimming it's safe to participate in all of these activities during your period.

Ogunfowokan and Babatunde (2010) found in their study that physical activities and positioning such as walking around and prone positioning was effective in managing primary dysmenorrhea. The findings imply the need for educating adolescent girls and young women on effective management of dysmenorrhea with exercise since a high prevalence rate was observed (Ogunfowokan and Babatunde, 2010).

2.7 Types of physical exercise relevant to dysmenorrhea prevention

During the past 30 years, exercise have been considered as an effective treatment for the prevention and treatment of dysmenorrhea. In the medical literature, exercise interventions vary in quality, intensity (Mild moderate and vigorous) and duration. In current studies the exercise relevant to dysmenorrhea for women comprise sessions of home-based stretching exercises, aerobic training, and relaxation exercises among others. These home based exercise programme were easy for every subject, and as a result the effects and compliance rate remained very high throughout the studies

Exercise generally influences growth and development positively and one of the important women-specific problems is their physical activity and its relationship with their menstrual cycle (Ameneh, Sadegh, Saeedeh and Gholamreza, 2016).

2.7.1 Aerobic exercise

Aerobic exercise speeds up your heart rate and breathing, it is important for general body functions. It may also help relax blood vessel walls and boost mood in women experiencing dysmenorrhea. Examples of aerobic exercise include walking, swimming, jogging, cycling and dancing. There are various studies done about the effect of aerobic exercise to relieve symptoms of primary dysmenorrhea. Aerobic exercise had been shown to reduce stress, and this reduction in stress may play a bigger role in the relief of the symptoms of dysmenorrhea (Downey, 2010)

It is clear that exercise activities in comparison with medicinal treatments are without side effects and therefore they are devoid of any risks. Aerobic exercise such as walking, cycling, swimming and mild running are favorable methods for settling down and elimination of the premenstrual tension (Knuttgen *et al,* 2007). The results of the study conducted by Mosalla Nejad *et al*, (2017) indicated that eight weeks of aerobic exercises considerably reduces the physical and affective symptoms of the premenstrual syndrome symptoms

The study of Mohammadi *et al* (2012) aimed at determining the effect of aerobic exercise on some of the menstrual symptoms of nonathletic students showed that with the regular and continuous exercise of aerobic exercise, early menstrual dysmenorrhea and severe menstrual bleeding can be controlled or prevented. Zahra *et al*, (2018) investigated the effect of 8 weeks of regular aerobic exercise on the severity of primary dysmenorrhea which showed reduction in dysmenorrhea among participants. Munawar *et al* (2013) conducted a study on effects of aerobics on reducing the pain of dysmenorrhea on 19 participants aged 20-25 years old and results had concluded that aerobics may reduce dysmenorrhea.

Abbaspour *et al* (2006) conducted a study on effect of aerobic exercise on primary dysmenorrhea on 142 students and results concluded that exercise can decrease the duration and severity of dysmenorrhea.

Nategheh *et al* (2003) conducted a study on effects of 8weeks aerobic exercises training on primary dysmenorrhea on 30 females had concluded that aerobic training reduces psychological and physical symptoms of primary dysmenorrhea.

2.7.2 Stretching

Stretching exercise helps maintain flexibility which increases range of motion, reduces pain and the risk of injury. Examples include, single knee rotation and squats. Six types of stretch training program (abdomen, pelvis and thigh) significantly reduced symptoms of dysmenorrhea **(**Karampour, 2012).

Therapeutic benefits of stretching exercise and dysmenorrhea include;

- Nausea and vomiting, other dysmenorrhea symptoms are decreases.
- Helps to reduce mood swings on pre-menstrual phase
- Heart pumps effectively
- Tones up the elasticity and strengthen the spine& pelvic muscle
- The diaphragm is mode elastic and strong, and can stretch to accommodate the uterus easily
- Healthy blood, oxygenation and other fluids are circulated properly to the uterus
- Exercise stabilizes the nervous system.
- Pain in joints and backache decreases.

- Exercise helps to stimulate the appetite and bowel action, hence constipation decreased.
- Raising the level of energy and also helping in maintenance of the metabolism.
- Anemia decrease & free flow during menstruation
- Maintain the hormone balance

Five vital tools for stretching exercise practice

1. **Proper Stretching Exercise** to help reproductive organs and pelvis to ensure easy menstruation and to ensure optimum supply of blood and nutrients to the uterus. Young women may practice the recommended exercise for 30 minutes on each day.
2. **Proper diet** should include proteins, carbohydrates, vitamins, minerals and fat, Sugar, cholesterol, high in vegetables, fruits, fiber and grains should be taken. Drink at least 8 to 10 glasses of water.
3. **Proper Breathing** helps one to be anchored in the present moment, calming and relaxing the mind completely. During the menstruation the practice of exercise eases the tension of uterine contractions, making them synchronized and harmonious.
4. **Proper Relaxation** technique-relax your toes, ankle, calf muscles, knees, thighs, waist (hip) , abdomen, chest, neck, shoulders, arm, forearm, palm, fingers, face, head.
5. **Proper Attitude** should be cool and calm person without any confusion and should have a clear vision , clear understanding , confident and commitment

Billig was one of the first advocates of stretching exercise for dysmenorrhea, in 1943 (Billig 1943). He thought women with dysmenorrhea had contracted ligamentous bands in the abdomen and devised a series of stretching exercises for which he claimed a high rate of symptom relief. The Billigs' exercise regime stretches the connective tissue around the pelvis, the hip flexors, and the muscles on the inside of the thighs.

Stretching exercises has positive effect in reducing pain intensity, pain duration, and reduced the use of painkillers (Shahr-jerdy *et al*, 2012). Shahrjerdi and Sheikh Hoseini (2010) also reported that the severity and length of pain due to primary dysmenorrhea in young women following 8 weeks stretching exercises are diminished and they take significantly less medicine.

Reda Mohamed *et al*, (2016) conducted a study on the effect of stretching exercise on dysmenorrhea and the results concluded that the premenstrual symptoms reduced after

practicing the stretching exercises. So, practicing the stretching exercises beside the usual menstrual care reduced the intensity of pain during menstruation for the studied group compared to those who did not practice it. Also, it reduced the premenstrual symptoms.

Golomb *et al* (2010) studied the effects of exercise therapy on the frequency of dysmenorrhea and premenstrual problems in female students for more than 3 years. Their findings showed that 39% of students in the experimental group compared with 61% of the control group experienced dysmenorrhea symptoms. However, the prescribed exercises were effective in reducing menstrual symptoms and were important to perform on daily base. The findings of this study suggest that there is a beneficial impact of physical exercise on menstrual cycle symptoms. Whether or not the effects of exercise could be long-term should be the subjects of further research. According to the results of this study, performing 8 weeks of selected stretching exercises reduces pain intensity, diminishes pain duration, and decreases the consumption of analgesics drugs in students with moderate-to-severe primary dysmenorrhea during the menstruation cycle.

2.7.3 Isometric exercise

Isometric exercise are a type of exercise in which the joint angle and muscle length do not change during contraction. These exercises work on the muscles in a static position and demand muscle tension without any actual movement. Examples include, push-ups, plank, back and shoulder stretch and lunge.

The potential mechanism of the effect of isometric exercises is strengthening pelvic muscles, facilitating bleeding, and excretion of wastes containing prostaglandin which causes contraction. Shavandi *et al*, (2010) conducted a quasi-experimental study on 30 female students suffering from dysmenorrhea, they examined the effect of 8 weeks isometric exercises on primary dysmenorrhea, pain intensity and duration of pain decreased after 4 weeks. They concluded that, given the positive effect of isometric exercise on primary dysmenorrhea as an important problem for female students, it will lead to absenteeism from the classroom and Isometric exercise is a useful method for this age group, and it is possible to spend isometric exercises anywhere without spending money to reduce the complications of primary dysmenorrhea.

A study conducted by Sara Azima *et al*, (2015) on effect of isometric exercises on primary dysmenorrhea, results concluded that pain intensity and duration of pain was significantly

reduced in exercise groups. Isometric exercises seem to be an easy, non-pharmacological method for reducing primary dysmenorrhea.

2.7.4 Relaxation exercise

Relaxation exercises refocuses your attention to help clear your mind, feel calm, slow down your body and importantly helps you put things in perspective. Practicing relaxation regularly can really help you cope with stress. Examples are deep breathing, meditation and yoga

Morse (2006) commented that approximately 10% of the women were severely affected by dysmenorrhea during the reproductive years. Relaxation instructions are provided to an experimental group and drug treatment were given to control group. The study revealed that experimental group have significant positive benefits from the relaxation technique.

Dos Santos (2004) conducted a study on pain management. The subjects were 61 patients with menstrual symptoms given relaxation technique for 24 weeks and various treatment are proposed. The result showed that subject's pain level are decreased after getting Billig's relaxation technique.

Yoga and tai chi are gentler forms of exercise that may be easier to do if you experience fatigue. In one study, young women who practice yoga for 60 minutes once a week for 12 weeks felt less menstrual distress and pain compare to those who did not do yoga. Some of the best poses that help women feel better during menstruation include bridge, staff pose, bound angel and cat stretch (resting hands and knees on the floor). These Exercise tones the muscles of the pelvic floor and the core abdominal muscles and releases pressure on the articular facets in the lumbar spine (Sciencedirect, 2017).

2.8 Knowledge on use physical exercise as a dysmenorrhea prevention method

A study conducted by Mohammad and Farzaneh (2012) to assess knowledge and attitude about dysmenorrhea among female students. Most of the subjects in the study (66%) were unaware of the effectiveness of exercise activities on their pain relief, and about 33% of students even avoided any kind of physical activities during their menstrual period. There was an indication on the similarity of the students' attitudes in different age groups towards the effectiveness of physical activities on menstruation pain relief. Meanwhile, other studies have shown that physical activities, especially mild exercise, could cause pain relief in most cases. Therefore, educating young girls and women about the positive consequences of

physical activities, even during their menstrual periods, could be useful for the formation of their healthy lifestyle.

Some misconceptions on use of physical exercise to prevent dysmenorrhea contributes to the poor knowledge of exercise as an effective prevention method. Bailey, Wellard and Dismore (2004) suggest that, historically, physical activity was regarded as potentially damaging to a young girl's development, as females were expected to base their careers around being a mother as opposed to something entailing physical activity. They go on to explain that some of these values are still supported in our society. Therefore, as women have been assigned the role of child bearing and raising children, some may have found themselves disadvantaged or have lacked the motivation to participate in physical activity. Some of these misconceptions include; *'Exercise disrupts menstruation', 'you should not exercise during periods', 'you should take a lot of rest as you lose a great amount of blood'.*

2.9 Level of participation in physical exercise to prevent dysmenorrhea among females

Despite a decreasing gender gap in exercise participation, there still remains a significant under-representation of women included in sport and exercise in medicine research studies. A review of 1382 sport and exercise research studies involving over 6 million participants, from 2011 to 2013, found the representation of women to be 39 %(Bruinvel, Burden and Brown 2016) which was considered very poor.

Dwyer *et al*, (2006) report that research has shown that there is a decline in physical exercise, and that this is more notable in female adolescents. Similarly, Caspersen, Pereira, and Curran (2000) explain how physical activity has actually been declining and that at all ages, females are less active.

Adegoke and Oyeyemi (2011) in a study on prevalence of physical inactivity among Nigeria youths concluded that physical inactivity was significantly higher among females than males, among married, by religion educational status. This is of concern, considering the health benefit of reducing the burden of dysmenorrhea among females.

2.10 Factors associated with participation in physical exercise to relief dysmenorrhea

A large proportion of adults in Western cultures are physically inactive, despite several decades of warnings about the potentially negative health consequences of a sedentary lifestyle. Efforts to promote physical activity have focused on identifying its determinants and designing interventions that might effectively promote regular physical activity. The

multitude of factors that induce adults to initiate and maintain programmes of physical activity have been divided into those that are invariable (age, gender, race, ethnicity) and those that are presumed to be modifiable (behavioural and personality characteristics, environmental circumstances and community settings). The lack of consistency in the design, analysis and reporting of interventions in the lives of inactive or sedentary individuals has produced equivocal results. However, several social and environmental factors have systematically emerged as determinants of physical activity in females, (Seefeldt, Malina and Clark, 2002)

Aarts *et al*, 1997, stated that; there are many obstacles to the development of exercise habits. First, the person may not know which type of exercise behaviour promotes health or that a sedentary lifestyle will have negative effects for health in the long term. Therefore, individuals may not be motivated to start any type of health enhancing exercise behaviour.

Second, despite health beliefs the person may never decide to attempt a certain activity, because it seems not desirable enough. This suggests that the initiation of exercise behaviour does not merely rely on having knowledge about the relationship between exercise and health. In addition, individuals will also base their decision to exercise on other, non-health-related consequences.

Third, after trying the behaviour and learning about its consequences and/or its difficulty, the person may decide to quit the action. This may be because the expected outcomes of the chosen type of exercise are not immediately obtained, basically because they are only visible in the long term (a problem related to many health behaviours). Also, when performing the behaviour persons may encounter unanticipated negative consequences. On the other hand, individuals may have created personal goals that are rather difficult to achieve. For example, jogging over a distance of 5 km may be a relatively more difficult task for untrained persons than cycling 10 km (notice that both types of activities can be done in 30 min). Therefore, individuals should be encouraged to choose a type of exercise behaviour that leads to immediate satisfactory experiences and can be executed within the boundaries of their personal capabilities. In other words, in order to develop exercise habits, focusing on both proximal outcomes and goals is more effective than directing attention to distal ones.

Fourth, the possibility to carry out the same behaviour any next time constitutes an important link in the chain of repeated exercise behaviour and the development of a habit. For example, time constraints and lack of facilities have been found to be the main reasons why individuals do not maintain an exercise program (Dishman, 1991).

Therefore, the degree of (internal and external) control over the behaviour is an important element in the process of habit formation and its livelihood (Prochaska, 1994). This suggests that relatively simple exercise behaviours (e.g. walking, cycling) may more easily become habitual than behaviours that are rather complex (e.g. attending an organized fitness program), because the latter behaviours are more subjected to facilities, and probably need more intentional effort and planning to occur.

Physical inactivity remains a serious issue in our society, particularly for women (Sarah S. Kohlstedt, 2013). Despite continued health education, more than 60% of American women do not engage in recommended levels of physical activity, and more than 25% are completely sedentary (Center for Disease Control, 2010)

Garcia *et al* (1995) also confirmed that compared to males, females reported less prior and current exercise, lower self-esteem, poorer health status, and lower exercise self-schema. Adolescents, in contrast to pre-adolescents, reported less social support for exercise and fewer exercise role models. In a path model, gender, the benefits/barriers differential, and access to exercise facilities and programs directly predicted exercise.

Caroline (2008) in her study proposed some factors affecting the practice of physical exercise as a means of managing dysmenorrhea and they include social, environmental, physiological, and psychological factors. The physiological and psychological factors, including social, sporting issues, and restrictions in relation to physical activity; gender; cultural; economic and other issues

2.10.1 Peers

According to Sallis (1999), when adolescents engage in physical activity with their peers the influence they have over each other is paramount. Furthermore, "the group creates a supportive environment for its members. If the main peer group devalues physical activity, this is an effective deterrent". If the female adolescent's friends lack interest in participating in the activity, it may influence the female adolescent not to participate. Tergerson and King (2002) explain how "having a friend encourage me to exercise" was an important factor in encouraging adolescents to engage in physical activity. They go on to mention that the female adolescents acknowledged that having a best friend who is physically active helps them participate. Lee (2004) further suggests that if some of their friends enjoy the physical activity, this may have the effect of influencing their other female friends to enjoy it more.

Similarly, Whitehead and Biddle (2008) explain how peers were often responsible for encouraging the female adolescent to participate in physical activity.

2.10.2 Restrictions

Badland and Schofield (2005) suggest that to increase physical activity and encourage children to walk to school or activities, the safety concerns of parents should be addressed. However, some adolescents need transportation, not only to surmount the distance to school or their physical activity, but also to cater for gear bags that hinder walking. Humbert *et al* (2006) suggest that adolescents are reliant on their parents for transportation, and if this is not readily available it may hinder their involvement.

While they found that students did not seem deterred if they had to catch a bus, it would need to be a local facility. They go on to mention how lack of, or perceived inadequacy of facilities, may hamper participation.

2.10.3 Time

Wiese-Bjornstal (1997) explain that they found female adolescents complained that they did not have enough time for physical activity, which they suggest was similar for adults. They suggested homework, part-time jobs, or family responsibilities made this difficult. Furthermore, Tergerson and King (2002) explain how the female adolescents preferred to do other things with their time rather than engaging in physical activity.

2.10.4 Parental

There's a widespread lack of parental concern, and that time and financial circumstances, exacerbated by negative peer pressure, may be the prime barriers to engaging female adolescents in physical activity. Parents' responsibility to attempt to encourage their adolescents into physical activity at an early age is poor. Some of these physical activities do require a lot of time. When both parents are working this may be difficult, but due to the benefits of physical activity this should somehow, be overcome within the family. Whilst some physical activity may place an extra financial burden on families, there are other forms, such as walking, swimming, or running, that will impose only a limited time and financial burden on the average family.

A report from the New Zealand Ministry of Social Development (2005) highlights the issue of poverty, or those surrounding financial matters, which may be significant barriers for adolescents participating in physical activity. The report explains how most young people

drop out at year seven and eight, as their families cannot afford the club fees. Though isolated studies specific to financial issues as barriers to physical activity for female adolescents were not identified, literature available does indicate this may be an important issue, and it should not be overlooked. The report suggests: "Parents work long hours to support their families. They have no time to take their kids to activities outside of school hours. One parent might be working night shift and there is only one car or no car".

A study in California by Quintero (2004) researched parents' perceptions of their daughters' participation in sports, and explains how girls' rates of physical activity decrease as they enter adolescence. Parental support has been identified as key for the retention of girls in sports". Whitehead and Biddle (2008) also suggest that parental support and the parents' own physical activity levels may influence their female adolescent. De Bonnaire and Falloon (1999) similarly identified that main reasons for adolescent girls not participating in sport included both access and adult involvement. Their study prepared for the Hillary Commission explains: "Parental interest is also a factor that may negatively impact on young people's participation. The worst case scenarios are those who put pressure on their children to participate and excel". The report also identified fear as an underlying barrier. De Bonnaire and Falloon (1999), reporting for the Hillary Commission, explain how fear of "being hurt, rejection, humiliation and failure" may also be barriers to physical activity, as with access, lack of adult involvement and competing activities, such as parties and hobbies.

Wightwick (2008) suggests that over-protective and overworked parents may be responsible for a lack of physical activity in young people, and that too many 7 to 18 year olds are not meeting the government's recommended level of physical activity levels. This decrease in physical activity may also be attributed to over-protective parents not allowing their children to freely participate in sports, or to walk to and from sports grounds and schools, or pre-occupied parents who allow their children to watch television for extended periods.

O'Connor (2005) explains that "children from broken homes are missing out on weekend sport as they juggle time between parents". With the rise in the incidence of marriage breakdowns, it is inevitable that children and adolescents who are dependent on their parents for not only encouraging participation in physical activity, but also for providing the financial and transportation means, may suffer as a consequence. Kolt *et al* (2006) also explain how "nuclear family structures may not always exist". They explain that in the nuclear family it is common for both parents to work. While this may mean the family is better off financially,

there are still issues with being able to find the time to transport adolescents to and from their physical activities.

Parental support, therefore, plays a major role in assisting or restricting females' participation in physical activity. Assistance may include financial, transportation, encouragement, or being a role model for the adolescent. Some parents may simply lack the means or motivation to be able to support their daughters in physical activity due to commitments or to other circumstances.

2.10.5 Psychological factors

This section reviews the argument that regular physical activity may have the potential to impact on specific psychological problems in adolescence, such as depression, poor body image, and eating disorders.

Depression

Paluska and Schwenk (2000) explain how physical activity may have the potential to play an important role in the "management of mild-to-moderate mental health diseases, especially depression and anxiety". Santrock (2005) suggests the female adolescent is more likely to develop depression than the male adolescent. While research on adolescents is limited, it appears that physical activity has a positive effect on depression and anxiety in this age group too (Paulsuka and Schwenk, 2000). Johnson (2003) has found that physical activity is of benefit for girls as it helps them feel good about themselves and improves their emotional well-being. The U.S. Department of Health and Human Services (1996) explain how physical activity may relieve symptoms of mental health problems such as depression, disposition, and apprehension, and further may prevent depression.

Depression may have serious consequences on the adolescent's life, impairing day-today activities and, without treatment, it risks continuing into adulthood. Depression in adolescents is also associated with an increased risk of suicidal behaviors. According to Mental Health Information New Zealand (2002), depression in adolescence may prevent the development of skills necessary for life and may also leave feelings of inadequacy in the world which surrounds them. Physical activity may, however, lessen the impact of stress on female adolescents who, particularly as they age, may be more susceptible to stress than males, by providing enjoyment, improving body image, and providing the adolescent with the peer interaction needed.

Brown and Siegal (1988) explained that an "investigation of 364 females in grades 7 through to 11" in Los Angeles, discussed that "the negative impact of stressful events on girls' health declined as their exercise levels rose", suggesting that exercise can be a valuable resource for combating the adolescent's life stresses. Similarly, Nabkasorn *et al* (2006) explain how, following regular exercise, depression, stress, and physiological fitness were all found to improve, in their study of female adolescents who had depression.

Therefore, it has been shown that there is a connection between physical activity and a reduction in anxiety or depression, and that female adolescents who participate in physical activity may be less likely to suffer from these conditions.

Poor body image and eating disorders

The fear of becoming overweight may develop during adolescence and those fears may lead to poor body image, low self-esteem and eating disorders. The Tucker Center for Research on Girls and Women in Sport (2007) explain how "Girls' self-esteem influences - and is influenced by - physical activity participation and girls, typically associate body image dissatisfaction with self-esteem".

A report by the President's Council on Physical Fitness and Sports (1997), supports the use of physical activity and sports as a means of improving self-esteem and body image for girls. The report concludes that physical activity has the potential to improve the mental health of the adolescent female, improving their feelings about their body image, self-esteem and improving their feelings of competence while participating in physical activity.

This may be important for the growing adolescent female who may be confronted with a variety of challenges threatening her self-esteem and body image, and therefore confidence and mental health. Most of the studies reviewed appear to be conducted by researchers coming come from sporting backgrounds, as opposed to researchers such as child psychotherapists or psychologists, who have an understanding of the nature of the adolescent. Since areas such as body image and self-esteem are so sensitive to the adolescent, questionnaires may not be the most appropriate methodology of capturing how the female adolescent actually experiences physical activity in relation to them.

For instance, Douthitt (1994) researched psychological determinants of adolescent exercise adherence. Douthitt (1994) explains how "the results indicated that perceived athletic competency, Perceived Global Self-Worth, and the Perceived Physical Appearance were predictive of female exercise adherence". Data was collected twice through questionnaires,

the first time in a classroom setting and the second in an instructed summer vacation exercise. The participants were all physical education students and therefore did not represent a true sample of average adolescents.

As with other research on adolescent girls, it has been shown that there is a direct relationship between physical activity and increasing self-esteem and body image in female adolescents. Furthermore, Fox (1999) explains: "There is growing evidence demonstrating that exercise can be effective in improving the mental well-being of the general public, largely through improved mood and self-perceptions".

However, female adolescents who regularly participate in physical activity may feel restricted by specific comments, from not only their peers, but also from adults in their lives. Although the "ideal" physique in today's society is a slender, lean female body, it is much less ideal with respect to physical and mental health (Gill, 1993). Sport-based pressures may include factors such as negative comments from coaches, teammates, and officials, and the standards and demands of the specific sport. Females who do not match this ideal, particularly those who are overweight or obese, are evaluated negatively and discriminated against (Gill, 1993). For example, some elite female swimmers lose self-esteem "due to derogatory comments or punitive measures for failing to meet what may be an unfair or unhealthy assigned weight standard" (Benson, 1991). Similarly, Whitehead and Biddle (2008) found adolescent females "feel embarrassed putting themselves 'on show' during sport or physical activity.

It is imperative that female adolescents are adequately nourished during this crucial period of growth and development, but as females, in particular, are self-conscious about their growing bodies, consequent self-esteem problems may intensify with increases in weight. Any adolescent who has a poor body image or low self-esteem may have a lack of motivation to participate in physical activity. Physical activity, however, may also be able to reduce a poor body image or low self-esteem but some adolescents may be vulnerable to negative comments whilst participating, which may also affect them.

2.10.6 Gender

Females' achievement in relation to physical activity has come a long way in recent years, but many sports which receive considerable coverage by the media are still male dominated. Allison, Dwyer, Goldenberg, and Fein (2005), explored the reasons for male adolescents participating in physical activity, the barriers they may encounter, and suggestions on how to

rectify male's involvement. They explain that with females participating less in physical activity, it is to be expected that there is more literature devoted to males.

Suris and Parera (2005) assessed whether physical activity amongst adolescents decreases with age and, if so, whether this decrease depends on gender. They considered whether physical activity is related to personal, family, and school factors, as well as healthy behaviors. The data was collected in Spain among adolescents aged 1419 years. The analysis was performed according to gender. Other findings showed that physical activity is more common in male adolescents, also that physical activity decreases with age and physically active youths perceived themselves as healthier, and happier with their body image. They also have a better relationship with their parents, better connected at school, and had a healthier lifestyle.

Similarly, a study by Alley and Hicks (2005) discussed how the issue of sex stereotypes for certain sports may influence who elects to participate and how participants are viewed by others according to their gender. Participants were asked to write a paragraph in relation to the research question. According to Alley and Hicks (2005), "There is a consistent decrease in rated femininity and increase in masculinity for both male and female adolescent targets as they switched from participating in a 'feminine' (ballet) to a neutral (tennis) to a 'masculine' (karate) sport". If female adolescents wish to participate in a variety of sports, some of which may be quite physical, the female adolescent may be disadvantaged purely by the fact of her gender.

Bailey *et al,* (2004) from Canterbury Christchurch University College, U.K., compiled a report on girls' participation in physical activities and health. The report shows that, clearly, physical activity amongst females is declining, and this decline increases as they age. Bailey *et al,* (2004) also suggest that male adolescents are notably more active than their female adolescent peers. The reasons for this appear to be unclear and the research is limited.

According to Bailey *et al*, (2004): Although boys are generally more physically active than girls, little is known about a possible explanation for this. From an early age, many parents, in a range of cultures, treat boys and girls differently and encourage different styles of play in physical activity contexts, most commonly by providing gender-based toys and encouraging boys and girls to engage in gender stereotyped activities, usually with boys encouraged to play vigorously and girls quietly.

Further studies are needed to identify specifically why this is occurring, and attempts should be made to tailor educational physical activity programmes according to gender. As Bailey *et*

al, (2004) have explained "the more opportunities that are available for girls to be physically active, the more they are active. Strategies need to be put in place that ensure activities, settings, and facilities are easily accessible and safe"

2.10.7 The influence of males on females participating in physical exercise

A report compiled by a working group formed to identify issues pertaining to physical activity in New Zealand found "girls do not want to participate with boys in schools and may not even want boys watching" (Auckland Regional Physical Activity and Sport Strategy (2005-2010), (2005). These female adolescents may have either experienced negative comments or have found the males too competitive. Gabbei (2004) refers to how females do not receive neutral physical education whilst participating in the class with males. They go on to suggest they will possibly give up or hold back whilst participating in games with males. In contrast however, Hannon and Williams (2008) suggest that males may hold back while participating with females and that the females may actually have a lower skill level, therefore lowering the team's ability. While some females clearly do enjoy participating with their male counterparts, for females to be given maximum opportunities, the above factors need to be taken into consideration.

2.10.8 Cultural, economic and other issues

As with other research on physical activity and females, literature surrounding culture was difficult to find. According to The President's Council on Physical Fitness and Sports report, Physical Activity and Sport in the Lives of Girls (1997), "Little is known about the dreams, interests and physical activities of girls of color, few opportunities exist for emotionally or physically challenged adolescents to engage in exercise and sport". With the lack of data specific to cultural barriers or adolescents who have disabilities, it is difficult to ascertain exactly what impact these issues may have as barriers to physical activities.

The Tucker Center for Research on Girls and Women in Sport (2007) explain how girls of colour may especially be well represented in "lower socioeconomic groups" and therefore, may have limited access to physical activity. A study by Mabry *et al,* (2003) used focus groups to research physical activity attitudes of African American and white adolescent girls. The purpose of the research was to compare the attitudes of African American adolescent girls toward physical activity with those of white adolescent girls. The study suggested that the African American adolescents were more accepting of their body image but that both groups mentioned appearance and hygiene, value of physical activity and the issue of

masculinity and social support. The researchers would have needed to be careful regarding the ethical issues of comparing these two groups of females and also would have needed to take into account that different cultures may not be so forthcoming in front of their peers.
Another study by Kimm *et al,* (2002) researched the decline in physical activity in black girls and white girls during adolescence. The researchers followed 1,213 black girls and 1,166 white girls from the ages of 9 or 10 to the ages of 18 or 19. The researchers concluded that substantial declines in physical activity occur during adolescence in girls and are greater in black girls than in white girls. Some determinants of this decline, such as higher body-mass index, pregnancy, and smoking, may be modifiable.

A report for the Hillary Commission explains how their study does not provide a comprehensive understanding of the situation and that there are clearly some dimensions which have yet to be explored, i.e. cultural and socio-economic differences (de Bonnaire and Falloon, 1999). The range of participants in this qualitative study was from those with a modest level of activity to those sustaining high levels of activity. Thus, the voice of the girls who did not participate at all in physical activity was missing. The report recommends further research on understanding issues and specific communication requirements of Maori but makes no reference to Pacific or Asian communities, or to adolescents with either disabilities or health problems.

The Auckland Regional Physical Activity and Sport Strategy 2005-2010, (2005), explains how the younger population of Pacific Islanders are considerably less active than the younger population of Maori or Europeans. According to the Ministry of Health (2003), "Fifty-two percent of young Pacific people are active, compared to 68 percent of other young New Zealanders, fifty-nine percent of young people from minority ethnic groups are active. Sixty-three percent of young people with a disability are active". While identifying research gaps, the Ministry of Health (2003) has included a gap in research on "physical activity participation by 'other' ethnic groups (including migrants and refugees)". Issues for these groups such as language barriers and cultural issues such as clothing should also be taken into account. According to the Ministry of Health (2003), children and adolescents are included in their priority group to increase physical activity.

As explained in the President's Council, Physical Fitness and Sports (1997) "because of the lack of available data and analysis, the authors of this report were unable to address in any depth some key aspects of girls' experiences with physical activity and sport". Not enough

research has been done in this area, where female adolescents have so much to gain (President's Council, Physical Fitness and Sports, 1997).

Little is known in relation to how adolescent females of different cultures, or how those who may face disabilities, experience physical activity. Most of these studies are based on healthy female adolescents who do not have any significant cultural reasons for not participating in physical activity.

2.11 CONCEPTUAL FRAMEWORK

The health providers and promoters need to understand that different people in the community not only behave differently but also have different reasons and explanations for behaving the way they do. Hence the need to direct a health education programmes or intervention based on the diagnosis about health behaviours in each community which is very important in the field of health promotion and education. Therefore PRECEDE MODEL will be used in this study to explain human behaviours as related to knowledge, participation, experience and factors influencing physical exercise as a dysmenorrhea prevention strategy among female undergraduate students of the University of Ibadan.

Precede Model: This model provides a comprehensive structure for assessing health and quality of life needs of the populace and designing, implementing and evaluating health promotion and other public health programmes to meet these needs. It was developed by Green, Kreuter and associates in 1970 and modified in 1999. The PRECEDE acronym stands for Predisposing, Reinforcing, Enabling Constructs in Education/Environmental Diagnosis and Evaluation.

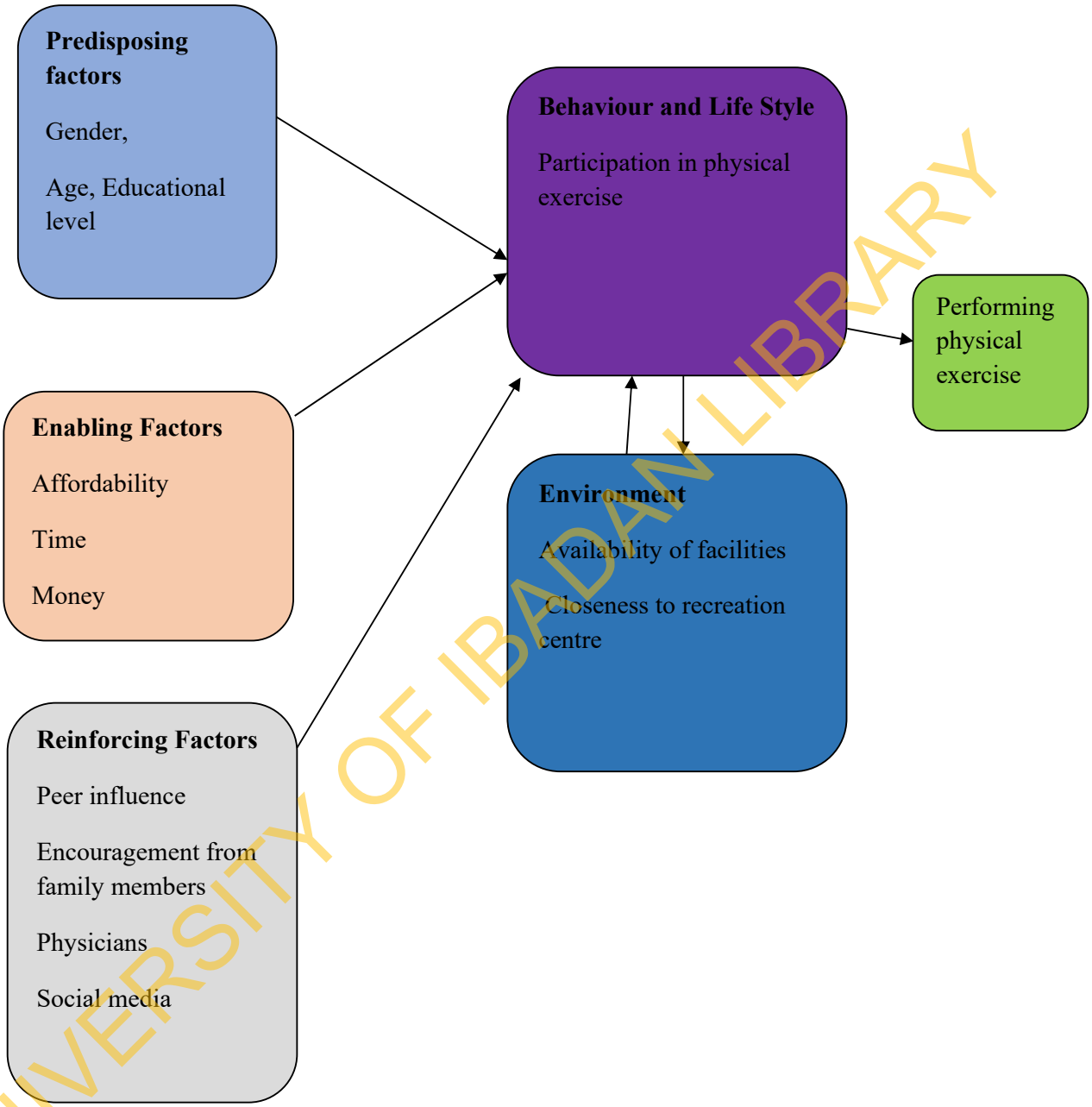
Predisposing Factors: The characteristics of individuals such as age, educational level, knowledge, cultural beliefs, individual's perception and experiences of dysmenorrhea and behaviour towards physical exercise come to play at this level

Reinforcing Factors: This factor encourages repetition and persistence of behaviour after a behaviour has been initiated. The reinforcing factors include influence of significant others such as friends, peer groups, parents, mass media, acquaintances, contacts in schools and work place. Friends and peer pressure are relevant factors that can also influence the opinion and belief of the students about the subject matter. Peer group and acquaintances can advise the students to get involved in physical exercise. Interventions targeted at the peer groups,

friends and acquaintances will surely help in correcting opinions and behaviours about physical exercise.

Enabling Factors: These are factors that enable people to act on their predisposition. They include money, education demands (time), availability of exercising facilities and closeness to a recreation centre either in the campus or off campus, and affordability that will allow the students to participate in physical exercise.

PRECEDE MODEL



Source: Modified from Green and Kreuter, 1999

Figure 2.1 Precede model

CHAPTER THREE

METHODOLOGY

3.0 Methodology

This section highlights the type of research design that this study employed, research participants, sampling method, instruments, data collection procedures, validity and reliability of the test, statistical treatment and analysis of data and ethical issues.

3.1 Description of study area

The study was carried out at the University of Ibadan, the premier university in Nigeria. The campus is located in the city of Ibadan (5miles i.e. 8 kilometers from the center of the city), the capital of Oyo state, in south western Nigeria. The institution occupying over 1,032 hectares of land and was originally established on the 17th of November, 1948 as an external University College, London. It was called University of Ibadan in 1962 and had over 12,000 undergraduate and post graduate students at that time. Currently, the institution had 13 faculties which include; Arts, Education, Law, Basic Medical science, Clinical sciences, Pharmacy, Public health, Dentistry, Veterinary Medicine, Technology, Agricultural sciences, Sciences and Social sciences. The University of Ibadan has twelve halls of residence but there are ten (10) halls of residence for undergraduate students with seven (7) for males namely Sultan Bello, Tedder, Mellanby, Independence, Nnamdi Azikiwe, Kuti and three (3) for females namely Queen Elizabeth II, Obafemi Awolowo and Queen Idia and one (1) for both males and females i.e. Alexander Brown Hall. The halls of residence have a caring capacity of over 8,000 students as 8368 students reside in the halls

3.2 Study design

The study design adopted for this study was a descriptive cross-sectional survey using semi-structured, self-administered questionnaire.

3.3 Study population

The study population consisted of female undergraduates admitted as regular students residing in the halls of residence within the campus.

3.4 Inclusion criteria: Female undergraduates who consent to participate in the study were resident in the female halls of the University.

3.5 Exclusion criteria: Female undergraduates who did not consent to participate in the study and female undergraduates who were not resident in the female halls of the University

3.6 Sample size determination

The sample size (n) for this study was determined using the Leslie Kish formula for single proportion for descriptive studies.

The prevalence (p) used in this study is 25%, which is the percentage of dysmenorrhea in a study; Menstrual Disorders in Adolescent School Girls in Enugu in Eastern Nigeria. (Nwankwo, 2010)

$$n = \frac{Z^2pq}{d^2}$$

n = minimum sample size

Z = Standard normal deviation set at 1.96 normal interval

p = prevalence, 0.25

q = proportions that does not have the characteristics being investigated (q = 1-p), q= 1-0.25= 0.75

d = Level of significance set at 0.05 (precision set at 5%)

Therefore, the sample size $n = \frac{(1.96)^2 \times 0.25 \times 0.75}{0.05 \times 0.05}$

$n = 288.12 \approx 288.$

A non-response of 10% of sample size was added to make up for possible cases of improper completion of the questionnaires and or cases of attrition.

n is readjusted as equal to 288/1-0.1=288/0.9=320

3.7 Sampling technique

The eligible participants were selected using multistage sampling techniques.

1. The first stage involved purposive selection of all four public undergraduate female hall of residence; namely; Queen Elizabeth II hall, Queen Idia hall, Obafemi Awolowo hall and Alexander Brown hall.
2. The second stage was selection of five (5) blocks in each hall where participants were sampled.

3. The third stage involved simple random selection of ten rooms in each selected block by balloting.
4. The fourth stage involved simple random selection of two or three occupants per room by balloting

3.8 Instrument for data collection

A quantitative method was applied using semi-structured self-administered questionnaire. This was developed based on the set objectives, review of literature and guidance of the research supervisor. The questionnaire contained six (6) sections and the focus were:

Section A: This section assessed socio demographic characteristics of the respondents such as age, department and level, hall of residence, religion, ethnicity and marital status.

Section B: This section explored the general knowledge of subjects on physical exercise as a dysmenorrhea prevention method

Section C: This section identified dysmenorrhea experiences among subjects; experiences such as age of menarche, intensity, duration, sites, signs and symptoms of pain

Section D: This section explored dysmenorrhea prevention methods adopted by female undergraduates; use of pain killers, consulting health professionals, hot showers among others.

Section E: This section determined the level of participation in physical exercise as a dysmenorrhea prevention method; participation before, during or after periods will be obtained

Section F: This section identified factors associated with participation in physical exercise to relief dysmenorrhea; factors such as family members, friends, social media, exercise facilities and health professionals.

3.9 Validation of instrument

Validity of the instrument was ensured by development of a draft instrument by consulting relevant literatures, subjecting the draft to independent, peer, and expert reviews, in particular expert in public health. Also, adequate training of the research assistants on the research procedure and instrument for data collection was to ensure validity.

3.10 Reliability of instrument

The reliability of the instrument was evaluated by applying the pre-test technique and Cronbach Alpha statistical tool (Cronbach, 1951). The Pre-test technique is a process

whereby the researcher administered the constructed questionnaire to 10% of the total study population in another representative population but the filled questionnaire for the pre-test was not used in the final analysis of the work. To ensure reliability, the instrument was pre-tested among female undergraduate in University of Lagos that are resident in the female halls, a similar population group with University of Ibadan. Reliability co-efficient of 0.846 and frequencies analysis was used to adjudge the questionnaire as being reliable.

3.11 Data collection procedure

Two research assistants with Bachelor's degree who had experience in data collection were recruited and trained to ensure viable collection of data. The training was featured on; providing an overview of the research topic, obtaining informed consent, data collection procedure, how to review questionnaire to ensure completeness and accuracy, issues relating to privacy and good interpersonal relationship. The criteria for selection of research assistants included; good communication skill, good interpersonal relationship, availability, interest for the research, respect for persons, familiar with halls of residence of female undergraduate students and being opened to acquiring good knowledge of the research topic after training.

Copies of the questionnaire were administered to selected study participants by the researcher and the two (2) trained research assistants after obtaining informed consent through provision of adequate information about the study; on the purpose, the risk involved, the benefit and the requirement of the participant. Data was collected in the selected rooms of the study participants after the day's lectures between 4.30 pm and 7:00 pm to reach a reasonable number of participants and the time was also within the range of the visiting hours. This was possible through obtaining permission from the porters/wardens of each of the female halls of residence. The copies of the questionnaire were retrieved immediately after completion and checked if they were correctly filled before leaving the field.

3.12 Data management and Analysis

Data collected through questionnaire was analyzed using Statistical Package for Social Sciences (SPSS) version 22 software after been serially numbered for easy identification, control, analysis and recall purposes in case of any problem. Data obtained was sorted, coded, entered and cleaned for errors. Descriptive statistics such as percentages, frequency, range, mean and standard deviation were used to summarize variables. Inferential statistics such as

Fishers exact test and regression analysis were utilized for cross-tabulations between dependent and independent variables. Associations were also determined between socio-demographic, knowledge on physical exercise as a prevention method and level of participation in exercise among participants.

Data on knowledge was analyzed using an eleven (10) point knowledge scale by allotting one (1) point to any correct answer and zero (0) point for any incorrect answer. Total score of ≥8 was classified as good knowledge, a score of ≥4.5 - 8 was considered fair while <4 was classified as having poor knowledge. The results obtained from the Statistical Package for Social Science (SPSS version 22) analysis was summarized and presented in tables and charts.

3.13 Study limitation

A limitation for this study is that female undergraduates were out or not be readily available for the study. Appointments was booked with them for a time when they were available.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics

The profile of the respondent is presented in Table 4.1. The ages of the respondent ranged from 16years to 29years with a mean of 20.3±2.3. Majority of the respondents (55.3%) were between 16-20years. Majority (24.46%) of the respondents were in 100 level. Most of the respondents were Christians (84.1%). Yoruba constituted the majority of the respondents (74.1%)

Table 4.1: Socio-demographic characteristics of respondents (N=320)

Socio-demographic variables	Frequency	%
Age in years		
≤ 20	177	55.3
21-25	137	42.8
26-30	6	1.9
Level of study		
100	67	20.9
200	55	17.2
300	64	20.0
400	78	24.4
500	36	11.3
600	20	6.3
Religion		
Christianity	269	84.1
Islam	51	15.9
Ethnicity		
Yoruba	237	74.1
Igbo	54	16.9
Hausa	3	0.9
Others*	26	8.1

Other tribes* Edo (10), Idoma (4), Urhobo (5), Ibibio (3), Efik (1), Tiv (1), Ebira (2)

4.2 Respondents knowledge of physical exercise as dysmenorrhea prevention method

In assessing knowledge of physical exercise as a dysmneorrhea prevention method, (47.5%) reported true, about (15.0) reported false while a significant portion of the respondents (37.5%) stated thay they did not know if physical exercise was a dysmneorrhea prevetion method. A percentage of 44.1% stated true that physical exercise boosts mood during periods, 24.1% stated false while 31.9% did not know if it does. When asked if physical exercise increases period pain, 12.8% stated true, more than half of the respondent 51.2% stated false while 35.9% did not know. Also, about 16.6% of the respondents stated true that physical exercise reduces heavy periods, 38.4% stated false while 45.0% had no idea, when asked if physical exercise beats fatigue during periods, 32.5% stated true, 27.2% stated false while 40.3% did not know. 23.4% stated true that physical exercise does not regulate periods naturally, 26.9% reported fasle while 49.7% did not know. Additionally, 'physical exercise gives better sleep during periods' was reported true by 39.1% of the respondents while 21.3% reported false, however, 39.7% of the respondents did not know if it does. Furthermore, when respondents were asked if "physical exercise is good for females during periods" 48.4% stated true, 15.6% stated fasle while 37.8% were undecided about it. Also, 48.8% stated true that they would recommend physical exercise to other females who experience dysmenorrhea as a prevention method, 15.6% stated false that they would not while 35.6% were undecided if they would. Finally, data showed that 18.4% of the respondents stated true that females should not be encouraged to engage in physical exercise to prevent dysmenorrhea, majority 49.4% stated false while 32.2% were undecided (Table 4.4a).

Overall level of knowlede on physical exercise as a dysmnorrea prevention method was determined to be poor with a mean score of 3.8±1.6. Additionally, 58.1% of the respondents had poor knowledge of physical exercise as a dysmenorrhea prevention method (<4), while 28.1% of the respondents had fair knowledge (≥4.5-8), and there were 13.8% of the respondents who had good knowledge (≥8) (Figure 4.4a).

Table 4.2a Respondents knowledge on physical exercise to prevent dysmenorrhea

(N=320)

Statement	True (%)	False (%)	Not sure (%)
Physical exercise is dysmenorrhea prevention method	152(47.5)*	48(15.0)	120(37.5)
Physical exercise improves mood during periods	141(44.1)*	77(24.1)	102(31.9)
Physical exercise increases period pains	41(12.8)	164(51.2)**	115(35.9)
Physical exercise reduces heavy periods	53(16.6)*	123(38.4)	144(45.0)
Physical exercise beats fatigue during periods	104(32.5)*	87(27.2)	129(40.3)
Physical exercise does not regulate irregular periods naturally	75(23.4)	86(26.9)**	159(49.7)
Physical exercise gives me better sleep during periods	125(39.1)*	68(21.3)	127(39.7)
Physical exercise is good for females during periods	155(48.4)*	121 (37.8)	44(13.75)
I would recommend physical exercise to those who experience dysmenorrhea	156(48.7)*	50(15.6)	114(35.6)
Females should not be encouraged to engage in physical exercise during menses	59(18.4)	158(49.4)**	103(32.2)

**** correct responses*** *****incorrect responses***

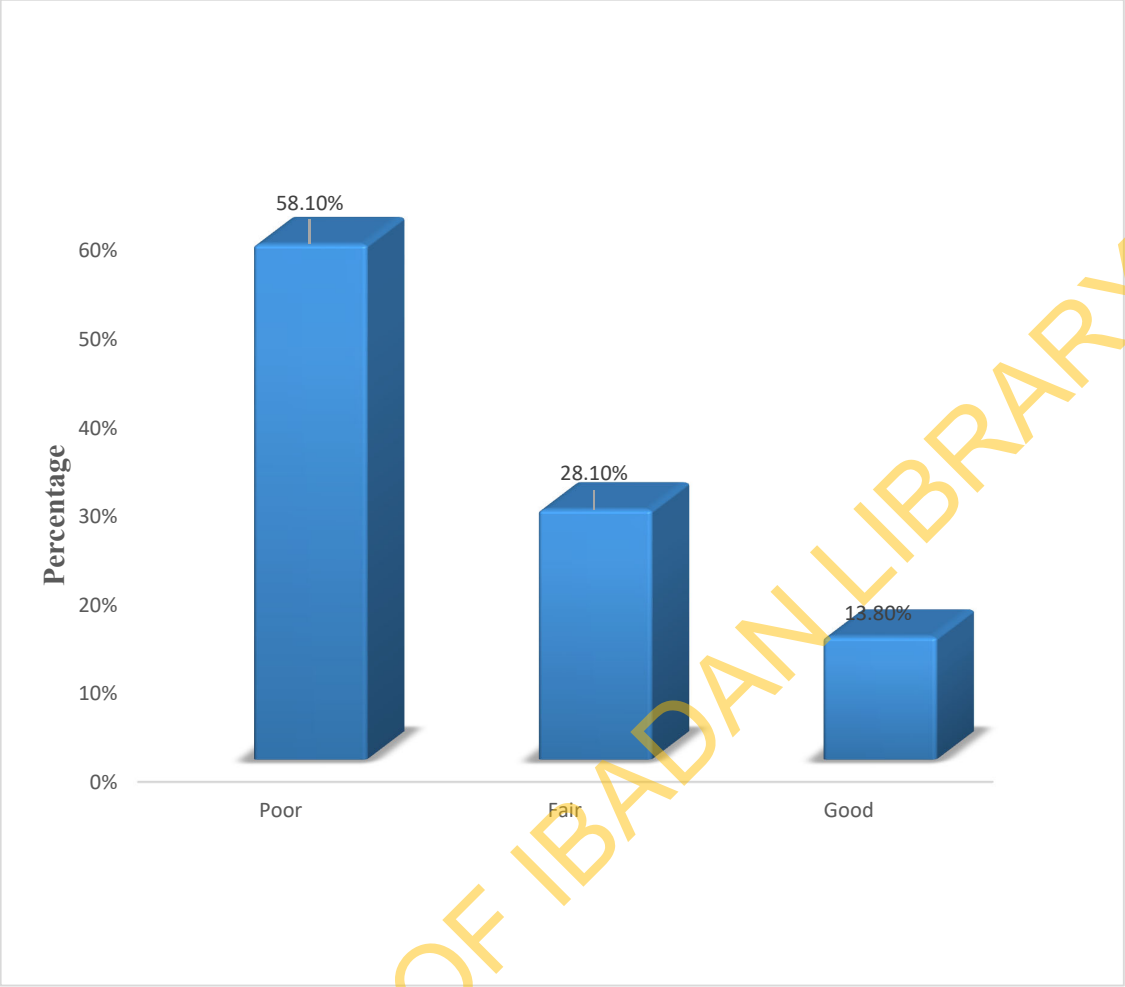


Figure 4.2a Respondents level of knowledge distribution

4.3 Respondent's experience of dysmenorrhea

Among all the 320 respondents that were studied, 314 (98.1%) was observed and confirmed to experience dysmenorrhea and its associated symptoms while 6 (1.9%) do not experience dysmenorrhea but do experience its associated symptoms. The menarche age of the respondents ranges between 8-12 years with 50% of the respondents falling in that category, 48.2% reported starting their first menstruation between the ages of 13-16 years while only 1.8% reported starting their menstruation between the ages of 17-19. However, their mean age is 12.7±1.62. A larger percentage 118 (36.9%) stated that their menstruation lasts for four days, 115 (35.9%) stated more than four days while 83 (25.9%) stated three days. A smaller percentage of 3 (0.95%) and 1 (0.3%) of the respondents stated that their menstruation lasts for two days and a day respectively (Table 4.3a).

When asked about the time they have been experiencing dysmenorrhea, 1.6% admitted that they just started experiencing it less than a year ago, 25.0% admitted theirs is between one to four years ago, 59.7% the majority respondents further stated that they have been experiencing dysmenorrhea for over four years while 13.7% could not recall since when they have been experiencing dysmenorrhea. Out of the total number of respondents (320), 110 (30.3%) of them explained that the nature of the pain experienced is mild, 140 (40.7%) experience moderate dysmenorrhea and 64 (20.1%) reported theirs to be severe dysmenorrhea while 6 (8.9%) could not explain their nature of pain (Table 4.3a).

With regards to the duration of pain experienced, 43 (13.1%) stated that experience the pain before their menstrual flow, majority of the respondents 142 (44.4%) reported they experience the pain only on the first day of their menstrual flow while 118 (36.9%) experience theirs everyday of menstrual flow. Thirteen (3.9%) reported the duration of dysmenorrhea for them is during and after menstruation while very few stated they experience dysmenorrhea before, during and after menstrual flow (Table 4.3a).

When asked about the part of body in which they experience the pain, majority of the respondents (87.8%) reported lower abdomen as their site of pain while just a few (12.2%) did not report or indicate it as their site of pain. A percentage of 8.85 only identified upper abdomen as their site of pain while less than half of the respondents 35.6% acknowledged low back as their site of pain. Only 19.1% reported hip joint as their site of pain while 44.1% and 25.3% reported waist and inner thighs as their site of pain respectively. Two percent of the total respondents reported knees and legs as site of pain while 1.2% reported pain of site

at the anus. Also, a small percentage of 2.2% of the total respondents identified breast as their site of pain while 1.3% recognized navel as their site of pain (Table 4.3b).

As regards the signs and associated symptoms being experienced, ninety-four (29.4%) of the total of respondents experience headache while less than half of the respondents 43.1% do experience backache. Thirty-six percent do experience dizziness and 52.8% experience loss of appetite during periods? More than half of the respondents 65.3% do feel weak during period, 63.4% reported mood swing as signs and associated symptoms. A larger percentage of the respondents (69.4%) reported abdominal discomfort during menstrual period, 35.9% experience short temper, 41.6% experience diarrhea, 31.6% experience nausea, 27.8% experience bloated stomach, 46.3% experience waist pain, 53.1% experience full or tender breast, 15.9% experience over eating, 35.6% experience oversleeping and 53.4% have pimples on their faces during menstruation period. Other signs and associated symptoms being experienced by respondents are shown in the table 4.3c.

Table 4.3a Dysmenorrhea experience **(N=320)**

Variable	Frequency	%
Time of Dysmenorrhea Experience		
Less than a year	5	1.6
1 - 4	80	25.1
4 years or more	191	59.7
I can't recall	44	13.7
Nature of the pain		
Mild	110	30.3
Moderate	140	40.7
Severe	64	20.1
I can't explain	6	8.9
Duration of pain		
Before menstrual flow	43	13.1
First day of flow	142	44.4
Everyday of menstrual flow	118	36.9
During and after menstrual flow	13	3.9
Before, During and after menstrual flow	4	1.7

Table 4.3b Site of pain experience

Site of pain	Frequency	(%)
Lower Abdomen *	281	87.8
Low back	144	45.0
Waist	44	13.7
Inner thighs	81	25.3
Hip Joint	61	91.1
Upper Abdomen	28	8.8
Knees	8	2.5
Legs	8	2.5
Breast	6	1.9
Navel	4	1.3
Anus	3	0.9
All over the body	2	0.6

Correct response

****Multiple response***

Table 4.3c Signs and associated symptoms of dysmenorrhea experienced

Signs and associated symptoms	Frequency	%
Abdominal discomfort	222	69.4
Weakness	209	65.3
Mood swing	203	63.4
Pimples on face	171	53.4
Full or tender breast	170	53.1
Loss of appetite	169	52.8
Waist Pain	148	46.3
Backache	138	43.1
Diarrhea	133	41.6
Short tempered	115	35.9
Oversleeping	114	35.6
Dizziness	101	31.6
Nausea	101	31.6
Headache	94	29.4
Bloated stomach	89	27.8
Eating too much	51	15.9
Restlessness	3	0.9
Feeling numb	1	0.3
Feeling thirsty	1	0.3
Fever	1	0.3
Genital pain	1	0.3

Multiple Responses

4.4 Prevention Methods Adopted to Manage Dysmenorrhea

Of the total respondents (320), majority 192 (60.0%) make use of modern medicines in managing dysmenorrhea and out of those who use medicines, 88.0% use paracetamol to reduce or manage dysmenorrhea, 27.6% use ibruprofen. In addition, quite a number of them 32.3% use felden, while very few (9.9%) use aspirin, 29.7% use buscopan and 21.3% use diclofenac. Some however use a combination of two or more medicines. Quite a few (4.7%) also prefer the use of herbal medicines and that they prefer it to the non-steroids anti-inflammatory drugs or over the counter drugs which does not work for them. A large number of them (95.3%) do not take herbal medicines. However, only a few (1.9%) admitted that they prefer taking Oral contraceptive pills as a way of managing dysmenorrhea while a majority of them (98.1%) do not take it. Other medicines taken are shown in the table 4.4a.

Many reasons were however given for taking the medicines listed above by respondents. The reasons included; Low cost (7.2%), perceived effectiveness in the management of dysmenorrhea (54.4%), its readily available (28.1%), some admitted it was taken as a placebo (10.3%). When asked who recommended the drugs, a large number of them (65.1%) reported they recommended the medicines for themselves, recommendation from health professionals was (19%) while from family members and friends are 30.6% and 18.8% respectively. Details are in the table 4.4b.

Aside the use of medicines as a means of managing dysmenorrhea, the respondents reported employing the following management patterns: about 33.8% reported adopting massage on the waist and lower back as a management pattern of dysmenorrhea, 17.8% use heating pads and hot water bottles while 31.9% adopt hot showers during periods to reduce dysmenorrhea, 4.1% use traditional herbs in form of tea while 30.9% take hot fluids, only a few 5% take alcohol to manage dysmenorrhea. However, a high percentage of respondents 67.5% stated that they only rest enough during the period as a way of managing the pain, 2.2% confirmed adopting exercise as their own management pattern, 0.6% reported seeing gynecologists while 25.9% modify their diet e.g. avoidance or reduction in sugar intake during periods to manage dysmenorrhea. Other management patterns employed and recommendations of these management pattern are shown in the table 4.4c.

Regarding the factors that influence their choice of management pattern, 69.7% of the respondents reported that severity of the pain can influence their choice of management pattern while 32.3% said that factor cannot influence their choice, 57.5% said that the

duration can influence their choice of management pattern while 42.5% said no to that. 40.6% reported that the location of the pain, 41.3% reported inability to sleep while 42.5% reported inability to engage in school activities are major factors can influence their choice of management pattern. To some (30%) the loss of appetite, a few percentage (13.8%) of them stated money as well could influence their choice of management pattern while a larger percentage (86.2%) stated money isn't a factor while 23.4% reported nausea feeling or vomiting could influence their choice of management pattern (Table 4.4f).

Table 4.4a Medicines taken by respondents to manage dysmenorrhea (n=192)

Medicines taken	Frequency	%
Paracetamol	169	88.0
Felden	62	32.3
Buscopan	57	29.7
Ibruprofen	53	27.6
Diclofenac	41	21.3
Aspirin	19	9.9
Herbal drugs	15	7.8
Panadol	14	7.3
Oral contraceptive	6	3.1
Tramadol	2	1.0
Flagyl	2	1.0
Cataflam	1	0.5
Naproxen	1	0.5
Orphesic	1	0.5

Multiple Responses

Table 4.4b Respondents reasons for taking the chosen medicines (n=192)

Reasons	Frequency	%
It is effective	158	82.3
It is readily available	74	38.5
As a placebo	33	17.2
It is cheap	23	12.0

Multiple Responses

Table 4.4c Who recommended the medicine(s) taken to manage dysmenorrhea (n=192)

Who recommended medicines taken	Frequency	%
Self	108	56.2
Family member	95	49.5
Healthcare provider	61	31.8
Friends	60	31.2

Multiple Responses

Table 4.4d Other prevention methods employed by Respondents (N=320)

Prevention methods employed by respondents	Frequency	%
Rest	216	67.5
Massage	108	33.8
Hot showers	102	31.9
Hot fluids	99	30.9
Diet modification	83	25.9
Exercise	81	25.3
Heating pads/bottles	57	17.8
Consult gynecologist	16	5.0
Alcohol	16	5.0
Traditional herbs	13	14.1
Extra/hard domestic work	8	2.5
Take a long walk	5	1.6
Long sleep	3	0.9
Ginger and Garlic drink	2	0.6
Pray	1	0.3
Salt water	1	0.3
Pillow beneath thighs	1	0.3

Multiple Responses

Table 4.4e Who recommended prevention method employed respondents (N=320)

Who recommended prevention method	Frequency	%
Self	198	62.0
Healthcare provider	68	21.3
Familly member	57	17.6
Friends	25	7.8
Internet	13	4.1

Multiple Responses

Table 4.4f Factors influencing respondents choice of prevention method (N=320)

Factors	Frequency	%
Severity of the pain	223	69.7
Duration of the pain	184	57.5
Inability to engage in school activities	136	42.5
Inability to sleep	132	41.3
Location of the pain	130	40.6
Loss of appetite	96	30.0
Nausea/vomitting	75	23.4
Money	44	13.8

Multiple Responses

4.5 Respondents level of participation in physical exercise as a dysmenorrhea prevention method

In determining the level of participation in physical exercise as a dysmenorrhea prevention method, 32.2% reported that they exercise before periods while 67.8% do not exercise before periods while, 29.9% exercise during periods while 70.0% do not exercise during periods and 37.9% of the respondents reported that they exercise after periods while 62.1% do not exercise after periods (Table 4.5a).

With regards to how frequent they exercise, 12.5% of the respondents admitted that they exercise regularly before periods, 19.6% exercise sometimes before while 67.9% never exercise before periods. 10.6% reported that they regularly exercise during periods, 19.3% exercise sometimes while 70.4% never exercise during exercise. Data showed that 14.3% of the respondents regularly exercise after periods, 23.4% exercise sometimes after while 62.3% never exercise after periods.

Overall level of participation in physical exercise to prevent dysmenorrhea was determined to be poor with a mean score of 1.4±2.5; 72.2% poor, 15.6% fair and 12.2% (Figure 4.5b).

Table 4.5a Level of participation in physical exercise to relief dysmenorrhea (n=264)

Level of participation in physical exercise	Frequency	%
Do exercise before periods	85	32.2
Do exercise during periods	79	29.9
Do exercise after periods	100	37.9

Table 4.5b Frequency of participation in physical exercise to relief dysmenorrhea (n=264)

Frequency of participation in physical exercise	Sometimes (%)	Regularly (%)	Total (%)
Exercises before periods	52(19.7)	33(12.5)	85(32.2)
Exercises during periods	51(19.3)	28(10.6)	79(29.9)
Exercises after periods	62(23.5)	38(14.4)	100(37.9)

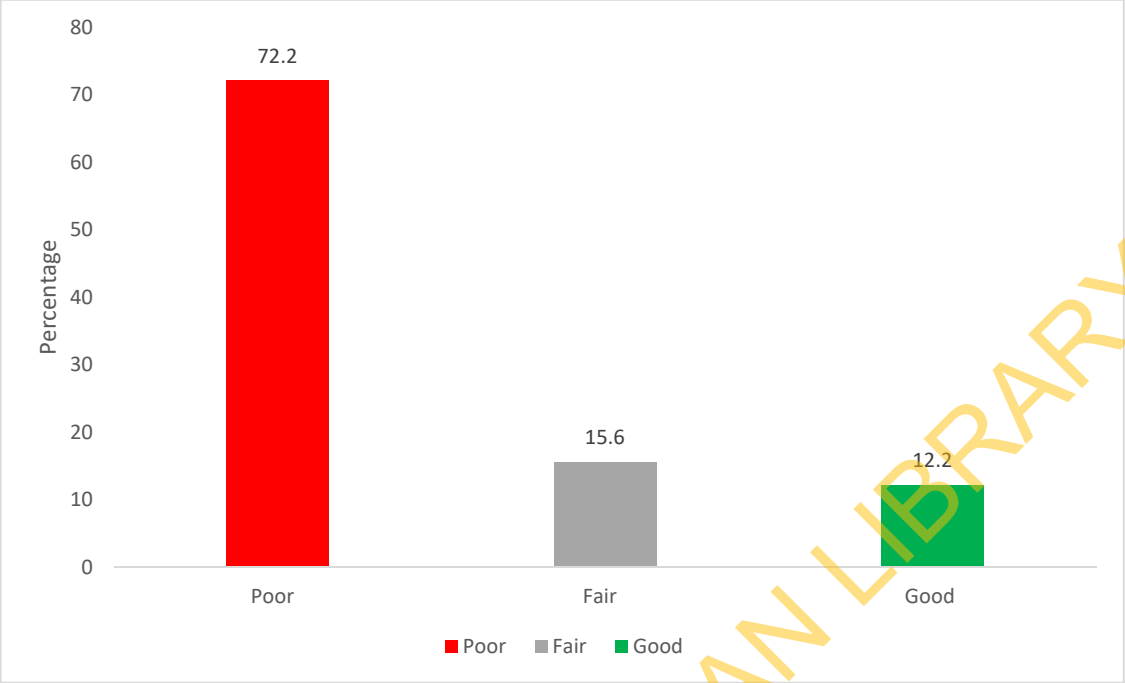


Figure 4.5b: Respondents level of participation in physical exercise to relief dysmenorrhea

4.6 Factors associated with participation in physical exercise as a means of relief of dysmenorrhea

With regards to factors associated with respondent's participation in physical exercise to relief dysmenorrhea, 61.6% believe that their friends influence their participation physical exercise while 38.4% do not believe so. More than half of the respondents (59.4%) reported that their mothers, sisters and female relatives do not engage in physical exercise to prevent dysmenorrhea, hence it does not influence them to participate in physical exercise while 40.6% reported that their mothers, sisters and female relatives do engage in physical exercise to prevent dysmenorrhea which may influence their participation. A larger proportion of the respondents (70.6%) stated that healthcare professional's advice influence their participation in physical exercise while 29.4% reported that healthcare professional's advice does not influence their participation. About 61.3% of respondents admitted that social media may influence them to participate in physical exercise while 70.0% reported that availability of exercise facilities may influence their participation in physical exercise to relief dysmenorrhea (Table 4.6)

Table 4.6 Factors associated with participation in physical exercise as a means of relief of dysmenorrhea (N=320)

Factors	Frequency	%
I believe my female friends influence my participation in physical exercise to relief dysmenorrhea during periods	197	61.6
My mother, sisters and female relatives do not participate in physical exercise to relief dysmenorrhea during periods	190	59.4
Healthcare professionals advice influence me to participate in physical exercise to relief dysmenorrhea during periods	226	70.6
Social media may influence me to participate in physical exercise to relief dysmenorrhea during periods	196	61.3
Availability of physical exercise facilities influences me to participate in exercise to relief dysmenorrhea during periods	224	70.0

Multiple Responses

4.7 Hypotheses Testing

Hypothesis 1: There is no significant association between the age and their level of knowledge of physical exercise as a dysmenorrhea prevention method

From the study, there was a significant association between age and level of knowledge on physical exercise as a dysmenorrhea prevention method $p< 0.05$ i.e. the age of respondents influences their level of knowledge on physical exercise as a dysmenorrhea prevention method. The null hypothesis is hereby rejected. This is presented on table 4.7.1.

Hypothesis 2: There is no significant association between knowledge and level of participation in physical exercise as a dysmenorrhea prevention method by respondents

From the study, there was a statistically significant association between Knowledge of physical exercise as a dysmenorrhea prevention method and level of participation $p<0.05$ i.e. level of knowledge influences level of participation. The null hypothesis is hereby rejected. This is presented on table 4.7.2.

Table 4.7.1 Association between age and level of knowledge on physical exercise as a dysmenorrhea prevention method

Level of knowledge

Age last birthday	Poor (%)	Fair (%)	Good (%)	Total (%)	Fisher(X^2)	df	Pvalue
16 - 20	103 (58.2)	50 (28.2)	24 (13.6)	177 (55.3)	2.088	4	0.005
21 - 25	80 (58.4)	37 (27.0)	20 (14.6)	137 (42.8)			
26 - 30	3 (50.0)	3 (50.0)	0 (0)	6 (1.9)			
Total	**186 (58.1)**	**90 (87.9)**	**44 (13.7)**	**320 (100)**			

Fisher exact test (X^2) = 2.088 df = 4 P value 0.005

Table 4.7.2 Association between level of knowledge and level of participation in physical exercise to prevent dysmenorrhea

Level of Participation

Level of knowledge	**Poor (%)**	**Fair (%)**	**Good (%)**	**Total (%)**	**Fisher(X^2)**	**df**	**Pvalue**
Poor	147 (45.9)	24 (7.5)	15 (4.6)	186 (58.1)	13.36	6	0.003
Fair	59 (18.4)	17 (5.3)	14 (4.3)	90 (28.1)			
Good	25(7.8)	9 (2.8)	10 (3.1)	44(13.7)			
Total	**231 (72.1)**	**50(15.6)**	**39 (12.1)**	**320(100)**			

Fisher exact test (X^2) = 13.366 df = 6 P value = 0.003

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Socio-demographic profile

The mean age of the respondent was 20.3 years with majority (55.3%) between the ages of 16 and 29 years. This may be due to the policy of the university that students can only be admitted at 16 years and above and most undergraduate courses are for four (4) years, this finding corresponds to previous study by Jegede and Dosunmu (2003) that revealed the age limit for admission into most Nigerian higher institutions as 16 to 17 years which implied that majority of undergraduate students are in their late teens and early twenties. Majority of the respondents (99.4%) were single, this could be attributed to the fact that majority are within the young age group and also the quest for higher education had influenced the age of entry into marriage as most people prefer to finish school before getting married (Arowojolu *et al*, 2002). This is supported by a study conducted among same population (93.3.6%) by Ogadimma, 2013. The fact that majority (74.1%) were Yoruba could be attributed to the location of study area as it is located in the Southwestern part of Nigeria where the predominant ethnic group is Yoruba (Arowojolu *et al*, 2002).

5.1.2 Knowledge of physical exercise as a dysmenorrhea prevention method

The knowledge of physical exercise to prevent dysmenorrhea in this study featured various aspect such as benefits and experience of exercise on dysmenorrhea and if it should be recommended for female in general. The overall knowledge revealed that majority (58.1%) of the respondents had a poor knowledge of exercise to prevent dysmenorrhea while only a few (13.8%) had a good knowledge, this result is in line with a study conducted in Shahid Sadoughi University by Mohammed *et al*, (2012) among female students on their knowledge of exercise on dysmenorrhea which obtained a poor knowledge of 66% (Mohammed *et al*, 2012). This poor knowledge of exercise could be attributed to the low level of participation in of exercise to prevent dysmenorrhea.

Generally, level of participation in exercise was very low as majority of the respondents do not engage in exercise either to prevent dysmenorrhea or even for general health benefits

even if they have access to exercise facility. Participation level of respondents was 72.2%. This finding is similar to a review of 1382 sport and exercise research studies involving over 6 million participants, from 2011 to 2013, found the representation of women to be 39 % (Bruinvels *et al*, 2016) which was considered poor. This is of concern, considering the health benefit of reducing the burden of dysmenorrhea among females.

5.1.3 Dysmenorrhea Experiences

The menarche age of the respondents who participated in the study is 12.66 years and this is same with mean menarche age of 12.66 years gotten from a study conducted by Humayun *et al*, (2015). Majority of the respondent's menstruation lasts for four days while some stated that theirs lasts more than four days. A few stated that theirs lasts for just three days while and only one respondent reported stated that their menstruation lasts for two days and a day respectively.

Some of the respondents experience dysmenorrhea at the onset of menstrual flow, a few of them experience it throughout the menstrual period while others experience dysmenorrhea pain before their menstrual flow. This is in contrast to the findings of the study carried out by Ezeukwu, (2013) which revealed that the highest duration among females with dysmenorrhea was 'one day'.

Majority of the respondents had experienced dysmenorrhea for over four years. A quarter have been experiencing it for the past one to four years while minority just started experiencing it less than a year ago.

The degree of pain was variable and pain location was also multi-dimensional and highly variable. Although respondents experience of pain was noted at the; waist, low back, inner thighs and a few response for hip joint, upper abdomen, legs, breast, navel and anus. However, the appropriate site of pain was noted to be in the lower abdomen .This seems to be in agreement with Harlow and Park (1996) as reported by Ezeukwu *et al,* (2013) who stated that dysmenorrhea among women is usually of the primary type with the highest site of occurrence of dysmenorrhea reported to be very high for lower abdomen.

Dysmenorrhea manifesting either as stomach pain or discomfort, stomach pain or discomfort headache, backache, dizziness, appetite loss, mood swing, weakness, fullness or tenderness in breast, pimples on face, nausea/vomiting, diarrhea and faint feeling were the most reported

among participants in this study. This is however consistent with Ezeukwu *et al*, (2013) that reported that while abdominal cramping is the most common dysmenorrhea symptom, many women of reproductive age suffer from other menstrual associated symptoms, such as headaches and vomiting. Also Melissa, (2006) seconded this by reporting that pain occurs mostly in the lower abdomen region and back and is accompanied by nausea, vomiting, fatigue, nervousness, diarrhea, headache, anxiety, mood liability, depression and syncope.

5.1.4 Dysmenorrhea Prevention Method

The results of this revealed that there is high rate of pharmacologic method of pain relief among the female residents of the undergraduate female halls in University of Ibadan. Nearly all respondents reported using non-steroids anti-inflammatory drugs as well as over the counter which were not prescribed in order to manage or reduce dysmenorrhea. Paracetamol was mostly used followed by felden. Although, majority of the students reported perceived self-efficacy influenced their choice of the method used for pain relief, while others gave reasons like it is cheap, it is readily available and sometimes taken as a placebo. It can be inferred that a reasonable part of this population self-medicate, considering the fact that the proportion of females who sought medical care is considerably low. This result is similar to Farotimi *et al*, (2017) who reported in his study that only 7.9% consulted health care provider. Similarly Wijesiri and Suresh showed in their study that 70% of participants did not seek medical treatment because they felt embarrassed to discuss their menstrual disorders with another person. Dysmenorrhea is often considered as normal by many healthcare personnel, patients, and parents. This is assumed to have led to the hesitation on the part of the affected individuals to seek medical help.

Out of those that chose non-pharmacological method, some still preferred diet modification like avoidance of sugary food or drink, rest/relaxation, massage on low back and waist, taking hot drinks, taking hot showers and a few sometimes exercise.

Female undergraduates do not engage in any harmful practice in managing dysmenorrhea but a significant number among those that use drugs practice self-medication which could be harmful if not regulated and controlled while only few (5.6%) of the respondents consult physicians or gynecologists. Others engage in extra domestic chores, take alcohol or traditional herbs.

5.1.5 Factors associated with participation in physical exercise as a means of relief of dysmenorrhea.

Different factors were identified by respondents for participating in exercise as a means of relief of dysmenorrhea which include peers, parents, social media, healthcare providers and availability of health facilities. The highest factor was healthcare providers' advice with 70.6% although, Lee (2004) suggested that if some of their friends enjoy physical exercise, this will have the effect of influencing their other female friends to enjoy it more. Similarly, Whitehead and Biddle also (2008) explained how peers were often responsible for encouraging the female adolescent to participate in physical exercise.

Parentally, the attempt to encourage their girls into physical exercise at an early age is poor. Some of these exercises do not require a lot of time. When both parents are working this may be difficult, but due to the benefits of physical exercise for females this should somehow, be overcome within the family. Whilst some physical activity may place an extra financial burden on families, there are other forms, such as walking, swimming, or running, that will impose only a limited financial burden on the average family. For this study, parental and female relation influence was 59.4% which is low, therefore, it a major role in assisting or restricting females' participation in physical exercise. Assistance may include financial, transportation, encouragement, or being a role model for the female child especially from mothers. Some parents simply lack the means or motivation to be able to support their daughters in exercise due to commitments or to other circumstances.

5.1.6 Implication of the study findings for health promotion and education

This study has laid a platform for developing appropriate and effective exercise intervention to address the experience of dysmenorrhea among young females in generally. Level of knowledge on physical exercise and likewise level of participation in exercise to prevent dysmenorrhea was low. One of the major findings of this study is the statistical significant relationship of knowledge of exercise and on the respondents' level of participation in exercise to prevent dysmenorrhea. Therefore, in an effort to improve participation in exercise by female undergraduates, there is need for an educational intervention aimed at educating female undergraduates on the benefits of different exercises such as stretching, aerobics, isometric and meditation to engage in to reduce the burden of dysmenorrhea.

5.2 Conclusion

From the study, dysmenorrhea is prevalent among female undergraduate students of University of Ibadan and they experience a number of physical, and psychological symptoms associated with it. Younger age group and final year students are mostly affected. Prevention method of dysmenorrhea is not good enough as majority of the respondents reported that they use medicines such as paracetamol, felden, diclofenac and ibuprofen to manage dysmenorrhea. Most of these medicines however when used inappropriately have side effects. Result of this study concluded that knowledge of physical exercise to manage dysmenorrhea is poor. Physical exercise such a stretching, aerobic and relation exercises should be encouraged, hence the need for employing a holistic approach to improve level of knowledge which will also influence level of participation in physical exercise thereby reducing the burden of dysmenorrhea among female students in Nigeria.

5.3 Recommendations

The following recommendations were made for this study:

1. Health education such as training, counselling and mobilization should be used to educate female undergraduates on the benefits and types of exercises to reduce burden of dysmenorrhea and its associated symptoms to ensure the health of women in the nation.

2. Engaging in physical exercise programme as an outcome of Physical fitness could be disseminated to students through the mass media (television, newspaper and radio), posters and magazine etc. Seminars and workshops could be used to disseminate information to female students by the Tertiary institution authority.

3. Tertiary institutions should make provisions for exercise facilities that will help young female students engage in physical exercise and should make it popular to students through creation of awareness as most people may be unaware of the available facilities.

4. More research should be carried out to explore other aspects of physical exercise as a dysmenorrhea prevention method among young females especially in Nigeria

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APPENDIX I

INFORMED CONSENT FORM

Title of the research:

Knowledge of physical exercise as a dysmenorrhea prevention method among female undergraduates of University of Ibadan

Name(s) and affiliation(s) of researcher(s) of applicant(s):

This study is being conducted by **ONUH GLORIA OCHANYA** from the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Oyo State.

Sponsor(s) of research:

The research is self- sponsored.

Purpose(s) of research:

The research is aimed at determining the knowledge of physical exercise as a dysmenorrhea prevention method among female undergraduate students of University of Ibadan.

Procedure of the research, what shall be required of each participant and appropriate total number of participants that would be involved in the research:

Multi-stage sampling technique will be applied in selecting 320 study participants among female undergraduate students residing in the hall of residence within the campus. The study will adopt quantitative method, semi-structured and self-administered questionnaire for data collection. The questionnaire will assess the experience of dysmenorrhea, prevention method adopted by participants, knowledge of physical exercise as a prevention method and also identify those that engage in it to relief dysmenorrhea within the campus. The study will only require the participant to provide adequate information.

Expected duration of research and of participant(s)' involvement:

The study will require a maximum of about 10 minutes of your time to fill the questionnaire and 15minutes for in-depth interview.

Risk(s): The study will not involve any risk as it does not involve use of any invasive material.

Costs to the participants, if any, of joining the research: Your participation will not cost a little time required to provide relevant information.

Benefit(s): There is no direct benefit to the participants but will help inform recommendations that will be used in orienting members of the campus community on how to prevent sexual entrapment in order to avoid the possible negative consequences.

Confidentiality: Information collected form the participants will be kept confidential as there is no means of identification on the instrument and all data will be kept under lock and assessed by only authorized individuals.

Voluntariness:

Your participation in this study is strictly voluntary and may choose to withdraw from the study at any time.

Alternatives to participation:

Your non-participation will not affect you in any way.

Consequences of participant's decision to withdraw from research and procedure for orderly termination of participation:

You may choose to withdraw from the research at any time. Please note that some of the information that has been obtained about you before you chose to withdraw may have been modified or used in reports and publications. These cannot be removed anymore. However the researchers promise to make effort in good faith to comply with your wishes as much as is practicable.

What happens to research participants and communities when the research is over?

The outcome of the research would be pasted on the notice board of each hall after obtaining permission from the appropriate authority.

Statement of the person obtaining informed consent:

I have fully explained this research to…….. And have given sufficient information, including risks and benefits to make an informed decision.

DATE……. SIGNATURE…….

NAME…….

Statement of person giving consent:

I have read the description of the research and had it translated into the language I understand. I understand that my participation is voluntary. I know enough about the purpose, methods, risks and benefits of the research to judge that I want to take part in it. I understand that I may freely stop being part of this study at any time. I have received a copy of this consent form and additional information sheet to keep for myself.

DATE……. SIGNATURE…….

NAME……

Detailed contact information including contact address, telephone, fax, email and other contact information of researcher(s), institutional HREC and head of the institution:

The research has been approved by the Ethics Committee of the University of Ibadan and the Chairman of this committee can be contacted at Biode Building, Room 210, 2nd floor, Institute for Advanced Medical Researcher and Training, College of Medicine, University of Ibadan,

E-mail: uiuchirc@yahoo.com and uiuchec@gmail.com

In addition, if you have question about your participation in this research, you can contact the principal investigator,

Name……..

Department……Phone……

Email……

PLEASE KEEP A COPY OF THE SIGNED INFORMED CONSENT

APPENDIX II

KNOWLEDE OF PHYSICAL EXERCISE AS A DYSMENORRHEA PREVENTION METHOD AMONG FEMALE UNDERGRADUATES IN UNIVERSITY OF IBADAN.

Dear Respondent,

I am a postgraduate student of Health Promotion and Education, Faculty of Public Health, University of Ibadan, Oyo State. The purpose of this study is to investigate the **Knowledge of Physical Exercise as a Dysmenorrhea Prevention Method among female undergraduates in University of Ibadan**. Your participation in this study is voluntary. It is desired that honest and sincere answers should be given as there is no right or wrong answer. The findings from this study will help in the design of programs and policies aimed at tackling dysmenorrhea ***(dysmenorrhea is defined as painful menstruation)***. All information gathered during the course of this study will be treated with high level of confidentiality and you do not have to write your name on this questionnaire. Now that you have fully understood the details of the study kindly indicate your willingness to participate in this study by ticking the box provided below.

Are you willing to participate in this study 1.Yes I am willing [ ] 2. No I do not wish to participate [ ]

Instruction: Please read the questions below carefully and give honest answers.

SECTION A: SOCIO DEMOGRAPHIC DATA

Kindly tick (√) as appropriate in the boxes provided and you are allowed to tick only one of the options.

1. Faculty: _____
2. Department _____
3. Level 1)100Level ☐ 2) 200Level ☐ 3) 300Level ☐
   4) 400Level ☐ 5) others specify _____
4. Age as at last birthday: _____ years
5. Hall of residence _____
6. Marital status: 1) Single ☐ 2) Married ☐ 3) Divorced ☐
   4) Cohabiting ☐
7. Religion: 1) Christianity ☐ 2) Islam ☐ 3) Traditional ☐
8. Ethnicity: 1) Yoruba 2) Igbo 3) Hausa 4) Others specify _____

SECTION B: DYSMENORRHEA EXPERIENCE

9. At what age did you have your first menstruation? *(In years)* _____

10. How many days does your menstruation last?

1) 1day ☐ 2) 2days ☐ 3) 3days ☐ 4) 4days ☐ 5) More than 4days ☐

11. Do you experience dysmenorrhea? 1. Yes ☐ 2. No ☐

12. If yes how long have you been experiencing it?_____ *(In months or years)*

13. When was the last time you experienced it? 1. Last week ☐ 2. Last Month ☐

3. Others, specify _____

14. What is the intensity of Pain? 1) Mild ☐ 2) Moderate ☐ 3) Severe ☐

15. What is the duration of pain in days?_____

16. Does the pain limit your daily activities? 1) Yes ☐ 2) No ☐

17. In what part of your body do you experience dysmenorrhea pain? *Multiple response allowed*

S/N	Sites of pain	Yes	No
(a)	Lower abdomen		
(b)	Upper abdomen		
(c)	Low back		
(d)	Hip Joint		
(e)	Waist		
(f)	Inner thighs		
(g)	Others *(please specify)*		

18. If you experience dysmenorrhea what signs and symptoms do you experience? *(Multiple response allowed)*

S/N	Signs and Symptoms of dysmenorrhea	Yes	No
(a)	Headache		
(b)	Backache		
(c)	Dizziness		
(d)	Loss of appetite		
(e)	Weakness		
(f)	Mood swing		
(g)	Short tempered		
(h)	Diarrhea		
(i)	Nausea feeling		
(j)	Abdominal pain or discomfort		
(k)	Blotted stomach		
(l)	Waist pain		
(m)	Pimples on the face		
(n)	Full or tender breasts		
(o)	Eating too much		
(p)	Over sleeping		
(q)	Others *(please specify)*		

SECTION C: PREVENTION METHODS

19. What method did you adopt to reduce the pain? *Multiple response allowed*

S/N	Prevention methods	Yes	No
(a)	Modern medicine		
(b)	Traditional Herbs		
(c)	Hot Fluids		
(g)	Alcohol		
(i)	Rest		
(j)	Diet modification		
(k)	Others, *please specify*		

20. Have you ever taken medicine to prevent or reduce dysmenorrhea? *If YES tick the ones you do take and continue, if NO go to question 21*

S/N	Type of medicine	Yes	No	Who prescribed it? 1. Health care provider 2. Family member(s) 3. Friend(s) 4. Self *(indicate with no. 1,2,3,or 4)*
(a)	Paracetamol			
(b)	Ibuprofen			
(c)	Felden			
(d)	Aspirin			
(e)	Buscopan			
(f)	Diclofenac			
(g)	Herbal medicine			
(h)	Oral Contraceptive Pills			
(i)	Others (please specify)			

21. What is or are the reason(s) for taking the medicines ticked?

(a) It is cheap ☐ (b) It is effective ☐ (c) It is readily available ☐

(d) Other reasons, specify_____

22. Have you ever experienced any side effects after taking any of the above listed medicines?

1) Yes ☐ 2) No ☐

23. Which other prevention methods do you make use of? *(Multiple response allowed)*

S/N	Other prevention methods	Yes	No	Who recommended it? 1. Family member 2. Friends 3. Health care provider 4. Others, specify*(indicate with no. 1,2,3or4)*
(a)	Massage on waist and lower back			
(b)	Heating pads			
(c)	Hot showers			
(g)	Consult gynecologist			
(i)	Exercising			
(j)	Others (please specify)			

24. Which of the following factors can influence your choice of prevention methods? *(Multiple response allowed)*

S/N	Factors	Yes	No
(a)	Severity of the pain		
(b)	Location of the pain		
(c)	Duration of the pain		
(d)	Inability to sleep		
(e)	Inability to attend classes		
(f)	Loss of appetite		

(g)	Money		
(h)	Nausea/vomiting		

SECTION D: KNOWLEDGE ON PHYSICAL EXERCISE AS A DYSMENORRHEA PREVENTION METHOD

25. Please indicate (√) Yes or No to the following statements.

S/N	Knowledge Statement	Agree	Disagree
(a)	Physical exercise is dysmenorrhea prevention method		
(b)	Physical exercise boosts mood during periods		
(c)	Physical exercise increases period pains		
(d)	Physical exercise reduces heavy periods		
(e)	Physical exercise beats fatigue during periods		
(f)	Physical exercise does not regulate irregular periods naturally		
(g)	Physical exercise gives me better sleep during periods		
(h)	Physical exercise is good for females during periods		
(i)	I would recommend physical exercise to those who experience dysmenorrhea		
(j)	Females should not be encouraged to engage in physical exercise during menstruation		

SECTION E: LEVEL OF PARTICIPATION IN PHYSICAL EXERCISE AS A DYSMENORRHEA PREVENTION METHOD

26. Do you exercise before periods? 1. Yes ☐ 2. No ☐ *(If No, go to question 29)*

27. If yes, how frequent? 1. Always ☐ 2. Sometimes ☐

28. How many days do you exercise before periods?_____

29. Do you exercise during periods? 1. Yes ☐ 2. No ☐ *(If No, go to question 32)*

30. If yes, how frequent? 1. Always ☐ 2. Sometimes ☐

31. How many days do you exercise during periods? _____

32. Do you exercise after periods? 1. Yes ☐ 2. No ☐ *(If No, go to question 35)*

33. If yes, how frequent 1. Always ☐ 2. Sometimes ☐

34. How many days do you exercise after periods? _____

SECTION F: FACTORS ASSOCIATED WITH PARTICIPATION IN PHYSICAL EXERCISE AS A MEANS OF RELIEF OF DYSMENORRHEA

35. Please indicate (√) Yes or No to the following statements.

S/N	Influencing Factor Statement	Yes	No
(a)	I believe my female friends influence my participation in physical exercise to relief dysmenorrhea during periods		
(b)	My mother, sisters and female relatives do not participate in physical exercise to relief dysmenorrhea during periods		
(c)	Healthcare professionals advice influences me to participate in physical exercise to relief dysmenorrhea during periods		
(d)	Social media influences me to participate in physical exercise to relief dysmenorrhea during periods		
(e)	Availability of physical exercise facilities influences me to participate in exercise to relief dysmenorrhea during periods		