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Prevalence and Predictors of Dysmenorrhea and its Impact on Quality of Life among Tribal Adolescent Girls in India

Sharvanan E Udayar[1], Devika P Jeergiyal[2], Kruthika K[1] ✉

[1]Kodagu Institute of Medical Sciences Government of Karnataka India
[2]Apollo Institute of Medical Sciences Chittoor - Andhra Pradesh India

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Abstract

Many girls are faced with the challenge of Dysmenorrhea during their adolescent years. Therefore, this study aimed at finding the prevalence of Dysmenorrhea, its risk factors, and its impact on quality of life among teenage girls residing in tribal welfare hostels. After obtaining informed consent, a cross-sectional survey was conducted among 582 adolescent girls residing in tribal welfare hostels in southern India. Data was collected by purposive sampling technique, and the mean, standard deviation and percentages, and frequencies were applied for summarizing the continuous and quantitative variables. Additionally, multinominal regression analysis was performed to determine the factors associated with Dysmenorrhea. The results indicated the prevalence of Dysmenorrhea was 58.4%, while 48.8% of participants reported physical premenstrual symptoms. Furthermore, there is a significant association between those experiencing moderate to severe pain and Dysmenorrhea (p<0.000). Association between factors such as prolonged menstrual duration [AOR,3.4(95%CI,1.49-7.81)], those having moderate [AOR,5.78(95% CI,1.96-17.02)] to severe menstrual bleeding [AOR, 5.1 (95% CI, 1.78-14.08)], family history [AOR, 3.5 (95%CI,2.30-5.54)]and somatic symptoms [AOR,2.03 (95%CI, 1.33-3.08] were statistically significant. In conclusion, Dysmenorrhea had a significant impact on quality of life since the girls could not attend routine activities. Therefore, incorporating reproductive health issues in education programs will encourage treatment-seeking behaviour among the girls.

INTRODUCTION

Adolescence is a transition period from childhood to adulthood involves dramatic physical, sexual, psychological and social developmental changes, all taking place at the same time. In addition to opportunities for development this transition poses risks to their health and well-being. There are about 350 million adolescents comprising about 22% of the population in the countries of the South-East Asia Region (SEAR). Adolescents are not a homogenous population. They exist in a variety of circumstances and have diverse needs (World Health Organization, 2020).

Menstruation is a normal physiological process that begins during adolescence which is characterized by periodic and cyclic shedding of progestational endometrium which is associated with loss of blood. Evaluation of menstrual cycle is a vital component in assessing the overall health status of female, as it highlights the reproductive hormonal status of the female, and

✉ Correspondence Address:
Kodagu Institute of Medical Sciences Government of Karnataka India
E-mail: kruthikakishore@gmail.com

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can predict future risks (Borjigen et al., 2019).

The onset of menarche is considered as one of the major physiological changes that take place in adolescent girls which is often associated with problems of excessive bleeding, irregular menstruation, and dysmenorrhoea. Among these dysmenorrhoea is the most common problem encountered by most of the adolescent girls.

Dysmenorrhea is caused due to an imbalance in the progesterone, the hormone which causes uterine contractions inturn stimulate the pain response of each individual. Based on the underlying pathophysiology, there are two types of dysmenorrhea, namely primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea occurs in women of childbearing age in the form of pain in the lower abdomen which can disrupt their quality of life. Dysmenorrhea often interferes with teenagers' productivity and influences coping abilities. (Chan & Desmawati, 2019).

Studies done Ethiopia reported prevalence of dysmenorrhea around 64.7%. Two thirds of adolescent girls reported school absenteeism due to impact of menstrual pain (Azagew et al., 2020; Giletew & Bekele, 2019; Tadese et al., 2021).There was a significant impact on academic activities such as poor class concentration ranging from 59% to 74% and school absenteeism from 18% to 50% as reported by studies done in various parts of the world (Banikarim et al., 2000; Chongpensuklert et al., 2008). Many studies conducted in India reported that the prevalence of dysmenorrhea varies from 33% to 79% associated with impact on quality of life in terms of interruption of educational and social life (Anikwe et al., 2020; Helwa et al., 2018; Fernández-Martínez et al., 2019; Agarwal & Agarwal, 2010; Sharma et al., 2008). These literature indicating an urgent need for addressing these important issues of menstrual health and its impact on quality of life in most vulnerable population.

However, literature on prevalence of dysmenorrhoeal among the adolescent girls belonging to scheduled tribe and backward communities who belong to the most marginalized section of the society is sparse. Hence this study was conducted with the objectives of: (1). To find out the prevalence and predictors of dysmenorrhea and its impact on quality of life; and (2). To describe the measures or actions taken during the dysmenorrhea by tribal adolescent girls residing in tribal and social welfare hostels.

METHOD

A community based cross sectional study was conducted among the adolescent girls aged 10-19years who were residing in the social and tribal welfare hostel in the Paramasamudram village of Kuppam Mandal of Chittoor Disrtict. Andhra Pradesh (as this was the only hostel meant for adolescent girls of trial community in the district) from April to September 2019. A total of 596 adolescent girls were residing in the hostel studying in various classes from secondary school to higher secondary school. We applied Leslie Kish formula for cross-sectional study designs for determining the sample size (Kish, 1965). Considering prevalence of 79% from the previous study (Fernández-Martínez et al., 2019) with 95% confidence interval and 5% allowable error the estimated sample size was around 417. Assuming 20% non-responsive rate the final sample became 582. The study was approved by the Institutional Ethics Committee (KoIMS/IEC/16/20-21). Permission from Assistant Social Welfare Officer and Assistant Tribal Welfare Officer was obtained for conducting the study and the wardens were intimated prior accordingly.

Purposive sampling technique was used for selection of study participants. A pre-tested semi structured proforma was applied for data collection which included variables like sociodemographic profile, menstrual characteristics, and dysmenorrhea status and questions related to quality of life such as physical activity, school attendance and also on various practices of treatment seeking for dysmenorrhea. Body mass indexes (BMI) – of the participants were classified according to World Health Organisation (WHO Expert Consultation, 2004). Those who reported painful menstrual periods in the last 6 months were

considered to be having dysmenorrhea (Patel et al., 2006). The second part of the questionnaires included visual analogue scale (VAS) of 0-4, to assess their pain (where zero was considered as least intensity of pain and 4 as pain severe enough to confine a participant to home/ bed) and modified quality of life scale which was originally devised by American Chronic Pain Association (American Chronic Pain Association, 2017).

Physical and psychological symptoms were included for evaluating the presence or absence of premenstrual symptoms. Physical symptoms were classified into abdominal symptoms (hypogastric pain, abdominal bloating), breast symptoms (breast tenderness/ heaviness) and other nonspecific symptoms (pain in thighs, headache, backache). Psychological symptoms like anxiety, disturbed sleep and uneasiness were included (Armour et al., 2019).

The collected data was checked coded and entered in MS-Excel and exported to SPSS Windows version 20 for analysis. Percentages, Chi square test and Fishers exact test were applied for categorical data. In order to determine the factors associated with dysmenorrhea binary logistic regression model was performed and those with p- value less than 0.05 were considered for multivariable logistic regression analysis. Unadjusted Odds Ratio (UOR) and Adjusted Odds Ratio (AOR) with 95 % CI were calculated by bivariate and multivariate logistic regression respectively. Statistically significant association was considered for variables with p-value less than 0.05 in the multivariate logistic regression.

RESULTS AND DISCUSION

The average age of the participants was 14.85 years +/- 1.36 years (ranging from 10-19 years). 45.7% (266) were found to be less than 14 years of age whereas 54.3% (316) were above 15 years of age. The mean Body Mass Index (BMI) of the participants was 18.46 +/- 2.76 kg/m^2 (ranging from 12.1 kg/m^2 to 32.5 kg/m^2). Majority of the participants had a normal BMI (18.5-23.5 kg/m^2) which was around 44% of the total participants. The underweight and overweight categories had almost 50.8% were and 5.2% respectively.

Table 1. Distribution of study participants according to gynecological related characteristics (n=582)

Variables	Frequency	Percentage
Age (in years)		
10-14	266	45.7
15-19	316	54.3
BMI		
Underweight	296	50.8
Normal	256	44.0
Overweight & Obese	30	5.2
Age at menarchy (years)		
<12	28	4.8
12-14	522	89.7
15-19	32	5.5
Length of cycle (days)		
<21	10	1.7
21-35	514	88.3
>35	58	10.0
Duration of menstruation (days)		
<3	534	91.8
>3	48	8.2
Nature of menstrual flow		
Mild	24	4.1
Moderate	194	33.3
severe	364	62.6
Monthly menstrual cycle		
Regular	478	82.1
Irregular	104	17.9
Family history of Dysmenorrhea		
Present	406	69.8
Absent	176	30.2

The average age at menarche was 13.04+/- 0.93years, (11 to 16 years). Among the 582 respondents a large chunk (88.3%) of students had menstrual cycle duration of 21 to 35 days; which is considered as normal and around 95% (558) had moderate to severe menstrual bleeding. Majority (82.1%) were having regular menstrual cycles. About two third of the students reported family history of dysmenorrhea (Table1).

Table 2 shows the association between prevalence of dysmenorrhea and its predictors. The prevalence of dysmenorrhea was high with

Table 2. Binary and Multivariate logistic regression analysis of variables with dysmenorrhea

Variables	Dysmenorrhea		AOR**, 95% CI	p
	Yes	No		
Age at Menarchy (years)				
<12	16(4.7)	12(5)	0.87 (0.37-2.08)	0.76
12-14	312(91.8)	210(86.8)	0.46 (0.14-1.4)	0.18
15-19	12(3.5)	20(8.3)	1	
Length of cycle (days)				
<21	6(1.8)	4(1.7)	1	
21-35	290(85.3)	224(92.6)	2.15(0.55-8.4)	0.27
>35	44(12.9)	14(5.8)	4.19(0.92-19.20)	0.06
Duration of menstruation (in days)				
<3	300(88.2)	234(96.7)	1	0.004
>3	40(11.8)	8(3.3)	3.40(1.49-7.81) *	
Nature of menstrual flow				
Mild	6(1.8)	18(7.4)	1	
Moderate	116(34.1)	78(32.2)	5.78(1.96-17.02)	0.001
Severe	218(64.1)	146(60.3)	5.14(1.78-14.08) *	0.002
Monthly menstrual cycle				
Regular	270(79.4)	208(86.0)	1	0.86
Irregular	70(20.6)	34(14.0)	0.95(0.53-1.71)	
Family history of Dysmenorrhea				
Present	136(40.0)	40(16.5)	3.57(2.30-5.54) *	0.000
Absent	204(60.0)	202(83.5)	1	
Physical symptoms				
Present	194(57.1)	90(37.2)	2.03(1.33-3.08) *	0.001
Absent	146(42.1)	152(62.8)	1	
Psychological symptoms				
Present	282(82.9)	174(71.9)	1.48(.90-2.45)	0.12
Absent	58(17.1)	68(28.1)	1	

*p<0.05 statistically significant, **Adjusted Odds Ratio

58.4% (340). Of the total 582 adolescents 48.8% (284) participants reported to have physical premenstrual symptoms. These were broadly classified into abdominal symptoms (abdominal pain, bloating), breast heaviness, and other symptoms (headache, backache, pain in thighs). Of them abdominal symptoms were reported by 57 % (162) while breast heaviness was reported by only 43% (122) of the women. Majority, 78.4% (456) of the surveyed women reported to have experienced some form of psychological premenstrual symptom. Out of these, 38% (173) of the subjects had experienced uneasiness whereas 28% (127) reported anxiety as the main problem.

Predictors of dysmenorrhea

We did multivariate model logistic regression to find out the predictors of dysmenorrhea (Table2). After doing adjustment for age at menarche, length of the cycle, duration and the nature of menstrual flow, family history of dysmenorrhea ,physical and psychological symptoms, there was significant association between factors like prolonged menstrual duration (AOR, 3.40 (95% CI,1.49-7.81; p-0.004), those who were having moderate (AOR, 5.78(95% CI, 1.96-17.02; p - 0.001) to severe menstrual bleeding (AOR, 5.14 (95% CI, 1.78-14.08;p - 0.002) ,positive family history (AOR, 3.57 (95% CI, 2.30-5.54;p-0.000) and also with respect to somatic symptoms (AOR, 2.03 (95% CI, 1.33-3.08;p-0.001). However there was no significant association between age at menarche, prolonged menstrual cycle, irregular menstrual cycles, psychological symptoms and the dysmenorrhea.

Impact of dysmenorrhea on quality of life

Table 3 shows the effect of dysmenorrhea on quality of life of the study participants. There was significant association between those experiencing moderate to severe pain and the dysmenorrhea (p<0.001). Majority (84.2%) of

Table 3. Distribution of study participants based on effect of dysmenorrhea on quality of life n (%)

Variables	Dysmenorrhea		p value
	Yes	No	
Pain intensity			
Mild	106(31.2)	224(92.6)	0.000
Moderate	210(61.8)	18(7.4)	
Severe	24(7.1)	0(0)	
Sickness Absenteeism			
Yes	286(84.2)	14(5.7)	0.000
No	54(15.8)	228(94.3)	
Daily Physical activity			
Affected	166(48.8)	106(43.8)	
Not affected	174(51.2)	136(56.2)	0.23

those who reported dysmenorrhea did not attend their routine academic activities and this was found to be statistically significant ($p<0.001$).However there was no association between physical activities and dysmenorrhea.

Coping mechanisms during dysmenorrhea

In our study we also collected information on various measures and actions adopted by the study participants to overcome the pain and stress during dysmenorrhea (Table 4). Almost two fifth (44.7%) of them ignored the pain during menstruation, followed by bed rest (33.5%), self-medication (16.5%), hot application (4.1%) and home remedies (1.5%).around forty percent of them were managing the effects of dysmenorrhea by themselves ,one fourth of them sought assistance from friends and only14.7% of the participants were seeking help from the teachers.

Nearly one fifth of population in India is represented by adolescent group and also the country's adolescent girls population is highest in the world (Chandramouli, 2011). In the present study the prevalence of dysmenorrhea was 58.7%. Similar findings were reported in India by Ahuja et al. (2016), Omidvar et al. (2016) and Armour et al. (2019); in Ethiopia by Azagew et al. (2020); and in Canada by Burnett et al. (2005). Our study findings was higher when compared to study done in Gujarat in which the prevalence of dysmenorrhea was 45% (Shah et al., 2013) and 52.07% in adolescent population of Tbilisi (Gagua et al., 2012) and 46.5% in Japan (Kazama et al., 2015). On the other side the current study findings was lower than the findings reported in Gwalior in which the figure was as high as 79.7% (Agarwal & Agarwal, 2010) and various studies across the globe (El-Gilany et al., 2005; Gulzar et al., 2015 Khalid et al., 2020; Habibi et al., 2015; Unsal et al., 2010). These variations in reported prevalence can be attributed to differences in selection methodology for participants and also due variations definitions applied for dysmenorrhea.

Our study reported a significantly increased odds of association between dysmenorrhea and factors like lengthy menstrual duration, moderate to heavy menstrual flow which is similar to findings reported in Italy (Balbi et al., 2000) Egypt (Mohamed, 2012) and among adolescent girls rural areas of Ghana (Acheampong et al., 2019)This might be due to excess prostaglandin production in the

Table 4. Measures and actions taken by study participants during dysmenorrhea

Variables	Dysmenorrhea		Total
	Yes	No	
Measures taken			
Consult a doctor	56(16.5)	48(19.8)	104(17.9%)
Hot application	14(4.1)	0(0)	14(2.4)
Home remedies	4(1.5)	6(2.5)	10(1.7)
Self medication & Bed rest	114(33.5)	22(9.1)	136(23.4)
Ignore the pain	152(44.7)	166(68.7)	318(54.6)
Actions taken			
Inform class teacher & seek help	50(14.7%)	30(12.4%)	80(13.7)
Inform friends & get help	82(24.1%)	18(7.4%)	100(17.2)
Manage the situation by self	144(42.4%)	140(57.9%)	284(48.8)
Ask permission from teacher	64(18.8%)	54(22.3%)	118(20.3)

endometrium and release of vasopressin during menstrual flow resulting in increased uterine contraction and severe pain .moreover dysfunctional uterine bleeding in relation to anovulation is one of the most common cause for heavy bleeding among the adolescents (Acheampong et al., 2019).

Our study revealed those who are having family history of dysmenorrhea have three and half times more likely chances of developing dysmenorrhea when compared to those who do not (AOR, 3.57 (95% CI, 2.30-5.54; p<0.001) .This is in comparable with studies done north eastern part of India (Patel et al., 2006), Ethopia (Azagew et al., 2020), and school going adolescent girls in Parakou (Sidi et al., 2016). This can be due to influence of genetic relationship between mother and the daughter as reported by various studies (Azagew et al., 2020).

Our study revealed a significant association between physical premenstrual symptoms and dysmenorrhea. More than half (57.1%) of those who were experiencing dysmenorrhea were having physical symptoms such as abdominal pain, bloating, breast heaviness.Odds of having physical symptoms was twice than those without physical symptoms (AOR, 2.03 (95% CI, 1.33-3.08; p<0.001) which is in consistent with findings of studies done in Gwalior (Agarwal & Agarwal, 2010) and by and in rural parts of France (Jarret et al., 1996).

In our study almost ninety percent of those who were experiencing dysmenorrhea were in the age group of 12 to 14 years but we could not find any association between these two and this is in similar to findings reported in South India (Omidvar et al, 2016) and in Ghana (Acheampong et al., 2019). This might be due to less chances of older women reporting pain during dysmenorrhea as reported in nursing college students (Weissman et al., 2004).

We also found no significant association between rhythm of menstrual cycles and dysmenorrhea (p>0.86) (Andersch & Milsom, 1982) and this in contrast to several studies (Omidvar et al., 2016 Munro et al., 2021; Azagew et al., 2020; Agarwal & Agarwal, 2010; Sidi et al., 2016) reporting a strong association .this is probably due to difference data collection procedure such as interview with the study subjects and differences in perception of menstrual cycles which might be due to recall bias.

Furthermore, 84.2% of the adolescent girls with dysmenorrhea reported absent from their school activities and this association was statistically significant. Although there is higher percentage of absenteeism in our study which is similar to findings among Thai adolescent girls in (Tangchai et al., 2004) where it was 80.6%, studies across India and around the world reported school absenteeism due to dysmenorrhea ranging from 5 to 57% (Femi-Agboola et al., 2017; Vashisht et al., 2018; Omidvar et al., 2016). These differences may be wide variations in cultural perceptions within the country and across the globe and also due to dissimilarities in responses to pain during menstruation.

Again nearly half (48.8%) of those with dysmenorrhea had reported restricted physical activity when compared to those who did not experience dysmenorrhea. Studies across the globe (Fernández-Martínez et al.,2019; Agarwal & Agarwal, 2010; Acheampong et al., 2019) reported significant association between dysmenorrhea and restricted physical activity but in our study the association was not significant (p>0.23).This might be due to variations in interpretation of responses provided by the adolescent girls.

With regard to coping mechanisms due to dysmenorrhea almost 44.7% of them ignored the menstrual pain and the most alarming finding was only 16.5% consulted doctor to get relieved from the severe pain which is similar to findings in Imphal wherein it was 13% (Kumar et al., 2016) and 19.4% in Ghana (Acheampong et al., 2019). Most of the adolescent girls are rural background and lack of awareness regarding pain during menstruation and stigma associated with it may be major factor for not seeking treatment.

Although the proportion of adolescents consulting doctor for treatment was higher in study when compared to 9% in Egypt (Mohamed, 2012), 3% among Omani high

school students (Al-Kindi & Al-Bulushi, 2011) and 7% in Thai adolescent girls in (Tangchai et al., 2004) but it was lower than secondary school adolescent girls in Nigeria in which it was more than 50% (Femi-Agboola et al., 2017; Nwankwo et al., 2010) and 28% in Mexican university students (Ortiz, 2010). Other methods like self-medication and hot application were also followed by the study participants which is in concordance with findings from various studies.

Despite the fact that our study had limitations such as self-reporting of menstrual experiences which has recall bias component and issues with generalization of study findings we made an attempt by considering the adequate sample size and by using pretested questionnaires which included validated data collection tools and privacy was ensured when questionnaire was administered.

CONCLUSION

The high prevalence of dysmenorrhea highlights one of the health issues faced by these socially deprived section of society who belong to scheduled tribal and backward communities of the society. Various factors like prolonged menstrual cycle, severity of menstrual bleeding and positive family history were having significant effect in determining dysmenorrhea in these vulnerable population. Dysmenorrhea had a significant impact on quality of life in terms of not attending their routine academic activities. Strengthening of school health education programmes which primarily focuses on improving the knowledge about misconceptions regarding menstrual experiences, incorporation of reproductive health issues in school curriculum and effective implementation, motivation by school teachers and peer group in order to overcome the various barriers for treatment seeking behaviour and health promotion activities at the primary health care settings would help in achieving the goal of reducing the burden (both physical as well as psychological) associated with dysmenorrhea.

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