

ORIGINAL ARTICLE

Self-Esteem and Quality Of Life among Women with the Menstrual Disorder at a Public Hospital

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ABSTRACT

Introduction: The regularity of menstrual cycles is considered an important indicator of women's reproductive health. Menstrual disorders such as dysmenorrhea, menorrhagia, and irregular cycles are common among women in reproductive age groups. They are responsible for physical, behavioural, and emotional changes around the menstruation period, leading to changes of normal routine. This study aimed to determine different types of menstrual irregularity, demographic association, self-esteem, and quality of life of women experiencing menstrual disorders at reproductive age. **Methods:** A cross-sectional study was conducted using the adopted Rosenberg Self-Esteem Score (RSES) and World Health Organization Quality of Life Assessment (WHOQOL-BREF) questionnaire among 253 women aged 18 to 49 who attended the Gynaecology Clinic at a public hospital in Klang Valley. **Results:** Dysmenorrhea was observed in 224 (88.5%) women. The majority of the respondent have a normal self-esteem level based on RSES score. The respondent's quality of life (QOL) score was average between 58 to 62%. Finding revealed a direct linear relationship between self-esteem and quality of life among respondents ($p < 0.001$). According to the domain QOL, positive association for QOL was found with age, educational level, marital status, and body mass index ($p < 0.005$), respectively with physical, social relationship and environment domain. **Conclusion:** There is a need for the Ministry of Health to evaluate current practice for improving women's reproductive health through menstruation-efficient interventions, to prevent the negative impact on self-esteem and quality of life. Future research should explore in-depth women's perceptions to understand better how menstrual problems affect their self-esteem and quality of life. *Malaysian Journal of Medicine and Health Sciences* (2022) 18(SUPP15): 43-50. doi:10.47836/mjmh18.s15.7

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INTRODUCTION

Menstruation is a normal physiological phenomenon among women during their reproductive age. It is considered one of the indications for women that their reproductive system is functioning and ready to take on a major role in the new phase of their life. The normal menstrual cycle relies on the action of hormone interactions and their effect on the endometrium (1). The normal pattern involves menstrual cycle between 24-32 days with a length of 3-5 days. A wide range of menstrual disorders that affect women from all parts of the world are becoming rampant and it became a significant reason for gynaecological visits (2). The most common reason for the visit includes amenorrhoea, heavy menstrual blood loss, dysmenorrhoea and premenstrual

symptom (3, 4).

The regularity of menstrual cycles is considered an important indicator of women's reproductive health (2, 3). The menstrual cycle irregularity has been reported to be between 14.3 to 25.0 per cent worldwide (5, 6). The changes and any abnormality related to menstrual cycles can have different underlying risk factors, such as polycystic ovarian syndrome (PCOS), endometriosis, and fibroids (7). It is also known to be associated with many chronic disease risks such as diabetes mellitus (DM) (5), cardiovascular disease (7), breast cancer, ovarian cancer (8) and infertility (9). In addition, women with lower socioeconomic status, including those with lower income, educational level, and poor nutrition, commonly experience menstrual irregularity (10).

Menstrual disorders can have various effects on women, either directly or indirectly, on their physical or emotional health. These disorders influence ordinary working and social life and may impose constrain their

daily routine and activities (4). Furthermore, women with menstrual disorders low attendance rates at school and workplace, and their quality of life was also adversely affected (7). Self-esteem is a term that refers to one's assessment of oneself. It is the way one feels about oneself and the extent to which individuals value themselves. It expresses an attitude of approval or disapproval and indicates the degree to which the individual makes and customarily maintains regarding herself regarding herself. The effect of low hormone level leads to emotional sensitivity, which can present as low self-confidence and depression, especially among those with menstrual disorders (11). While compared to other disorders, women with amenorrhea are reported to have low self-esteem, especially in the case of PCOS due to the incomplete feeling as a woman, attributed to the absence of menstruation (12). Furthermore, there is a significant relationship between menstrual irregularity, and low self-esteem (13).

Quality of life (QOL) is a multidimensional concept reflecting an individual's experience of physical, emotional, social well-being and the perception of health status. Menstrual disorders have shown a profound effect on the day-to-day lives of most of those who suffer from it and can lead to loss of independence and QOL (10). For example, women with dysmenorrhea in India reported poor QOL than women without menstrual problems (14). In addition, menstrual problems can also lead to limitations at work and school and may adversely affect educational and academic achievements (1, 12, 15, 16, 17).

There is a scarcity of literatures on menstrual disorders' affecting women's self-esteem and QOL in Malaysia. The research regarding this issue focuses mainly on school and university students rather than on women at the reproductive age, especially those married or who plans to get married (12, 13). Many studies in Malaysia may have looked into menstrual disorder issues while focusing on QOL, without analyzing the association of self-esteem (18, 19). Understanding the association of self-esteem and QOL of women in reproductive age who attended gynaecology clinics will contribute to the body of knowledge on how healthcare providers can meet the needs of women. This will also increase women's confidence substantially and they will be able to make sound decisions regarding their body process as they become more knowledgeable of themselves. Therefore, this study aimed to determine the menstrual irregularity, self-esteem, and QOL of women experiencing menstrual disorders among women of the reproductive age who attended the Gynaecology Clinic at a public hospital in Klang Valley.

MATERIALS AND METHODS

A cross-sectional study method was applied to this research using purposive sampling conducted among

287 women who attended Gynaecology Clinic at a public hospital in Klang Valley and fulfilled the inclusion and exclusion criteria. The hospital serves the district of Gombak, Petaling, and Kuala Selangor, with 40 per cent coverage of the total Selangor population. The inclusion criteria were women ages 18 to 49 years old attending Gynaecology Clinic who are voluntarily willing to participate in the study and understand Malay or English language. Meanwhile, the exclusion criteria are pregnant, lactating women, menopause, or those with chronic mental disorders (schizophrenia, bipolar, major depression). Out of 287 respondents that were recruited for this study, 253 respondents completed the questionnaire.

Study Instruments

A self-administered questionnaire was used for this research. The questionnaire consisted of closed-ended questions, which was divided into three parts, part 1, 2 and 3. Part 1 consists of demographic and menstrual history questions. In Part 2, The Rosenberg's Self-Esteem Scale (RSES) measures the self-esteem value (20). The questionnaire has ten items graded on 3-point- Likert scale, ranging from 0 to 3, representing the category of strongly disagree, agree, disagree and strongly disagree. Total score was obtained by summing across each item score ranging between 25 to 15. The higher the score, the higher the woman's self-esteem. The reliability of the RSES scale in Malay version has been tested within the Malaysian context with the value of Cronbach Alpha of > 0.80 (20).

Subsequently, to identify the level QOL of women experiencing menstrual disorders, –The World Health Organization Quality of Life Assessment (WHOQOL-BREF) was used (21). This questionnaire consist of 26 questions based on a 5-point Likert scale that includes two overall health assessment questions and 24 questions from 4 domains - physical, psychological, social, and environmental health. The scores were then linearly converted to a scale of 0 to 100. The higher the score, the better QOL experienced by the respondent. The Cronbach Alpha value for the Malay version of The World Health Organization Quality of Life (WHOQOL) questionnaire ranged from 0.64 to 0.80 (21).

Ethical consideration

The study received ethical approval from the Research Ethics Committee of Universiti Teknologi MARA, Malaysia (600-IRMI (5/1/6)), Medical Research and Ethics Committee (MREC) (KKM/NIHSEC/P19-2203(6)) and management of Sungai Buloh Hospital (Bil (170) HSB/CRC/770/21/01/06 Jld 14). Respondents in this study were recruited entirely on voluntary basis and had the right to refuse to participate in this research or withdraw at any time without any consequences.

Data Collection

The data was collected after screening for the eligibility

of the women according to the inclusion and exclusion criteria. The list of gynaecology cases was obtained from the nurse in charge of the clinic through the clinic information system. The respondent's selection was based on medical diagnosis, primary complaint, and age. Later, the selected respondents were approached for objective explanation, consent, and questionnaire distribution during the registration process. The respondents were informed that their participation is voluntary, and they are at liberty to withdraw from the study. All respondents were given ample time to complete the questionnaire while waiting for their appointment. The completed questionnaires were returned to the box located in front of the nurse's counter. The information gained from the study was kept confidential. All data obtained from this study were analysed and summarised using Statistical Package for Social Science (SPSS) program version 25.0. The analysis was conducted using descriptive and inferential statistics (i.e., simple linear regression), with a p-value less than 0.05 considered significant.

RESULTS

Demographic Characteristics of Respondents

Most of the respondents aged between 29 and 39 years old represent 52.2 %, while ages 40 and 49 have the smallest percentage (16.6 %) (Table I). The mean age is 32 years old (SD=7.34). Majority of the respondents were married. The result shows a high percentage of the respondents, 114 (45.1%), work in the private sector, followed by 74 (29.2%) were full-time housewives. According to BMI, 94 (37.2%) respondents had normal BMI followed by obese with 84 (33.2%).

Menstrual History Characteristics

In Table II, the majority of the respondents or 159 (63.3%), reported that they experienced menarche at 12 to 14 years old. 144 (56.9%) admit that they have a menstrual irregularity. 1.4% of the respondents never had a period of experience throughout their lives. The majority of the respondents, 181 (71.5%), have an average day of menses between 2 to 8 days. Only 70 (27.7%) of the respondents had prolonged bleeding days

Based on the result, 224 (88.5%) respondents reported pain during menstruation. Among those, the majority had a moderate level of pain, 113 (50.4%), followed by severe pain, 72 (32.1%) and mild pain 39 (17.4%). The respondents also had a combination of more than one type of menstrual disorder. Findings (Table II) revealed a high prevalence of respondents experiencing dysmenorrhea, which comprises of 224 participants (88.5%) followed by prolonged menstrual bleeding.

Levels of Self-Esteem in Women with Menstrual Disorder

A total of 221 (87.4%) women with menstrual disorders attending Gynaecology Clinic at Hospital Sungai Buloh have a normal level of self-esteem with an RSES

Table I: Demographic Characteristics

Variables	(f)	(%)
Age		
18-28	79	31.2
29-39	132	52.2
40-49	42	16.6
Marital Status		
Married	199	78.7
Single	54	21.3
Children		
0-2	209	82.6
3-5	38	15.0
6-8	6	2.4
Educational Level		
PMR/SPM	106	41.9
STPM/Certificate/Diploma	56	22.1
Degree	91	36.0
Occupation		
Government Sector	47	18.6
Private Sector	114	45.1
Self Employed	18	7.1
Not Working/Housewife	74	29.2
Income		
RM0-RM4000	231	91.3
RM4001-RM8000	21	8.3
RM8001-RM10000	1	0.4
Body Mass Index		
Underweight	10	3.9
Normal Weight	94	37.2
Overweight	65	25.7
Obese	84	33.2

Table II: Menstrual History Characteristics

Variables	(f)	(%)
Age of Menarche		
9 -11	67	26.7
12-14	159	63.3
15 - 17	25	10.0
Menstrual Regularity		
Yes	109	43.1
No	144	56.9
Pattern of Irregularity		
Once in 3 months	32	22.2
Once in 6 months	16	11.1
Once in 9 months	4	2.8
Once in a year	14	9.7
Never have bleeding	2	1.4
Others	76	52.8
Days of menses		
2 - 5 day	72	28.7
6 - 8 day	109	43.4
9 - 15 day	43	17.1
> 15 day	27	10.8
Menstrual flow		
Light	24	9.6
Moderate	125	49.8
Heavy	102	40.6
Pain during menstrual		
Yes	107	42.6
No	27	10.8
Severity of Pain		
Sometimes	117	46.6
Mild	39	17.4
Moderate	113	50.4
Severe	72	32.1
Type of menstrual disorder		
Dysmenorrhea	224	88.5
Prolonged menstrual bleeding	70	27.7
Menorrhagia	46	18.2
Amenorrhea	36	14.2

score >15. Meanwhile, the remaining 12.6% of the respondents reported a low level of self-esteem (Table III).

Table III: Self-esteem level

Variables	Category	(f)	(%)
Self-esteem level	Low <15	32	12.6
	High >15	221	87.4

The Quality of Life of Women with Menstrual Disorders

Generally, approximately half of the respondents or 47.8% evaluate and rate their quality of life as good, while 34.0% of respondents rated it as neither poor nor good (Table IV). The descriptive statistics for the four domains of quality of life showed that the mean of the physical domain is 58.52 (SD=12.67), the psychological domain is 59.89 ±13.52, the social relationship is 61.10 ± 13.62 and environment is 62.07 ± 14.27. On a scale of 100, respondents rated their QOL as moderate, with 62 being the highest and 58 being the lowest.

Table IV: Quality of Life Domain

Domain	Minimum	Maximum	Mean	Std. Deviation
Physical	9.14	16.57	12.67	1.36
Psychological	8.67	18.00	13.52	1.89
Social Relationship	4.00	20.00	13.62	3.30
Environment	9.50	20.00	14.27	1.85

The Association between Self-Esteem and Quality of Life

A simple linear regression was conducted to analyse whether self-esteem predicted the quality of life and all QOL domains among women with menstrual disorders. There was a significant association between self-esteem and four domain quality of life with the p < 0.05 (Table V). The findings indicated the change in self-esteem affected the physical domain by 86%, and the model is significant F (7,245) = 3.527, p = 0.04).

Table V: The Association between Self-Esteem and Domain Quality of Life

	b ^a (95% CI)	t statistic	p value*	r ²
Physical	1.12 (12.84,12.51)	4.86	< 0.001	0.860
Psychological	1.97 (13.76,13.29)	6.33	< 0.001	0.138
Social	1.77 (14.03,13.21)	3.081	< 0.001	0.330
Environment	2.01 (14.50,14.04)	6.63	<0.001	0.146

^asimple linear regression

The Relationship between Respondent Sociodemographic Characteristics with Quality of Life

The multiple linear regression analysis in Table VI meets the analysis’s assumptions that educational level affects the physical domain, p < 0.05. This suggests that women with educational level lower than a degree will have 1.025 lower quality of life in the physical domain. Furthermore, the multiple linear regression model confirmed and agreed that marital status and

Table VI: Regression Analysis Summary for Sociodemographic Variables with Quality of Life

Domain	Variables	B	95% CI	β	t	p
Physical	Educational Level	1.025	-0.102, 0.080	-0.085	-1.276	0.040*
	Marital Status	2.039	-6.016, 1.739	-0.250	-0.349	0.000**
Social Relationship	BMI	2.284	2.409, 0.632	0.225	3.810	0.000**
	Age	1.104	0.273, 0.217	0.100	1.257	0.018*

Reference group = Degree, single, obese and age group of 18-28

Note R2 = 0.015

Note R2 = 0.159

Note R2 = 0.025

* Significant at p < 0.05

** Significant at p < 0.01

BMI affect the social relationship, p< 0.05. As shown in Table VI, marital status significantly negatively affected social relationships (B=2.039, 95%CI -6.016 to 1.739, p=0.000), and BMI significantly affected social relationships (B=2.284, 95%CI 2.409 to 0.632, p=0.000). The analysis assumptions in the environmental domain, conclude that age affects the environment domain, p< 0.05. Women aged 29-39 will have a 1.104 higher quality of life (environment) than the reference group (18-28).

DISCUSSION

Half of the respondents for this study reported to experience menstrual irregularity. This is expected to be higher as all respondents visited the Gynaecological Clinic due to the underlying reproductive issues. Contrary to the study findings on menstrual irregularity worldwide which accounts only between 14.3% to 25.0%, notably lower than the present finding (5, 6). This difference can be attributed to the location of the study conducted in the urban area and the type of sampling method. The current research used purposive sampling rather than a random sampling method. Other than that, the difficulty women experience in obtaining care for menstrual problems and the lack of knowledge among primary care providers about protocols for the diagnosis and treatment of menstrual disorders are contributing factors to the underreported menstrual irregularity case, especially in rural areas. Furthermore, there is a significant association between physiological stress and menstrual problem (22). Stress affects hormonal production leading to abnormal ovulation and menstruation. In this study, most of the married respondents and resided in urban areas might perceive stress due to the high cost of living. Thus, stress factors may increase the number of menstrual irregularities among women.

Dysmenorrhea has been identified as the most common menstrual disorder women experienced in this study, with intensity levels ranging from moderate to severe. This prevalence is low compared to a previous study in Malaysia, which revealed the prevalence of dysmenorrhea 94% (12). However, it remains the same

as the common type of menstrual disorder identified. Nowadays, additional auxiliary support, such as a heating pad and pain medicine, may improve women's pain tolerance during menses. Additionally, this finding supports the work of other studies in Saudi Arabia which reported a high prevalence of dysmenorrhea (89.7%) as compared to abnormal vaginal bleeding (9.3%), amenorrhea (9.2%) and menorrhagia (3.4%) (19). The high prevalence in this study might reflect the respondent's level of awareness related to the respondent's overall higher level of education than secondary school education, which leads to a more heightened awareness of menstrual disorder presence (23, 24).

The Self-Esteem and Its Association with QOL

Reported finding from this study contradicts the previous research finding which stated that menstrual disorder leads to a loss of self-confidence (4, 25). Lack of emotional support related to the symptom that is considered a minimum, but prolonged makes those suffering go on through life without help. Specifically, one study showed that negative self-esteem was observed at the perimenstrual phase but became positive toward mid-cycle (25). The perimenstrual phase is known as the time of vulnerability. During this phase, the respondent experiences a higher level of depression due to the symptoms affecting their self-esteem than the mid-cycle phase. Thus, this finding summarised that all women experienced disruption of self-esteem, whether with or without the menstrual disorder.

There is a direct linear relationship between self-esteem and QOL based on the finding, which proves that self-esteem impacts the QOL of women. This finding rationalised the impact of self-esteem as perceived with the QOL depends on women's ability to adapt and other aspects such as controlling their working and family life (26). Although only 2.6% of respondents have a low level of self-esteem, the impact on their QOL is significant.

Similarly, lower self-esteem leads to poor quality of life in menstrual disordered women than those with the normal menstrual (15). Furthermore, irregular menstrual cycle play an important role in patient perceptions of infertility and indirectly lower self-esteem and overall health among women (27). Though the result reported that self-esteem is strongly connected with the QOL, their connection remains obscure. A possible explanation for this might be related to the experience of body shame and pain during menstruation, that is predicted to be worse and be a leading cause of underlying the association between self-esteem and QOL among women with the menstrual disorder (28). Unfortunately, this present study were unable to explore the hidden and individualised reason that can be an underlying factor which leads to the respondents' disruption of self-esteem and overall QOL.

The Quality of life and Its Association with Sociodemographic Characteristics

The respondent QOL is found to be disrupted from the aspects of physical, psychological, social relationships, and the environment domain in this study which was also similar to previous finding (29), which has identified that menstrual disorders have a direct negative effect on the QOL. Based on the recent finding, the most substantial impact was on the environment domain, which reflects on physical safety and security, home environment, financial, health and social care, and transportation aspects. In contrast, in the earlier part of QOL measurement as general, nearly half of the respondents, 47.8% evaluate and rate their quality of life as good. This can be attributed to the fact that general self-ratedness is mainly focused on an individual's perception. Still, the metric might be skewed due to additional confounders in physical, social relationships, psychological, and environmental based solely on theory (30).

The finding of this study showed a direct linear association between some of the listed sociodemographic characteristics with the quality of life, precisely according to the 4-domain. Specifically, the analysis showed a direct linear relationship between the physical domain and the educational level, thus confirming the menstrual disorder's effect. This finding agrees with other studies that identify those with lower educational levels were prone to poor physical health and QOL (31).

This study revealed the linear relationship of social relations domain between marital status and BMI. The domain includes aspects of personal relation, social support and sexual activity. In response to the marital status finding, higher QOL were seen among unmarried patients than married patients (32). The lack of a male partner's support impacts the woman's perceived severity of her disorder, leading to poor QOL. More than half of the respondents in this study (58.9%) have BMI over 25, considered overweight or obese. The impact of obesity during reproductive age can trigger many abnormalities and multiply the risk of developing non-communicable diseases such as hypertension, diabetes, and cancer(33). This finding may suggest the negative impact of obesity in social relationships related to social appearance and body image as it does not meet social attractiveness standards (34).

The significant relationship between the respondent age and environment domain was linked to the dimension of financial security, health and social care, and transportation based on WHOQOL-VREF measurement. This concludes that the frequency of thinking about financial security among women as they were getting older was negatively correlated, suggesting that frequent thoughts about financial security were associated with unpleasant emotions, although the data was unable to determine the direction of causality (35, 36). The calculation is based on the linear relationship between

age, ownership of a home, and transportation ownership. Additional financial worries among a woman were buying or renovating a home (11%), supporting children and paying tuition fees (10%), bills (6%), and health insurance (2%) (35,37). It can be inferred that women's feelings about financial security and the frequency of these thoughts may effectively relate with objective and subjective economic standards and policy outcomes to the broader psychological definition of wealth and health (38). This finding is a valid and meaningful factor in women's health construction that predicts life satisfaction and quality of life as a whole.

In describing the future status of women's health and well-being in life, preparing women for the transition from teenagers to young adults, middle-aged adults, and older adults are essential. This study revealed the impact of age, educational level, marital status and BMI among women with a menstrual disorder QOL as benchmarks for improvement. Therefore, the enhancement in improving this variable's aspect, such as BMI, will enhance women's QOL.

Implication and Limitation of the Study

This study indicates a high prevalence of menstrual irregularities and its impact on women's QOL. As a part of the medical team, nurses are responsible for raising public awareness of menstrual problems and their treatment. This will indirectly help women come for early treatment to reduce pain and suffering, thus improving their QOL. However, current study was limited to a single government hospital. Perhaps in the future, research might be conducted to obtain a larger sample size to allow for generalization from a few other government hospitals in Selangor. The different impacts of women with menstrual disorder QOL in urban and rural areas could be explored by including a range of research settings. Furthermore, this study employed the questionnaire solely; thus, respondents' perception of how their QOL and self-esteem were affected by menstrual disorder was unable to be included in the finding.

CONCLUSION

This study has explored a new dimension by deducing further information regarding menstrual disorder and its impact on self-esteem and a woman's quality of life at their reproductive age. The identification of sociodemographic characteristic association for both aspects have been identified and reported positive association, thus reflecting its impact on women's self-esteem and quality of life with menstrual disorder. Irregular menstruation is an essential indicator of current and potential health problems. Thus, evaluating the factors associated with irregular menstruation is necessary to determine appropriate preventive and treatment strategies. A higher prevalence of menstrual disorders, specifically dysmenorrhea and prolonged

menstrual bleeding requiring gynaecology examination and care in the hospital, was observed in the present study. Public health professionals should recognise the need for early education, detection, and intervention for at-risk populations and stress the importance of building a multidimensional understanding of the menstrual disorder, thus reducing the foreseen impact on women's health. Therefore, understanding the factors associated with menstrual disorders and their effect on women's QOL and self-esteem is essential to promoting women's menstrual and reproductive health.

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REFERENCES

1. Aref N, Rizwan F, Abbas MM. Frequency of Different Menstrual Disorders among Female Medical Students at Taif Medical College Obstetrics and Gynaecology Department Taif Medical College, KSA. *World Journal of Medical Sciences*. 2015;12(7):109–114. doi: 10.5829/idosi.wjms.2015.12.2.9350
2. Mahmood M, Jabeen N. Pattern of Menstrual Irregularities amongst Women Presenting to Gynecological Outpatient Department. *Journal of Islamabad Medical and Dental College*. 2013;2(1):9–12.
3. Kim T, Nam GE, Han B, Cho SJ, Kim J, Eum DH, et al. Associations of mental health and sleep duration with menstrual cycle irregularity: a population-based study. *Archives of Women's Mental Health*. 2018;21(6):619–626. doi:10.1007/s00737-018-0872-8
4. Negi P, Mishra A, Lakhera P. Menstrual abnormalities and their association with lifestyle pattern in adolescent girl of Garhwal, India. *Journal of Family Medicine and Primary Care*. 2018;7(4):804-808. doi: 10.4103/jfmpc.jfmpc_159_17.
5. Dovan RM, Ramezani Tehrani F, Djalalinia S, Cheraghi L, Behboudi GS, Azizi F. Menstrual cycle irregularity and metabolic disorders: a population-based prospective study. *PLoS One*. 2016;11. doi: 10.1371/journal.pone.0168402.
6. Jung EK, Kim SW, Ock SM, Song CH. Prevalence and related factors of irregular menstrual cycles in Korean women: the 5th Korean National Health and Nutrition Examination Survey. *Journal Psychosomatic Obstetric Gynaecology*, 2018 Sep;39(3):196-202. doi: 10.1080/0167482X.2017.1321631.7.

- National Institutes of Health. What causes menstrual irregularities; 2017. Available from <https://www.crossref.org/pdfs/annual-report-2015-16.pdf>. <https://blogs.savethechildren.org.uk/2010/09/young-female-and-pregnant-in-liberia/>
8. Harris HR, Titus LJ, Cramer DW, Terry KL. Long and irregular menstrual cycles, polycystic ovary syndrome and ovarian cancer risk in population-based case control study. *International Journal of Cancer*. 2017;140:285-291. doi: 10.1002/ijc.30441
 9. Munalula NK, Ahmed Y, Vwalika B. Factors associated with infertility among women attending the gynaecology clinic at University Teaching Hospital, Lusaka, Zambia. *Medical Journal of Zambia*. 2017;44 (1):41-44.
 10. Kwak Y, Kim Y, Baek KA. Prevalence of irregular menstruation according to socioeconomic status: A population-based nationwide cross-sectional study. *PLoS One*. 2019;14(3). doi:10.1371/journal.pone.0214071
 11. Duarte NS, Almeida Corrka LM, Assunçao LR, Menezes AA, Castro OB & Teixeira LF. Relation between Depression and Hormonal Dysregulation. *Open Journal of Depression*. 2017; 6(3), 69–78. doi: 10.4236/ojd.2017.63005
 12. Nur Azurah AG, Sanci L, Moore E, Grover S. The Quality of Life of Adolescents with Menstrual Problems. *Journal of Pediatric and Adolescent Gynecology*. 2013;26(2): 102–108. doi: 10.1016/j.jpag.2012.11.004
 13. Drosdzol-Cop A, Bąk-Sosnowska M, Sajdak D, Białk A, Kobiółka A, Franik G & Skrzypulec-Plinta V. Assessment of the menstrual cycle, eating disorders and self-esteem of Polish adolescents. *Journal of Psychosomatic Obstetric Gynaecology*. 2017; 38(1), 30-36. doi: 10.1080/0167482X.2016.1216959.
 14. Laksham KB, Selvaraj R, Kar SS. Menstrual disorders and quality of life of women in an urban area of Puducherry: A community-based cross-sectional study. *Journal of Family Medicine and Primary Care*. 2019;8 (1):137-140. doi: 10.4103/jfmpc.jfmpc_209_18.
 15. Unsal A, Tozun M, Aslan G, Ayranci U, & Alkan G. Evaluation of dysmenorrhea among women and its impact on quality of life in a region of western Turkey. *Pakistan Journal of Medical Sciences*. 2010; 26(1), 142–147.
 16. Karanth L & Liya SR. Prevalence and risk factor for dysmenorrhea among nursing student and its impact on their quality of life. *International Journal of Reproduction, Contraception, Obstetric and Gynecology*. 2018; 7 (7), 2661-2667. doi: 10.18203/2320-1770.ijrcog20182483
 17. Farquhar CM, Bhattacharya S, Repping S, et al. Female subfertility. *Nat Rev Dis Primers*, 2019;5:7. doi:10.1038/s41572-018-0058-8
 18. Gulbrandsen K, Hakonsen LB, Ernst A, Toft G, Lyngso J, Olsen J, et al. Age of menarche and time to pregnancy. *Human Reproduction*. 2014;29:2058–64. doi: 10.1093/humrep/deu153.
 19. Nor Asyikin Y, Nani D, Nor Azwany Y, Shamsul Kamal A, Imran A, Shaiful Bahari I, Rosediani M. Knowledge of and attitudes towards of menstrual disorders adults in north-eastern state of Peninsular Malaysia. *Malaysian family physician. Journal of Academy of Family Physicians of Malaysia*. 2015;10(3):2–10.
 20. Lim HL, Ling MY, Teh CH, et al. Construct Validity and Reliability of Rosenberg Self-Esteem Scale-Malay (RSES-M) Among Upper Secondary School Students in Malaysia. *Malaysian Journal of Medicine and Health Sciences*. 2019;15 (2):32-38.
 21. Hasanah CI, Naing L, Rahman ARA. World Health Organization Quality of Life Assessment; Brief Version in Bahasa Malaysia. *Medical Journal Malaysia*. 2003;58 (1) :79-88.
 22. Nazish R, Mona HAS. Prevalence of Menstrual Problems and Their Association with Psychological Stress in Young Female Students Studying Health Sciences. *Saudi Medical Journal*. 2018;39 (1):67-73. doi: 10.15537/smj.2018.1.21438
 23. Dars S, Sayed K, Yousufza Z. Relationship of menstrual irregularities to BMI and nutritional status in adolescent girls. *Pakistan Journal of Medical Sciences*. 2014;30 (1):141-144. doi: 10.12669/pjms.301.3949
 24. Weghofer A, Kim A, Barad DH, Gleicher N. Age at menarche: a predictor of diminished ovarian function? *Fertil Steril*. 2013;100:1039–43. doi: 10.1016/j.fertnstert.2013.05.042.
 25. Wahab A, Wilopo SA, Hakimi M, Ismail D. Declining age at menarche in Indonesia: a systematic review and meta-analysis. *Int J Adolesc Med Health*. 2018. doi: 10.1515/ijamh-2018-0021.
 26. Zhang Q, Wang YY, Zhang Y, et al. The influence of age at menarche, menstrual cycle length and bleeding duration on time to pregnancy: a large prospective cohort study among rural Chinese women. *BJOG*. 2017;124(11):1654-1662. doi:10.1111/1471-0528.14469
 27. Rafique N, Al-Sheikh MH. Prevalence of menstrual problems and their association with psychological stress in young female students studying health sciences. *Saudi Med Journal*. 2019;39(1):67-73. doi:10.15537/smj.2018.1.21438
 28. Toffol E, Koponen P, Luoto R, Partonen T. Pubertal timing, menstrual irregularity, and mental health: results of a population-based study. *Arch Womens Ment Health*, 2014;17: 127–135. doi: 10.1007/s00737-013-0399-y.
 29. Vanitha D, Shanthi E, Suresh V, Muthuthandavan AR. A Community Based Study on Menstrual Disorders Among the Rural Women of Reproductive Age. *International Journal of Women's Health and Reproduction Sciences*, 2017; 5(4):270-276. doi: 10.15296/ijwhr.2017.46

30. O'Flynn N. Menstrual symptoms: The importance of social factors in women's experiences. *British Journal of General Practice*, 2006;56(533):950–957.
31. Acmaz G, Albayrak E, Acmaz B, Başer M, Soyak M, Zararsız G, İpekMüderriş I. Level of Anxiety, Depression, Self-Esteem, Social Anxiety, and Quality of Life among the Women with Polycystic Ovary Syndrome. *The Scientific World Journal*.2013;851815. doi: 10.1155/2013/851815.
32. Sveinsdyttir H. Menstruation, objectification and health-related quality of life: A questionnaire study. *J Adv Nurs*.2017;73(6):1390-1402. doi:10.1111/jan.13220.
33. Seif MW, Diamond K , Nickkho-Amiry M. Obesity and Menstrual Disorders. *Best Pract Res Clin Obstet Gynaecol*.2015;209 (2):202. doi: 10.1016/j.bpobgyn.2014.10.010.
34. Oh BG, Chen SR, Song CH et al. Quality of life and menstruation in adolescents. *Curr Opin Obstet Gynecol*, 2015;27(5):309-314. doi:10.1097/GCO.0000000000000199
35. Eriksson I, Undén AL, Elofsson S. Self-rated health; Comparisons between three different measures. Results from a population study, *International Journal of Epidemiology*. 2011;30 (2):326–333. doi:10.1093/ije/30.2.326
36. Yang KT, To EC . Is marital status associated with quality of life?. *Health and quality of life outcomes*.2015;12:109. doi:10.1186/s12955-014-0109-0.
37. Lehnert T, Sonntag D, Konnopka A, Riedel-Heller S, Kunig HH. Economic costs of overweight and obesity. *Best Pract Res Clin Endocrinol Metab*. 2013;27(2):105–15. doi: 10.1016/j.beem.2013.01.002.
38. Hajek A, Kunig H. The association between obesity and social exclusion in middle-aged and older adults: findings from a nationally representative study in Germany. *BMC Geriatric*.2018;18: 258. doi:10.1186/s12877-018-0946-5