

**VALIDATION OF MENSTRUAL DISORDERS  
QUESTIONNAIRE (MDQ) AMONG MEDICAL  
STUDENTS IN UNIVERSITI SAINS MALAYSIA**

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**By**

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## LIST OF ABBREVIATION

%	Percentage
<	Less than
n	number of sample
BMJ	British Medical Journal
CFA	Confirmatory factor analysis
CITC	Corrected item total correlation
EFA	Exploratory factor analysis
FSH	Follicle stimulating hormone
GnRH	Gonadotropin releasing hormone
HUSM	Hospital Universiti Sains Malaysia
ICC	Intraclass correlation coefficient
IUDs	Intrauterine devices
KAP	Knowledge, Attitude, Practice
KMO	Kaiser-Meyer-Olkin
LH	Luteinizing hormone
MDQ	Menstrual Disorders Questionnaire
O&G	Obstetrics and Gynecology
PCOS	Polycystic ovarian syndrome
PMS	Premenstrual syndrome
SD	Standard deviation
SEM	Structural Equation Modeling
PASW	Predictive Analytics Software
USM	Universiti Sains Malaysia

**VALIDASI SOALAN KAJI SELIDIK TENTANG  
MASALAH KITARAN HAID (MDQ) DALAM KALANGAN  
PELAJAR PERUBATAN DI UNIVERSITI SAINS MALAYSIA**

**ABSTRAK**

Tujuan kajian ini adalah untuk menilai kesahihan, kebolehpercayaan dan kebolehlaksanaan kaji selidik pengetahuan dan sikap ke atas masalah kitaran haid (MDQ). Ini merupakan kajian keratan rentas yang telah dijalankan di Pusat Pengajian Sains Perubatan, Universiti Sains Malaysia mulai Julai 2010 sehingga Disember 2010 dengan menggunakan soalan kaji selidik yang distrukturkan dan dijawab oleh responden sendiri yang dihasilkan oleh sekumpulan pakar daripada obstetrik dan ginekologi, perubatan keluarga, epidemiologi dan statistik. Soalan kaji selidik ini mengandungi 62 item dalam domain Pengetahuan dan 14 item dalam domain Sikap yang berkaitan dengan gangguan menstruasi. Satu sampel yang mengandungi 202 orang pelajar perubatan Tahun 4 terlibat dalam kaji selidik ini. Kebanyakan pelajar terdiri daripada pelajar Melayu yang merangkumi 59.9% perempuan dan 40.1% lelaki. Untuk mengkaji *test-retest reliability*, hanya melibatkan 98 orang pelajar. Mereka diberi soalan kaji selidik yang sama untuk kali kedua selepas dua minggu berikutnya. Sebanyak 24 item disingkirkan daripada domain Pengetahuan disebabkan oleh korelasi yang rendah, indeks kesusahan yang terlalu tinggi atau terlalu rendah, satu item dalam satu faktor atau bebanan faktor yang rendah. Terdapat empat item telah disingkirkan daripada domain Sikap disebabkan kandungan item yang sama. Skor purata dalam MDQ ini adalah antara

julat 1.37 hingga 4.26. Bebanan faktor yang menggunakan analisis komponen principal (PCA) dan putaran *Varimax* adalah antara julat 0.48 hingga 0.94. Terdapat enam sub-domain dalam domain Pengetahuan dan tiga sub-domain dalam domain Sikap. Konsistensi dalaman MDQ menggunakan *Cronbach* alfa adalah antara julat 0.22 hingga 0.94. *Test-retest reliability* menggunakan pekali korelasi intrakelas (ICC) adalah 0.74 untuk domain Pengetahuan dan 0.80 untuk domain Sikap. Penyampaian grafik untuk *test-retest reliability* dengan menggunakan plot Bland Altman menunjukkan data diagihkan sama rata dalam plot tersebut. MDQ mempunyai kesan siling pada domain Sikap sebanyak 0.5% dan tiada kesan lantai. MDQ adalah sah dan dibolehpercayai untuk menguji sikap terhadap gangguan menstruasi pada kalangan pelajar medik. Namun, ia adalah sah tetapi mempunyai indeks kebolehpercayaan yang rendah untuk menguji pengetahuan terhadap gangguan menstruasi dalam kaji selidik ini. Tindakan penambahbaikan perlu dilakukan ke atas soalan kaji selidik ini untuk meningkatkan kebolehpercayaan soalan kaji selidik ini.

**VALIDATION OF MENSTRUAL DISORDERS QUESTIONNAIRE (MDQ)  
AMONG MEDICAL STUDENTS IN UNIVERSITI SAINS MALAYSIA**

**ABSTRACT**

The aim of this study was to determine the validity and reliability of knowledge and attitude on Menstrual Disorders Questionnaire (MDQ) among Year four medical students. A cross sectional study was undertaken at the School of Medical Sciences, Universiti Sains Malaysia. It started in July 2010 and ended in December 2010 using the structured self-administered questionnaire developed by a group of experts from Departments of Obstetrics and Gynaecology, Family Medicine, Epidemiology and Biostatistics. The questionnaire comprised 62 items in knowledge domain and 14 items in attitude domain related to menstrual disorders. A sample of 202 year four medical students was drawn for the data collection purpose in this study. There were 118 Malay respondents (58.4%) that consists 121 female (59.9%) and 81 male (40.1%). To assess the test-retest reliability, 98 students were drawn from all the respondents were given the same questionnaire for the second time after two weeks interval. The total of 24 items were removed for knowledge domain from the original questionnaire due to low correlations, too low or too high difficulty index, single item in one factor or low factor loading value. There were four items removed for the attitude domain from the original questionnaire due to the repetition of content. The mean score of items in MDQ ranged from 1.37 to 4.26. The factor loading value using Principal Component Analysis (PCA) extraction and Varimax rotation for both the knowledge and attitude domain ranged from 0.48 to 0.94. There

were six sub-domains in knowledge domain and three sub-domains in attitude domain. Internal consistency of MDQ using Cronbach's alpha ranged from 0.22 to 0.94. Test-retest reliability using intraclass correlation coefficient (ICC) was 0.74 for knowledge domain and 0.80 for attitude domain. Graphical presentation of test-retest reliability using Bland Altman plot showed the data distributed evenly in the plot. The MDQ had 0.5% ceiling effect at attitude domain and zero floor effect. The MDQ was valid and reliable to determine the attitude among medical students or the future health care personnel. It was valid but less reliable for measuring knowledge on menstrual disorders in this study. Further improvement of the questionnaire is needed to improve the reliability of the questionnaire.

## CHAPTER 1

### INTRODUCTION

Questionnaire is an important tool used by the researchers in many disciplines to obtain information to answer a research question especially in health and medical science research. It is also commonly used in measuring knowledge and attitude regarding menstrual disorders. Thus, questionnaire design or development is a critical component of many research projects. Validation study is conducted to assess the validity and reliability of the questionnaire. This study used self-administered questionnaire with two domains, knowledge and attitude, to assess the level of understanding of medical students towards menstrual disorders and validate the questionnaire.

Menstruation is a significant transition stage for females where the periodic discharge of blood, tissue, fluid and mucus from the reproductive organs of sexually mature females (Farlex, 2010a). The onset of menstruation or menarche is normally developed during the earlier time of second decade of life and ends with menopause, typically in the fifth decade of life (Greydanus *et al.*, 2009) and menarche is considered the central event of the female puberty. Menstrual cycle starts during puberty where it is the transition childhood to womanhood for an adolescent. It is a phase of rapid physical growth and development along with physiological and

behavioral maturity. Adolescent can be present in wide variety of menstrual dilemmas and disorders.

Menstrual disorder is a situation that interferes with the normal menstrual cycle, causing pain, unusual heavy or light bleeding or missed periods (Farlex, 2010b). Menstrual disorders affect 75.0% of adolescent females and are common reasons for them to seek for medical care (Slap, 2003). Menstrual problems are very common among female adolescents (Agarwal and Venkat, 2009; Chan *et al.*, 2009; Sebanti *et al.*, 2005; Sharma *et al.*, 2008). Cultural beliefs may affect attitudes of adolescents towards menstruation, which in turn may influence the views of adolescents (Lu, 2001). So, instead of taking medication, most of the female adolescents followed what their mothers tell them to do when they encountered any menstrual disorders. For example, some adolescents and their mothers believed that eating foods considered to be too hot or too cold should be avoided during menstruation according to literature review report by Khan (2000). Therefore, as a medical student and probably health care personnel in future, proper knowledge on menstrual disorders is very important in order to advice their patients and family members.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Questionnaire Development

A questionnaire provides a tool for eliciting information which can be tabulated and discussed. In many evaluations, a questionnaire serves as the major source of information. A questionnaire must be well designed and carefully developed in order to adequately answer the research questions. A well designed questionnaire can facilitate the collection of information in a standardized way, provides greater objectivity and less measurement bias than unstructured interviews or ad hoc data collection. Poorly developed questions and questionnaires can result in the loss of information, wasted resources and missed opportunities (Queensland Government, 2005).

Questionnaire development is a complex task and it takes time and much attention. Thus, before constructing questionnaire, a preliminary idea of the pattern of questionnaire would have to be formed. There are a few guidelines suggested by Oppenheim (1978) such that the decisions concerning the main methods of data collections, the method of approach to the respondents, the build-up of question sequences and the order of questions, for each domain, types of question (factual or attitudinal) and the use of pre-coded versus free-response questions. Questionnaire design process proposed by Frazer and Lawley (2000) is as follows:-

- (1) Determine the required information and from whom it should be sought.
- (2) Determine the methods of data collection and the length of questionnaire.
- (3) Prepare the draft questionnaire in terms of question content, question wording, response format, structure and layout.
- (4) Revise the pre-tested questionnaire.
- (5) Assess the validity and reliability of the questionnaire.

The information needed to be derived from a questionnaire can be identified by referring to the research objectives. In some cases, these objectives may further synthesize into research questions and hypotheses. Basically, five different types of information may be distinguished by using questionnaire such that knowledge, belief, attitude, behavior and attributes (Marshall, 2006). Knowledge describes how well a person understands something. Belief is a judgment of what a person think is true or false or in another word, it is an opinion. Attitude represents a person's preference or feeling about something. Behavior is about what a person had done in the past, doing now and plan to do in the future. It can be a physical or mental behavior. Attributes are a person's personal or demographic characteristics such as age, education, occupation, income and so on. Data will also need to be collected in a form that is suitable for the proposed data analysis method. Those who have the required knowledge may access the information and the authority also may provide the information required. The appropriate respondents from whom to gather the data would be a sample of people who had experience of the issues related.

There are numerous methods of data collection in medical research, from lengthy interview to impersonal, mailed questionnaire and analysis of medical records in the hospital. Particularly for data collection method by questionnaires, there are interviews, mail, e-mail, telephone, self-administered, group-administered and web-based. The choice of method will affect the questionnaire design. Thus, method of data collection should be decided before constructing the questionnaire. For example, with personal interviews, more complex questions and explanation can be used because greater interaction possible between the interviewer and respondent. Questionnaires delivered over the internet should have the simplicity of mail questionnaires as well as simple procedures for responding, such as clicking buttons for choices. While self-administered questionnaires should have clear instructions and questions must be simple. The length of questionnaire will depend on the amount of data required, the cost of research, the likely response rate and the amount of time respondents are willing to spend to complete the questionnaire. Lengthy questionnaires may result in low response rate. Some researchers want to make the questionnaire looks shorter and make no spaces between questions. This also may lead to low response rate as space is as important as content in the presentation of a questionnaire (Bourque and Fielder, 2003).

Questionnaire content will be determined by reviewing the research objectives and seeing what needs to be addressed. Content of the questionnaire is based on the access of the necessary information and the willingness of respondents to provide information. Phrasing the questions to obtain the intended information and to be

understood by all respondents is a challenging task. Three things that need to be considered when phrasing the questions are (Marshall, 2006),

- (1) The particular people for whom the questionnaire is being designed.
- (2) The particular purpose of the questionnaire.
- (3) How questions will be placed in relation to each other in the questionnaire.

A checklist suggested by Marshall (2006) in terms of phrasing the questions such as the use of simple and clear wording, avoiding the use of abbreviations, jargon or foreign phrases, avoiding making assumptions, avoiding double questions and use mutually exclusive categories. The main consideration for the choice of response format is the data analysis method, which may specify a particular type of measurement, namely nominal, ordinal, interval or ratio. Generally, all questions' response is either "open" or "close" in format. A closed question is the one which the respondent is offered a choice of alternative responses. A closed question can be asked in a few different ways such as one best answer, rating scale, ordered choice and ranking. Open-ended questions are the types of question that are not followed by any kind of option and the answers have to be recorded fully. Although open-ended questions are much easier to write than close-ended questions, they are more difficult to answer and even more difficult to analyze. Thus, a classification process known as "coding" is employed. It requires drawing up some system of categories as a coding frame. For example, correct response will be given one point and incorrect response will be given zero point. In designing all questionnaires, researchers should try to start with the easiest questions and proceed to more complex or sensitive question due to the order of questions can affect the motivation of respondents to complete the questionnaire. A questionnaire should start with simple, interesting

and non-sensitive questions in order to gain respondent's cooperation. Besides, questions should be in logical order, i.e. from the general to the more specific.

## **2.2 Method of Administrations**

One of the main primary data collection instruments in social, health and epidemiological research is the survey questionnaire. Modes of data collection by questionnaire differ in several ways, included the method of contacting respondents, the medium of delivering the questionnaire to respondents and administration of the questions. Today, several types of questionnaires administration included face to face interview, paper and pencil administration, computer assisted, telephone and mail survey administration. The variation can have different effects on the accuracy and quality of the data obtained (Bowling, 2005). Thus, administration of the measurement must be carefully considered when designing the instrument.

Face to face interview as the name implies, involves a trained interviewer administering the scale or questionnaire on a one-to-one basis (Streiner and Norman, 2008). The main advantage of face to face interview is that the researcher can adapt the questions as necessary, clarify doubt and ensure that the responses are properly understood, repeating or rephrasing the questions. Any discomfort or stress that the respondent experiences can be detected through frowns, nervous tapping and other body language, unconsciously exhibited by any person. This would not be possible to detect in other types of administration. It is useful especially when the respondents are illiterate for example the geriatric generation. However, the face to face interview

involves huge resources which are cost, manpower and time even worse if the survey needs to be done nationally or internationally. Cost for training is needed to standardize the way the interviewer ask questions and handle unusual circumstances to avoid interviewer bias in data collection. Furthermore, the respondents may feel uneasy about the anonymity of their responses when they are having face to face interviews.

Mail surveys are generally less expensive compared to face to face interview especially with a very large sample. Sometimes, it can contain longer and more complicated questions since the respondents can see the question and read it at their own pace. In others words, it is convenient at the respondents' side. But, it does not provide the option of someone to explain the questions if needed and do not provide a chance for follow-up for responses (Zahs and Baker, 2007).

Telephone interview is generally more expensive compared to mail survey. It is usually quicker to complete the survey compared to mail surveys where time is needed for respondents to post back the responses. Response rate is higher than mail surveys as a person is administering the survey live. The researcher can guide the respondents if any questions are not be understood. However, telephone survey usually limited to a maximum of about 15 minutes (Dominowski and Bartholet, 1997). The longer the survey time, higher the dropout rate from the respondents. Questions must be simple and clearly stated since respondents cannot read the questions. Complicated or long questions are not appropriate for telephone surveys.

Self-administered questionnaires are one of the most frequently used methods for collecting data in research studies. Self-administered questionnaires are the instruments used to collect information from people who complete the instruments themselves (Bourque and Fielder, 2003). This method of data collection ensures a high response rate, accurate sampling and a minimum of interviewer bias, providing necessary explanation and giving the benefit of a degree of personal contact (Oppenheim, 1978). There are two types of self-administered questionnaires which are supervised administration and unsupervised administration. Supervised administration can be one-to-one and to the extent of group administration.

### **2.3 Knowledge, Attitude and Practice (KAP) Questionnaire in General**

KAP study serves as an educational diagnosis of the community (Kaliyaperumal, 2004), particular in this context, the community refers to the medical students. Before beginning the process of creating awareness in any given community, it is first necessary to assess the environment in which awareness creation will take place. KAP study tells us what people know about certain things, how they feel and also how they behave. A proper assessment of knowledge, attitudes and practice study will assure appropriateness of education programs or policy changing. The lack of awareness among medical students may contribute to lower quality health care providers.

## 2.4 Validity

Once the questionnaire is prepared for the study, it must be validated. The purpose of validation is to assess their ease of comprehension, relevance to their intended topics, effectiveness in providing useful information and degree to which the questions are interpreted and understood by different individual (Kaliyaperumal, 2004). With a validated questionnaire, results of the questionnaire can be objectively measured. Validation includes several aspects which are face validity, content validity, criterion validity and construct validity.

Face validity involves checking whether items in an instrument appear “on the face of it” to cover the intended topics clearly and unambiguously (Fayers and Machin, 2000). If a questionnaire has good face validity, it will get better cooperation among the respondents. The face validity is a qualitative measure of validity; it is not quantified with statistical methods. However, it is still an important step to check whether the items in the questionnaire are relevant to the concept being assessed. The face validity is considered as the least scientific measure among all the validity measures.

Content validity relates to the adequacy of content of an instrument, in terms of the number and scope of the individual questions that it contains (Fayers and Machin, 2000). Thus, content validation involves the critical examination of the basic structure of the instrument, a review of the procedures used for the development of the questionnaire and also consideration of the applicability to the intended research

question (Fayers and Machin, 2000). It is important to evaluate the test usefulness. The content validity, like the face validity, is a qualitative measure of validity; it is normally not quantified with statistical methods.

Criterion validity involves assessing an instrument against the true value or against some other standard that is accepted as providing an indication of the true values for the measurements (Fayers and Machin, 2000). It can be divided into two sub categories which are concurrent and predictive validity. Concurrent validity is to check the agreement between a new questionnaire and a more well-established questionnaire, also called the “gold standard” instrument. Usually, it needs to be conducted if the objective of developing a new instrument is to produce a shorter or simpler questionnaire. Predictive validity concerns about the ability of the instrument to predict future health status, future events or future test results.

Construct validity is one of the most important characteristics of a measurement instrument. It is an assessment of the degree to which an instrument measures the construct that it was designed to measure (Fayers and Machin, 2000). A construct validation can be conducted by using factor analysis. By using this statistical test, convergent and discriminant validity can be evaluated. There are two types of factor analyses such that exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Exploratory factor analysis is used to explore the possible underlying factor structure of a set of observed variables without imposing a preconceived structure on the outcome (Child, 1990). Data reduction is allowed in EFA. Confirmatory factor

analysis is a statistical technique used to verify the factor structure of a set of observed variables. Thus, for CFA, the researchers must specify the number of factors a priori. Structural equation modeling (SEM) is a statistical methodology with graphical modeling interface that takes a confirmatory approach to the analysis of a structural theory bearing on some phenomenon (Byrne, 2009). SEM allows making use of several indicator variables per construct simultaneously, which leads to more valid conclusions on the construct level. SEM also takes measurement error into account by explicitly including measurement error variables that correspond to the measurement error portions of observed variables. Therefore, conclusions about relationships between constructs are not biased by measurement error (Karin, 2009).

## **2.5 Reliability**

The concept of reliability is a fundamental way to reflect the amount of error, random and systematic, inherent in any measurement (Streiner and Norman, 2008). Reliability is a measure of consistency of the test, in other words, the questionnaire will it be answered similarly by the same subjects at different time. Briefly, there are three forms of reliability such that rater reliability (inter and intra rater), test-retest reliability and internal consistency. Internal consistency refers to the extent to which the items are interrelated where it can be tested by using Cronbach's alpha value. Alpha value should be above 0.70, but probably not higher than 0.90 to indicate there is a good consistency of items in the domain (Streiner and Norman, 2008). Cronbach's alpha value is the ratio of true score to observed score variance. The formula for calculating Cronbach's alpha value is

$$\alpha = \frac{m}{m-1} \left[ 1 - \left( \frac{\sum \text{Var}(x_i)}{\text{Var}(S)} \right) \right] \quad (\text{Streiner and Norman, 2008})$$

Where,

m = number of items,

Var (xi) = variance of the i<sub>th</sub> item, and

S =  $\sum x_i$

One of the most useful applications of Cronbach's alpha is in the development of scales and selection of items. If the alpha value is increased when an item is omitted, that item is an ideal candidate for removal from the scale. On the contrary, a new item may be worth including if it causes a substantial increase.

Test-retest reliability conducted by testing the same questionnaire to the same subjects on two occasions separated by a time interval sufficiently short that we can assume that the underlying process is unlikely to have changed in order to test whether they have the same understanding towards the questionnaire (Streiner and Norman, 2008). Intraclass correlation coefficient (ICC) is used to test this reliability for continuous data and Kappa agreement for categorical data.

Bland Altman plot is also another approach to conduct test-retest reliability for continuous data. It is a graphical presentation which calculates the mean differences between two tests of measurement and 95.0% limits of agreement as the mean difference of 1.96 standard deviation (Myles, 2007). The smaller the range between

these two limits the better the agreement is. It also shows clearly any extreme or outlying observations.

Inter-rater reliability used to assess the degree to which different raters or observers give consistent estimates of the same phenomenon (William, 2006). People are easily distracted and tired of doing the tasks repeatedly. Inter-rater reliability is important when assessment was done by human. Different statistics are appropriate for different types of measurements. Cohen's kappa is commonly used for categorical measurement and interclass correlation coefficient (ICC) is commonly used for numerical measurements.

An observer may apply slightly different standards from day to day. Thus, it may results variation within the observer himself in different time interval. The reliability of interest called intra-rater reliability. It is a type of reliability assessment in which the same assessment is completed by the same rater or observer on two or more occasions (Streiner and Norman, 2008). However, the rater's subsequent ratings will be contaminated by the knowledge of earlier ratings since it is the same individual to complete both assessments (Sushil and Verma, 2010).

## **2.6 Knowledge and Attitude Questionnaire on Menstrual Disorders among Medical Students**

A study done by McPherson and Korfine in 2004 investigated knowledge, behaviors, education and preparedness of a female towards menstruation. There are also some studies related to menstruation and menstrual disorders done in Malaysia, Singapore, Hong Kong, Australia and United States by using questionnaire (Houston *et al.*, 2006; Lee *et al.*, 2006; Agarwal and Venkat, 2009; Chan *et al.*, 2009; Parker *et al.*, 2010). However, all the respondents were female adolescents who had the experience of menstruation or menstrual disorders. To date, there is no published research on the basic knowledge and attitude on menstrual disorders among medical students.

## **2.7 Physiology of Menstrual Cycle**

Sometimes, young patients and their parents frequently have difficulty in assessing what constitutes normal menstrual cycles due to limited knowledge regarding menstruation. Definition of normal menstrual cycle is differ from country to country due to difference in culture, beliefs, socioeconomic status of the country and so on (Harlow, 2000). A normal menstrual can be defined as the cycle in which the amount of menstrual blood loss is approximately four sanitary pads per day, duration of menses is between three and seven days and cycle length interval is 21 days to 35 days (Lee *et al.*, 2006). Age of menarche averages between 12 and 13 years old (Lee *et al.*, 2006, Chan *et al.*, 2009, Agarwal and Venkat, 2009). Puberty is the process of physical changes in which a child's body becomes an adult body to be able to reproduce. Puberty is initiated by hormone signals from the brain to the gonads. The

onset of puberty is associated with high gonadotropin releasing hormone (GnRH) pulsing, which precedes the rise in sex hormones, luteinizing hormone (LH) and follicle stimulating hormone (FSH). GnRH is secreted from the hypothalamus in a pulsatile manner throughout the menstrual cycle. Puberty is impacted by these hormones, which affect the cellular and glandular components of the reproductive system leading to the anatomical changes. Menarche generally occurs roughly 2.3 years after the initiation of puberty, between 11 and 14 years, in 95.0% of girls depending on race, ethnicity, socioeconomic and nutritional status (Greydanus *et al.*, 2009). The development of regular ovulatory menstrual cycles may take one to five years after menarche as the hypothalamic-pituitary-ovarian axis continues to mature (Greydanus *et al.*, 2009). With the presence of a GnRH pulse, the pituitary and ovarian hormones exert mutual control over the circulating levels of one another. The menstrual cycle is basically divided into two phases which included follicular phase and the luteal phase. The fertile window is marked between the first and second phase which is ovulation. The hypothalamus serves as a generator of puberty, while GnRH serves as a regulator controlling menstrual cycling.

## **2.8 Types of Menstrual Disorders**

Generally, there are various types of menstrual disorders experienced by females at their different level of reproductive stages. These disorders can be grouped into disorders of (1) ovulation, (2) menstrual cycle length, (3) menses flow, (4) dysmenorrhea, (5) premenstrual syndrome and (6) other menstrual disorders which are not very common among female at older times. Disorders of menstrual cycle length are defined as:

- a) amenorrhea – absence of a menstrual period in a woman of reproductive age
- b) irregular menstruation – menstruation shorter than 21 days or longer than 35 days
- c) metrorrhagia – uterine bleeding at irregular intervals, particularly between the expected menstrual periods
- d) oligomenorrhea – menstruation occurring at intervals of greater than 35 days, with only four to nine periods in a year

Disorders of menses flow are defined as:

- a) hypomenorrhea – extremely light menstrual period flow
- b) menometrorrhagia – prolonged or excessive uterine bleeding occurs irregularly and more frequently than normal
- c) menorrhagia – abnormally heavy and prolonged menstruation at regular intervals

Dysmenorrhea is divided into two categories which are primary dysmenorrhea and secondary dysmenorrhea. Another common problem that might be experienced by most females is premenstrual syndrome (PMS). It is a condition of physical, psychological and emotional symptoms related to a woman's menstrual cycle. Based on several studies done in Hong Kong (Chan *et al.*, 2009), Malaysia (Lee *et al.*, 2006), Singapore (Agarwal and Venkat, 2009) and China (World Health Organization, 2005), dysmenorrhea, menorrhagia, irregular menstruation and premenstrual syndrome are the most common among female adolescents. A study done in Hong Kong using questionnaire to evaluate the menstrual problems that experienced by female adolescents in secondary school found that 68.7% of the

subjects are experiencing dysmenorrhea, 17.9% of them having excessive bleeding (menorrhagia) during menstruation and 37.7% of them are having premenstrual syndrome (Chan *et al.*, 2009). A study done in Negeri Sembilan, Malaysia using questionnaire, showed that 69.4% of the subjects had dysmenorrhea, 74.6% of them experienced premenstrual syndrome, 37.2% of the subjects had irregular menstrual cycle and 18.0% of them experienced menorrhagia (Lee *et al.*, 2006).

### **2.8.1 Dysmenorrhea**

Dysmenorrhea is a medical condition characterized by severe uterine pain during menstruation, often called period pain. The main symptom of dysmenorrhea is the pain concentrated in the lower abdomen. It is also commonly felt in the right or left abdomen. Other symptoms may include nausea and vomiting, diarrhea or constipation, headache, dizziness, disorientation, hypersensitivity to sound, light, smell and touch, fainting and fatigue. Symptoms of dysmenorrhea often begin immediately following ovulation and may last until the end of menstruation due to association with changes in hormonal levels in the body that occur with ovulation. There are two different therapies in treating dysmenorrhea which are nutritional and medication. Nutritional supplement or food source which contains omega-3 fatty acids, magnesium, vitamin E, zinc and vitamin B<sub>1</sub> may improve the pain situation experienced by females. Hormonal contraceptives can relieve the symptoms of dysmenorrhea. Herbal therapies are also said to be able to help reduce the menstrual pain (William, 2009).

## 2.8.2 Amenorrhea and Oligomenorrhea

Amenorrhea is divided into primary amenorrhea and secondary amenorrhea. Primary amenorrhea, by definition, is either the absence of menses by age of 16 if normal development and sexual characteristics are present or the absence of menses by age of 14 if no secondary sexual characteristics have developed (Heiman, 2009). Secondary amenorrhea is more common and is defined as the absence of menses for three months in a woman who had previously regular menses or for nine months in a woman who had previous oligomenorrhea (Heiman, 2009). Amenorrhea may occur in the setting of pubertal delay, otherwise normal puberty or genital tract anomalies (Pletcher and Slap, 1999). The first treatment for a patient with amenorrhea is the attempt to restore ovulatory cycles that leads to the best long-term prognosis for future health. Estrogen-progestin therapy is used if menses do not occur spontaneously. Oligomenorrhea is one of the types of disorders of menstrual cycle length. Generally, it is caused by diet, hormonal birth control, stress, lactation, menarche and menopause (Len, 2010a). Poor diet and a drastic weight loss or gain may influence the hormonal levels in a female's body. Many recent studies also show that stress is being one of the major affecting factors that give rise to irregular menstruation (Lin *et al.*, 2007, Yamamoto *et al.*, 2009, Nohara *et al.*, 2010). Symptoms of irregular menstrual cycle begin with very little or excessive bleeding. Bleeding also occurs in between regular menses. The gap between two menstrual cycles is either longer or shorter as compare to normal cycle. There is also a pain in flanks, back just above the pelvic region (Herbal, 2008). There are three methods as reported by Len (2010b) in treating irregular menstrual cycle such as herbal remedies, medical treatment and lifestyle changes. In addition, an Iran study shows that

prevalence of amenorrhea and oligomenorrhea is higher among females athletes (Dadgostar *et al.*, 2009).

### **2.8.3 Menorrhagia**

Menorrhagia is defined as blood loss of greater than 80ml in a regular basis of menstruation. Factors that cause menorrhagia are divided into four categories such that organic, endocrinologic, anatomic and iatrogenic (Shaw, 2009). Organic causes of menorrhagia include infection in any genitourinary origin, bleeding disorders such as Willebrand disease and organ dysfunction such as chronic liver disease. Endocrine causes of menorrhagia include thyroid and adrenal gland dysfunction, pituitary tumors, anovulatory cycles, polycystic ovarian syndrome (PCOS), obesity and vasculature imbalance. Anatomic etiologies for menorrhagia include uterine fibroids, endometrial polyps, endometrial hyperplasia and pregnancy. Iatrogenic causes of menorrhagia include the use of intrauterine devices (IUDs), steroid hormones, chemotherapy agents and medication, for example, anticoagulants. Identification of the underlying cause of menorrhagia is important to solve the problem thoroughly. Treatment will be directed to the underlying cause of menorrhagia.

### **2.8.4 Premenstrual Syndrome (PMS)**

The three most notable symptoms of PMS are irritability, tension and dysphoria (unhappiness). Common emotional symptoms include stress, anxiety, crying,

insomnia, headache, fatigue, mood swings and increased emotional sensitivity. PMS appears to be related to fluctuations in estrogen and progesterone (American Medical Network, 2006). Estrogen and progesterone may cause transitory fluid retention, which seems to explain some PMS symptoms. Stress and diet may also be factors contributing to PMS. Different treatments are aimed at different causes of PMS and different approaches may be used to treat symptoms, but not others. Most of the treatments involve drugs to relieve the symptoms. Anti-anxiety drugs and antidepressants may help with mood, irritability and concentration.

## **2.9 Rationale of Study**

Menstrual problems are common at any reproductive stage in females and it is a significant source of morbidity. Influence of one's culture or beliefs play a vital role in female during their reproductive age, especially, in rural area where there is poor access to information. Some of those cultures or beliefs may not on the basis of medical sciences. As a medical student who is the future doctor or health care provider, proper knowledge and attitude regarding menstrual disorders among medical students is necessary in order to provide guidance to their patients and family members and contribute to a better prognosis for their patients. The validated questionnaire acted as a module for health care providers to improve the effectiveness of management. With a validated questionnaire, it identifies the misconception and creates awareness and concern and among medical students. The conceptual framework of the study is shown as Figure 2.7.1 below.

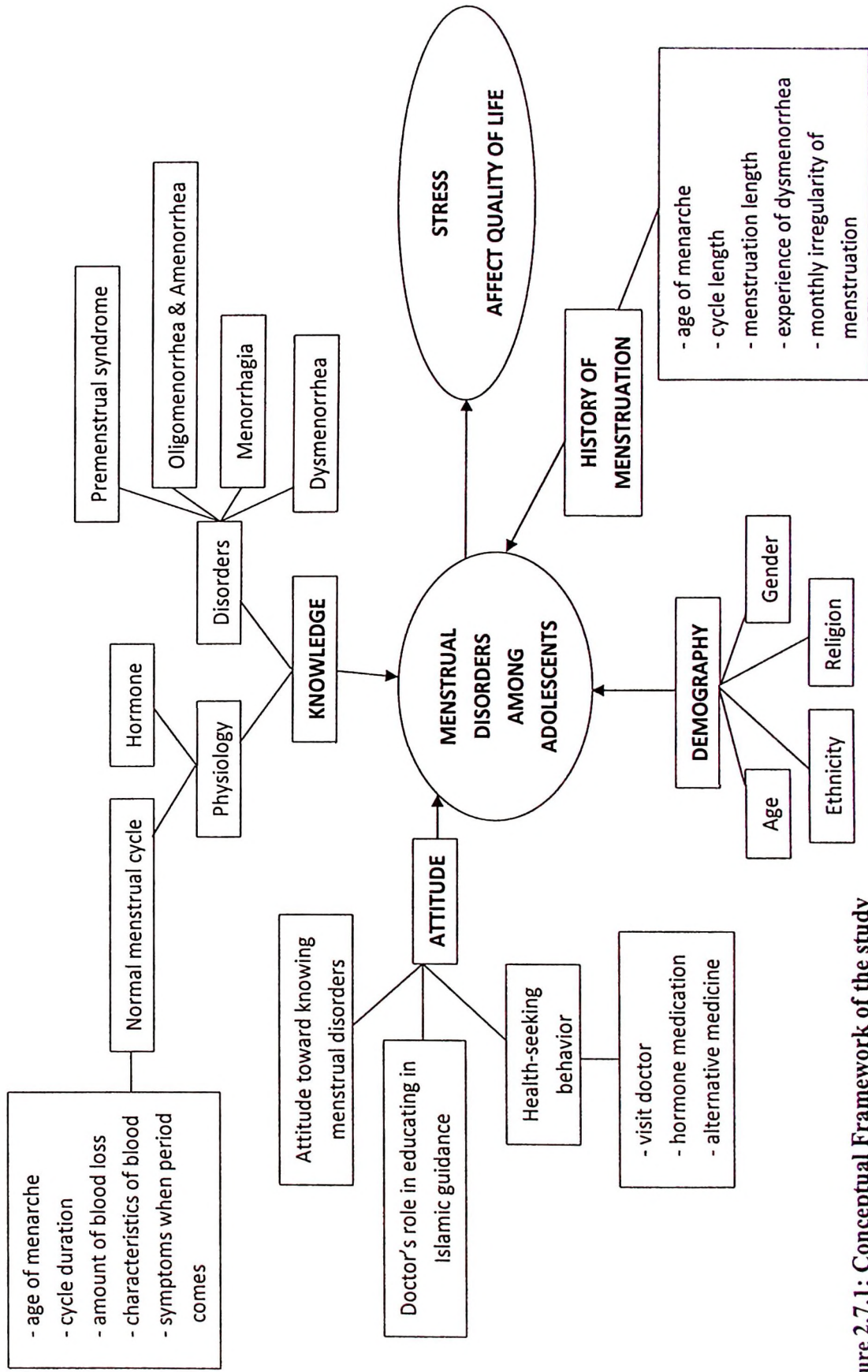


Figure 2.7.1: Conceptual Framework of the study

## **CHAPTER 3**

### **OBJECTIVES**

#### **3.1 Objectives of the Study**

##### **3.1.1 General Objective**

To validate the Malay questionnaire of knowledge and attitude on menstrual disorders (MDQ) among medical students in Universiti Sains Malaysia (USM).

##### **3.1.2 Specific Objectives**

1. To determine validity of the questionnaire in terms of
  - content validity
  - face validity
  - construct validity
2. To determine reliability of the questionnaire in terms of
  - internal consistency
  - test-retest reliability

#### **3.2 Research Question**

Is the Menstrual Disorders Questionnaire (MDQ) among medical students valid and reliable?

## CHAPTER 4

### METHODOLOGY

#### 4.1 Study Design

A cross-sectional study was conducted to validate the Menstrual Disorders Questionnaire (MDQ).

#### 4.2 Study Location

This study was conducted in Health Campus, Universiti Sains Malaysia (USM), Kubang Kerian, Kelantan. The health campus was built on August 1983 especially for medical field. It is located five kilometers away from Kota Bharu town area. The medical degree program consists of five-year integrated curriculum. The curriculum is divided into three phases. Phase I for the year 1 students is fundamental basic sciences phases. Phase II is for the year 2 and year 3 students. Phase II also known as pre-clinical phase where students are taught about health disorders with some exposure to clinical input. Phase III is for year 4 and year 5 students. This is the clinical phase where students are posted in rotation to various medical disciplines. In this phase, the teaching is totally clinical oriented.