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Original Article

The Influence of Gadgets on Menstruation of Medical student in Indonesia

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Abstract

Background: Menstruation is bleeding that comes out of the vagina periodically and cyclically in the corpus uteri accompanied by pregestational endometrial desquamation as a sign of the process of maturity of the reproductive organs and fertility in women. Not all women have normal periods. Menstrual disorders are one of the gynecological problems affecting women of childbearing age with a global prevalence of 30-70%. In Indonesia, as many as 13.7% of 68% of women experience irregular menstruation, and 30% of women experience changes in menstrual patterns. The increasing prevalence of gadget use globally with a high level of mass media exposure results in disruption of menstruation supported by various factors.
Aim: Identify and measure the influence of gadgets on menstrual disorders.
Method: Probability proportional to size sampling through the provision of questionnaires with certain criteria to all female students of the class of 2020, then from 200 samples, research subjects who met the inclusion criteria were obtained as many as 134 people.
Results: The highest duration of gadget use is 9-16 hours / day (weight) while menstrual symptoms ($p = 0.876$), length of menstrual days ($p = 0.891$), menstrual rhythm ($p = 0.849$), and menstrual distance to the next period ($p = 0.651$) so there is no significant relationship between the use of gadgets and the menstruation of female students.
Conclusion: There was no significant relationship between the duration of gadget use and the menstruation of female students.

INTRODUCTION

Menstruation is bleeding coming out of the vagina that occurs periodically and cyclically in the corpus uteri accompanied by detachment (desquamation) of the progestational endometrium between menarche and menopause. (Dwi Prayuni, Imandiri, and Adianti 2018; Igbokwe 2021) Menstruation is closely related to fertility rates in women. But not all women have normal periods. (Aesthetica and Farida 2019; Critchley et al. 2020)

Menstrual disorders are one of the most common in gynecological problems affecting women of childbearing age with a global prevalence of 30-70%. In Lebanon, in a study on the development and pattern of menstrual symptoms among female students, data obtained on the most common menstrual disorders were the frequency of menstrual irregularities (80.7%), premenstrual syndrome (54.0%), variable menstrual duration (43.8%), dysmenorrhea (38.1%). %), polymenorrhoea (37.5%) and oligomenorrhoea (19.3%). The U.S. reports 90% of the prevalence of women experiencing dysmenorrhea and becoming a public health problem. (Odongo et al. 2023; Igbokwe 2021) Based on Riskesdas (2013), most of the 68% of women in Indonesia aged 10-59 years stated that as many as 13.7% experienced irregular menstrual problems, as many as 30% of women will experience changes in menstrual blood flow volume or pattern, which is defined as symptoms of abnormal uterine bleeding (AUB) which in turn can be caused by various etiologies and sometimes more than 1 etiology at the same time.

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One of them is mass media exposure.(Prasetia and Rudiyanto 2019; Critchley et al. 2020; Astuti Nurfa, Kristina, and Suweni 2023)

In today's technological era, gadgets have become one of the mandatory human needs and become the main facilities that can be used in various sectors of life. This is the cause of high dependence on the use of gadgets (smartphones). Exposure to gadget radiation can cause injury to the structure and function of various organs, such as the brain, heart, reproductive organs, and endocrine organs, which endanger human health. (Lai, Wang, and Peng 2021; Sinik 2019; Ali and Professor Journalism and 2021) Based on Newzoo 2019 it is said that gadget users globally in 2019, there were 3.8 billion active users with an increase of 5.6% from the previous year. In 2022, it still has an increase reaching at least 3.9 billion users. Indonesia is listed as the fifth rank of countries using gadgets, especially smartphones. The most users in Indonesia are those with the age group of 15-19 years followed by the age group of 20-24 years and children aged 5-9 years. From these three groups, it shows that teenagers contribute a lot to the active use of gadgets.(Marendeng Majene 2020; Wong and Bahmani 2022; Akkam et al. 2020)

The high prevalence of gadget use can result in menstrual disorders supported by various factors such as, stress, lifestyle, physical activity, medical conditions, hormonal abnormalities and nutritional status. This is a parameter to find and know the picture of the influence given from the use of gadgets on menstruation. (Aesthetica and Farida 2019; Irshad, Aijaz, and Husain 2022; mohammed amin and Faraj 2021)

METHOD

The type of research in this study is descriptive analytic with data collection through a cross sectional approach to identify the presence or absence of the influence of the independent variable on the dependent variable. To determine the sample size, collection is carried out through probability proportional to size sampling techniques, where the probability of selecting a sample unit is equal to the size of the population. Data collection was carried out using primary data, namely by using research instruments with questionnaire techniques with certain criteria to all female students of the class of 2020, then from 200 samples, research subjects who met the inclusion criteria were obtained as many as 134 people. Data analysis was carried out using univariate analysis to see frequency distribution and bivariate analysis to see the relationship between independent variables and dependent variables using the Chi-Square statistical test.

RESULTS

From 200 samples, 134 research subjects met the inclusion criteria. The following complete data includes a comparison of independent variables and dependent variables obtained.

Table 1. Duration of Gadgets Light Medium Heavy

	Symptoms of menstruation			**Total**	**P-Value**
Gadget	Light	Moderate	Heavy		
Duration	F (n)	F (n)	F (n)		
Light	3	0	0	3	0.876
Moderate	28	4	0	32	
Heavy	87	10	2	99	
Total	118	14	2	134	

In the table above, the P Value value is indicated by the Asymptotic Significance value. If the P Value value > the critical limit of the research value α (0.05). So that the chi-square independence test informs that there is no significant association between the duration of gadget use and menstrual symptoms experienced by a person, where X2(4) = 1.211, p = 0.876

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Table 2. Frequency distribution of gadget duration with length of menstrual days

Gadget Duration	Length of Menstrual Days			Total	*P-Value*
	Hypomenorrhea	Normal	Hypermenorrhea		
	F (n)	F (n)	F (n)		
Light	0	3	0	3	0.891
Moderate	0	30	2	32	
Heavy	2	93	4	99	
Total	2	126	6	134	

In the table above, the P Value value > the value of α (0.05) so that the chi-square independence test informs that there is no significant association between the duration of gadget use and the length of a person's menstruation, where X2(4) = 1.129, p = 0.891.

Table 3. Frequency distribution of gadget duration with menstrual distance to the next menstruation

Gadget Duration	Menstrual Distance to Next Menstruation				Total	*P-Value*
	Amenorrhea	Polymenorrhea	Normal	Oligomenorrhea		
	F (n)	F (n)	F (n)	F (n)		
Light	0	0	3	0	3	0.651
Moderate	1	0	31	0	32	
Heavy	6	2	84	7	99	
Total	7	2	118	7	134	

In the table above, the P Value value is indicated by the Asymptotic Significance value. If the P Value value > the critical limit of the research value α (0.05). So that the results of the chi-square independence test inform that there is no significant association between the duration of gadget use and the distance of menstruation to the next menstruation, X2(6) = 4.188, p = 0.651.

DISCUSSION

Based on age characteristics, the most results were obtained namely respondents aged 21 years as many as 68 students (50.7%) and the average experienced menstruation for the first time (menarche) at the age of 13-14 years. In theory, normal menarche age generally occurs at the age of 11-14. Menarche occurs earlier at the age of 9 years, or later at the age of 15 years as a sign of the process of maturity in the reproductive organs and is closely related to fertility rates in women. Although there are still those who experience more recent menarche, this is related to other factors that are concerned and have an effect on a person's physical development. (Aesthetica and Farida 2019; Juliyatmi et al. 2015)

Based on the table above, respondents who used light, moderate, or heavy category gadgets found that 118 female students experienced mild menstrual symptoms, 126 female students with normal menstrual duration, as many as 123 female students experienced regular menstrual patterns, and 118 received menstruation every month. This shows that only a small percentage have a history of menstrual disorders. This is in accordance with previous research that reports that a person's menstruation occurs regularly if a teenager has reached the age of 17-18 years and above, but can also occur after 3-5 years of age. (Aesthetica and Farida 2019; Draper et al. 2018)

According to Greendale, G. A. et al. Exposure to large and long doses of radiation with artificial lighting will trigger the formation of free radicals in the body and inhibit the production of endogenous melatonin hormone. Both of these factors will trigger a decrease in sleep quality and time and form oxidative stress in a person. (Greendale et al. 2020; Olcese 2020)

According to Nepomnaschy 2018. A correlation was found between stress and menstrual problems. Students who experienced stress had increased odds ratios of 2 times, 3 times, and 4 times for dysmenorrhea,

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amenorrhea, and premenstrual syndrome ($p < 0.05$). The results of this study are following the theory, that when a person-experiences increased stress, a neuroendocrine response occurs so that CRH stimulates the secretion of ACTH which will increase the secretion of adrenal cortisol. These hormones stimulate the secretion of FSH and LH which is inhibited so that progesterone cannot be synthesized and released. Low levels of progesterone in the body will provide an increase in prostaglandin synthesis so that PGF2ά activation will increase which then causes ischemia of myometrial cells and increased uterine contractions continuously. Excessive contractions will cause a person to experience dysmenorrhoea. This is in line with other studies that report that stress can interfere with the work of the endocrine system so that it can affect menstruation such as irregularities in both cycle and rhythm each month and pain during menstruation (dysmenorrhea). (Olcese 2020; Petraglia et al. 2017; Negi, Mishra, and Lakhera 2018)

Based on the results of research data analysis that has been done, the hypothetical decision is to accept H0 which means there is no significant influence from the use of gadgets on menstruation either from the symptoms felt, the length of menstruation, menstrual rhythm, or its influence on the distance of menstruation to the next menstruation. This is in line with other research. With exposure to lighter doses of radiation, some may cause no symptoms. (Kelting 2021; Sinik 2019; Manasa Rekha, Mathappan, and Info 2020)

In case-control research from Barsam et al. Mentioning both users and non-users of electromagnetic equipment that produces ELF (Extremely Low Frequency), both have the same sleep quality. Users with 2G, 3G, and 4G cellular networks have microwaves of 600 Mhz-3.5 GHz which are relatively low. 5G cellular networks have frequency waves in or near the 24-52 GHz frequency band range which is classified as high. Most likely this effect is not so real because the ELF equipment used has a low or different level of emissions. Other studies also report that the older a person gets, the ability to manage stress will increase better. This may be following the results of the study obtained where the largest percentage of respondents have normal menstruation even with prolonged radiation exposure or weight categories. (Kelting 2021; Olcese 2020; Steller, Alberts, and Ronca 2018)

WHO also states that in the International EMF Project showing that there is scientific evidence regarding the possible health impacts of electromagnetic fields (EMFs) and exposures to many parts of the frequency spectrum, the overall review shows that, as long as such exposures fall below the limits recommended under the International Commission on Non-Ionizing Radiation Protection (ICNIRP)'s EMF guidelines (1998) covering the full frequency range of 0–300 GHz, So the frequency exposure obtained does not have an impact on health that may be detrimental. (Tuieng et al. 2021)

Thus, the use of gadgets has no relationship with menstrual cycle irregularities, menstrual symptoms, menstrual duration, or menstrual rhythm. So it is necessary to do more research on female students who may complain of other causes of menstrual problems before gadgets are assumed to be the cause.

CONCLUSION

Based on the results of the study, it is known that the duration of the most laptop use is the medium category (5-8 hours) and the duration of the most device use is the weight category (9-16 hours) while the majority of respondents experience a good menstrual history. This shows that there is no significant relationship between gadgets and menstruation. For this reason, further research needs to be done related to the activity of using gadgets with menstrual pattern disorders by using and controlling outside variables that affect menstruation such as psychological conditions, and it is important to know the relationship between the dose of gadget radiation exposure with the level of stress events that can affect further menstrual disorders. For this reason, it is hoped that everyone can limit the use of tools that emit electromagnetic wave radiation because of the many impacts that can be caused to health.

Ethical Clearance

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Declaration of Conflicting Interest

This research will not cause problems when published and the results of this study are only to add insight and knowledge about the presence or absence of a relationship between gadgets and menstruation.

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