

Menstrual Health Literacy and Management Strategies in Young Women in Australia: A National Online Survey of Young Women Aged 13-25 Years



Mike Armour PhD^{1,2,*}, Mikayla S. Hyman BA^{1,3}, Mahmoud Al-Dabbas BSc¹, Kelly Parry BSc¹, Tania Ferfolja PhD⁴, Christina Curry PhD⁴, Freya MacMillan PhD^{2,5}, Caroline A. Smith PhD^{1,2}, Kathryn Holmes PhD⁴

¹ NICM Health Research Institute, Western Sydney University, Penrith, NSW, Australia

² Translational Health Research Institute, Western Sydney University, Penrith, NSW, Australia

³ Department of Sociology/Anthropology, Middlebury College, Middlebury, Vermont

⁴ Centre for Educational Research, Western Sydney University, Penrith, NSW, Australia

⁵ School of Health Sciences, Western Sydney University, Penrith, NSW, Australia

ABSTRACT

Study Objective: To explore key aspects of menstrual health literacy and menstrual management in young women at school or in tertiary education.

Design: Cross-sectional online survey.

Setting: Australia-wide.

Participants: A total of 4202 adolescent and young women (13-25 years of age; median age 17 years), having reached menarche, living in Australia and currently attending school (n = 2421) or tertiary education (n = 1781).

Interventions: Online survey hosted by Qualtrics between November 2017 and January 2018. Data were collected on contraceptive use, management strategies, sources of information, and knowledge of menstruation.

Main Outcome Measures: Information on prevalence and effectiveness of different management strategies, health-seeking behavior, knowledge about menstruation, and common menstrual disorders such as endometriosis.

Results: The majority of young women did not seek medical advice for their menstrual symptoms, but used information from the Internet (50%) and engaged in self-management, most commonly with over-the-counter medications such as paracetamol (51%) or ibuprofen (52%). Oral contraceptive use was relatively common (35%), and mostly for reduction of menstrual pain (58%). Despite having significant dysmenorrhea, approximately one-half of the participants (51%) thought that their period was normal. Women with higher pain scores were more likely to rate their period as "abnormal" ($P < .0001$) but not more likely to consult a doctor ($P = .13$). Only 53% of those at school had heard of endometriosis.

Conclusion: Self-management of menstrual symptoms is common, but a significant minority of women are underdosing or choosing ineffective methods. Most women do not seek medical advice even when symptoms are severe, and cannot identify symptoms suggestive of secondary dysmenorrhea. Improved education on menstruation is vital.

Key Words: dysmenorrhea, Menstruation, Health literacy, Education, Endometriosis, Pelvic pain

Introduction

Menstrual disorders are highly prevalent among adolescents and young women.^a Primary dysmenorrhea (menstrual pain) affects around three-fourths of women

under 25 worldwide,¹ with around 90% of young women in Australia reporting menstrual pain.^{2,3} As well as the health burden of menstrual pain itself directly to the individual, menstrual pain can detrimentally affect adolescents and young women socially and in their studies and work.⁴ Health promotion strategies are therefore imperative to educate and support adolescents and young women around management of menstrual pain. A particular challenge in the need to support adolescents and young women in menstrual pain management is that health literacy, defined by the Institute of Medicine as "the degree to which individuals have the capacity to obtain, process, and understand basic health-related decisions,"⁵ is low among Australian adolescent girls. Although learning about reproductive health, puberty, health care access, and medical care is part of the Australian Health and Physical Education (HPE) curriculum, most young women frame period pain as a normal part of becoming a woman,⁶ a common

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* Address correspondence to: Mike Armour, PhD, Senior Research Fellow, NICM Health Research Institute, Western Sydney University, Locked Bag 1797, Penrith NSW 2751, Australia

E-mail address: m.armour@westernsydney.edu.au (M. Armour).

^a This paper generally aligns menstruation with girls/women reflecting the bulk of research in the area. The authors are cognizant, however, that menstruation and menstrual concerns are relevant to many individuals who do not identify with the binary gender constructions girl/boy, woman/man. As such, we acknowledge that not everyone who menstruates identifies as a girl/woman/female.

theme across varying geographic and ethnic boundaries.^{7,8} Many adolescent women do not necessarily know the correct length of a normal menstrual cycle,⁹ are unable to identify the symptoms of primary dysmenorrhea,¹⁰ do not know what causes period pain,^{8,11} or do not know how to use pain medication to attain optimal pain relief.¹² These findings are concerning due to low health literacy being associated with overall poorer health status, less adherence to correct medication use, and less use of preventive health care.⁵

The combination of low menstrual health literacy and the normalization of menstrual pain may result in a serious risk of chronic health conditions being underdiagnosed and undertreated. At least 1 in 10 women will have secondary (structural) dysmenorrhea, often caused by endometriosis, the presence of tissue similar to the uterine lining outside the uterus.¹³ A 2010 Australian survey of adolescents indicated that around 5–15% of participants had symptoms suggestive of endometriosis,² and our team's recent online survey found that more than one-half (55%) of young Australian women 13–25 years of age reported noncyclical pelvic pain.⁴ Aboriginal and Torres Strait Islander women, especially in remote areas, may also have significant issues accessing reliable health care information on menstruation, and this may be further complicated by cultural taboos.¹⁴

Discussion of menstruation is often considered unmentionable for Australian women from various ethnic cultural backgrounds.^{15,16} Given this, young people often rely on schools to provide high quality education with reliable and accurate information pertaining to all aspects of sexual health.¹⁷ However, little research has focused on the teaching of menstrual health, and it is unclear what level of menstrual health literacy there is among young women in Australia. This paper reports on a survey that aimed to explore some key aspects of menstrual health literacy of young women at school or in tertiary education in Australia, how that affects their management strategies, and what sources of information are used in making health care decisions, in order to develop recommendations to inform future health promotion strategies.

Materials and Methods

A 59-item online questionnaire was developed by the research team, which includes experts in menstrual health, education, and health promotion. The questionnaire was piloted with 10 young women in Australia 13–22 years of age, and minor amendments in question wording were made for clarity based on their feedback. The targeted reading age for the questionnaire was 13 years. The final version of the questionnaire was hosted via Qualtrics online surveys (Qualtrics Ltd). Questions included topics on age, residing state/territory, current educational/work status, current oral contraceptive use, age of menarche, regularity of menstrual periods, presence and severity of dysmenorrhea or noncyclical pelvic pain, current management options for dysmenorrhea, impact of dysmenorrhea and/or pelvic pain on daily or social activities, impact of dysmenorrhea on academic performance or engagement, school and/or university support, health literacy around

menstruation, and sources of knowledge. A mixture of closed, multiple-choice, and open-ended questions were used. A copy of the survey instrument can be found in Supplementary File 1. Ethnicity was classified as per the Australian Standard Classification of Cultural and Ethnic Groups (ASCCEG) and was based on the guidelines provided by the Australian Bureau of Statistics.¹⁸ Menstrual pain severity was based on a self-reported a 0–10 numeric rating scale asking for the severity of menstrual period pain over the last 3 menstrual cycles. Pelvic pain impact (including both menstrual and nonmenstrual phases) over the last month was quantified through the Pelvic Pain Impact Questionnaire (PPIQ), a validated questionnaire with a high interclass correlation coefficient (0.91).¹⁹ The questionnaire took approximately 20 minutes to complete. Features were enabled within Qualtrics that prevented multiple completions from either a single IP address or the same computer to reduce the chance of duplicate completions, and the survey needed to be completed in 1 sitting. This manuscript details the questionnaire results on health literacy and management, including help-seeking behavior, sources of knowledge, and use of contraceptives or analgesics. Results concerning the prevalence and educational impact of menstrual symptoms have been published separately.⁴ The study was approved by the Western Sydney University Human Research Ethics Committee (approval number H12411, approved November 24, 2017).

Adolescents and young women were eligible to participate in the study if they were between 13 and 25 years of age, had reached menarche (at least 1 previous menstrual period), were at school (year 6–12) or undertaking tertiary education (at a university, technical and further education (TAFE) institution, or other tertiary provider), and were currently living in Australia. Those who did not menstruate regularly for whatever reason (eg, menstrual suppression or amenorrhea) were eligible to participate.

Recruitment primarily occurred via Facebook paid advertising between November 30, 2017, and mid-January 2018, which was targeted to females in Australia 13–25 years of age. Several Australian women's health advocacy and education groups also shared the study link with their followers on social media, including Family Planning New South Wales (NSW), Endometriosis Australia, Jean Hailes for Women's Health and Australian Council Health, and Physical Education & Recreation (ACHPER). A direct link was provided from the social media postings to the survey introduction, which explained the survey and provided an online link to the information sheet. The survey link was active for 8 weeks between November 30, 2017, and January 31, 2018. The survey was closed when no new responses were received for 5 days. Potential respondents were advised that the survey was anonymous and that clicking through the survey gave implied consent. There was no contact between the research team and the respondents.

Data were analyzed using SPSS v24 (IBM Corporation, Armonk, NY). Descriptive statistics were presented as means and standard deviations (for normally distributed data), medians and interquartile ranges (for non-normally distributed data), or numbers and percentages (for categorical data). Inferential statistics for between-group

comparisons were performed using a *t* test (for normally distributed data), a Mann–Whitney *U* test (for nonparametric data), or χ^2 test as appropriate. Correlations between categorical and continuous variables were analyzed using the Spearman rank order correlation. Statistical significance was set at $P < .05$. Missing data were reported and not replaced.

Results

Demographics

Table 1 outlines the demographics of the respondents. In all, 57.6% of respondents were at school (years 6–12), whereas 42.3% were undertaking tertiary education. The median age was 17 years (range 16–19 years), with slightly more than one-half of the respondents (51.2%) between 16 and 18 years of age, and predominantly identified as Australian Peoples (71.2%) (Australian peoples include Anglo Australians as well as aboriginal and Torres Strait Islanders (ATSI)). Of the respondents, 14.5% spoke a language other than English at home. The average age at

menarche was 12.3 (1.4) years. A diagnosed cause of secondary dysmenorrhea was reported as being due to endometriosis by 5.4%.

Management of Menstrual Symptoms

Table 2 outlines the common pharmacological and nonpharmacological strategies used. Using less than the recommended dosage of analgesic medication was common, with 39.3% of participants using less than the recommended dosage for ibuprofen, 44.8% for paracetamol, and 26.1% for mefenamic acid. There was a significant difference ($P < .001$) in self-reported effectiveness of different analgesic medication, with similar rates of pain being “completely relieved” in those taking ibuprofen (13.1%), paracetamol (10.6%), ibuprofen, and paracetamol combined (14.4%), but in 29.3% of those taking mefenamic acid. Timing of analgesic medication tended to be after pain started in most respondents; however participants using mefenamic acid were more likely to take this prior to the onset of pain (21.2%) compared to those using other forms of analgesic medication. There was no difference in the prevalence of

Table 1
Demographics of Respondents

	Overall (n = 4202)	Overall (%)	School (n = 2421)	School (%)	Tertiary Education (n = 1781)	Tertiary Education (%)
Age, yr						
13–15	909	21.6	905	37.4	4	0.2
16–18	2152	51.2	1510	62.4	642	36.0
19–21	616	14.7	5	0.2	611	34.3
22–25	525	12.5	1	0.0	524	29.4
Age at menarche, mean (SD)	12.3 (1.4)	-	-	-	-	-
Ethnicity						
Australian Peoples	2991	71.2	1796	74.2	1195	67.1
Other	650	15.5	360	14.9	290	16.3
British	372	8.9	178	7.4	194	10.9
Aboriginal/Torres Strait Islanders (ATSI)	134	3.2	79	3.3	55	3.1
Western European	128	3	62	2.6	66	3.7
Southern Asian	61	1.5	25	1.0	36	2.0
Language spoken at home (other than English)	608	14.5	358	14.8	250	14.0
Other (not listed)	427	70.2	242	67.6	185	74.0
Arabic	63	10.4	28	7.8	35	14.0
Mandarin	33	5.43	28	7.8	5	2.0
Vietnamese	33	5.43	19	5.3	14	5.6
Cantonese	26	4.28	20	5.6	6	2.4
Italian	26	4.28	21	5.9	5	2.0
School Year						
Year 6	-	-	1	0.0	-	-
Year 7	-	-	23	1.0	-	-
Year 8	-	-	83	3.4	-	-
Year 9	-	-	293	12.1	-	-
Year 10	-	-	497	20.5	-	-
Year 11	-	-	633	26.1	-	-
Year 12	-	-	891	36.8	-	-
Blank	-	-	0	0.0	-	-
Socioeconomic status (decile 1–10)						
Decile 1	255	6.1				
Decile 2	254	6.1				
Decile 3	274	6.5				
Decile 4	368	8.8				
Decile 5	396	9.4				
Decile 6	395	9.4				
Decile 7	341	8.1				
Decile 8	435	10.3				
Decile 9	631	15.0				
Decile 10	669	16.0				
Missing	186	4.4				
Diagnosed Endometriosis	146	5.4	50	3.9	96	6.8
Diagnosed PCOS	215	8.3	66	5.5	149	10.8

Table 2
Management Strategies

	Total	At School	Uni/TAFE/Other
Total, n	3874	2215	1659
Methods of management, n (%)			
Ibuprofen	2003 (51.7%)	1103 (49.8%)	900 (54.2%)
Paracetamol	1990 (51.4%)	1195 (54%)	795 (47.9%)
Paracetamol and ibuprofen together	887 (22.9%)	498 (22.5%)	389 (23.4%)
Mefenamic acid	867 (22.4%)	437 (19.7%)	430 (25.9%)
Heat	2620 (67.6%)	1474 (66.5%)	1146 (69.1%)
Rest	2324 (60%)	1316 (59.4%)	1008 (60.8%)
Traditional remedies	360 (9.3%)	221 (10%)	139 (8.4%)
Meditation	152 (3.9%)	86 (3.9%)	66 (4%)
Yoga	335 (8.6%)	209 (9.4%)	126 (7.6%)
Supplements/nutraceuticals	305 (7.9%)	153 (6.9%)	152 (9.2%)
Nothing	406 (10.5)	232 (10.5%)	174 (10.5%)
Other	399 (10.3%)	193 (8.7%)	206 (12.4%)
Ibuprofen, n (%)			
Dosage of ibuprofen			
Maximum dose	1002 (50%)	573 (51.9%)	429 (47.7%)
More than recommended dose	163 (8.1%)	79 (7.2%)	84 (9.3%)
Less than recommended dose	787 (39.3%)	413 (37.4%)	374 (41.6%)
Other	44 (2.2%)	35 (3.2%)	9 (1%)
Timing of ibuprofen			
Before my period starts	117 (5.8%)	56 (5.1%)	61 (6.8%)
After period but before pain	211 (10.5%)	118 (10.7%)	93 (10.3%)
After pain	1644 (82.1%)	913 (82.8%)	731 (81.2%)
Other	25 (1.2%)	13 (1.2%)	12 (1.3%)
Effectiveness of ibuprofen			
Pain completely gone	263 (13.1%)	150 (13.6%)	113 (6.8%)
Reduces pain significantly, but still bothersome	1214 (60.6%)	655 (59.4%)	559 (33.7%)
Does not reduce pain	520 (26%)	295 (26.7%)	225 (13.6%)
Paracetamol, n (%)			
Dosage of paracetamol			
Maximum dose	928 (46.6%)	566 (47.4%)	362 (45.5%)
More than recommended dose	111 (5.6%)	66 (5.5%)	45 (5.7%)
Less than recommended dose	891 (44.8%)	521 (43.6%)	370 (46.5%)
Other	57 (2.9%)	40 (3.3%)	17 (2.1%)
Timing of paracetamol			
Before my period starts	84 (4.2%)	42 (3.5%)	42 (5.3%)
After period but before pain	210 (10.6%)	130 (10.9%)	80 (10.1%)
After pain	1649 (82.9%)	998 (83.5%)	651 (81.9%)
Other	44 (2.2%)	22 (1.8%)	22 (2.8%)
Effectiveness of paracetamol			
Pain completely gone	211 (10.6%)	128 (10.7%)	83 (10.4%)
Reduces pain significantly, but still bothersome	1061 (53.3%)	636 (53.2%)	425 (53.5%)
Does not reduce pain	713 (35.8%)	426 (35.6%)	287 (36.1%)
Paracetamol and ibuprofen, n (%)			
Dosage of paracetamol and ibuprofen			
Maximum dose	485 (54.7%)	279 (56%)	206 (53%)
More than recommended dose	83 (9.4%)	40 (8%)	43 (11.1%)
Less than recommended dose	288 (32.5%)	158 (31.7%)	130 (33.4%)
Other	26 (2.9%)	17 (3.4%)	9 (2.3%)
Timing of paracetamol and ibuprofen			
Before my period starts	69 (7.8%)	30 (6%)	39 (10%)
After period but before pain	105 (11.8%)	64 (12.9%)	41 (10.5%)
After pain	691 (77.9%)	389 (78.1%)	302 (77.6%)
Other	17 (1.9%)	11 (2.2%)	6 (1.5%)
Effectiveness of paracetamol and ibuprofen			
Pain completely gone	128 (14.4%)	75 (15.1%)	53 (13.6%)
Reduces pain significantly, but still bothersome	517 (58.3%)	288 (57.8%)	229 (58.9%)
Does not reduce pain	237 (26.7%)	131 (26.3%)	106 (27.2%)
Mefenamic acid, n (%)			
Dosage of mefenamic acid			
Maximum dose	499 (57.6%)	253 (57.9%)	246 (57.2%)
More than recommended dose	54 (6.2%)	22 (5%)	32 (7.4%)
Less than recommended dose	226 (26.1%)	116 (26.5%)	110 (25.6%)
Other	13 (1.5%)	9 (2.1%)	4 (0.9%)
Timing of mefenamic acid			
Before my period starts	119 (13.7%)	57 (13%)	62 (14.4%)
After period but before pain	184 (21.2%)	98 (22.4%)	86 (20%)
After pain	480 (55.4%)	240 (54.9%)	240 (55.8%)
Other	13 (1.5%)	6 (1.4%)	7 (1.6%)
Effectiveness of mefenamic acid			
Pain completely gone	254 (29.3%)	134 (30.7%)	120 (27.9%)
Reduces pain significantly, but still bothersome	409 (47.2%)	204 (46.7%)	205 (47.7%)
Does not reduce pain	132 (15.2%)	61 (14%)	71 (16.5%)

different management strategies between different ethnic groups ($P > .05$ for all comparisons) or any association between age and choice of management strategies ($P > .05$ for all comparisons).

Contraceptive Use

Table 3 outlines prevalence and drivers of contraceptive use. Just over one-third of all young women currently used the oral contraceptive pill (35.4%), with usage rates in participants at school being around one-half that (25.8%) of participants in higher education (48.4%), with a significant association between increasing age and increasing contraceptive usage [$r_s(4204) = 0.264, P < .001$]. Reducing menstrual pain was the most commonly reported reason for contraceptive use overall in both cohorts (57.5%). The second most common reason in women attending school was a reduction in heavy bleeding (42.8%) compared to contraception (53.5%) for women in higher education. Doctors were the predominant source of contraceptive advice for both women attending school (59.6%) and women in tertiary education (36.9%), with family being the second most common resource used for advice in participants at school (26.6%) and women attending university, TAFE, and other technical colleges (11%). Only 0.3% of all women sought the advice of a school nurse, and only 1.7% of all respondents used their HPE class or teacher to seek advice despite almost 80% having learned about menstruation in their HPE class.

Median period pain scores were slightly higher in those reporting current use of the oral contraceptive pills (OCPs) (7.0) compared to those not currently reporting OCP use (6.0) ($P = .013$). Almost three-fourths of women with

endometriosis (73.2%) and just over one-half (54.7%) of women with PCOS were current OCP users. Current OCP use was more likely in either of these groups ($P < .0001$ for both) than in those not reporting either of these conditions.

Menstrual Health Literacy

Table 4 outlines young women's sources of knowledge and health-seeking behavior. Approximately one-half of the respondents (49.8%) indicated that they used online information to determine whether their period was normal, with slightly more than one-third (36.3%) discussing this topic with their mother and slightly less than one-third (31.1%) speaking with their doctor. Health professionals were considered the most trustworthy source of information (72.1%), followed by family (56.7%) and the Internet (54.6%). Only 20.7% of participants indicated that their teachers were a trusted source of information. The most common menstrual symptoms that respondents believed were normal included emotional changes (85.5%) and dysmenorrhea (83.8%). Respondents would most commonly seek medical advice on pain when urinating (81.8%), and pain that prevented them going to school or university (73.6%). Only one-half (50.4%) would seek medical advice if they were having pelvic pain when not menstruating. Most had heard of endometriosis overall (64%), but only one-half of those attending school (52.8%), versus more than three-fourths (80%) of women in tertiary education, were aware of endometriosis. There was a significant association between increasing age and having heard of endometriosis [$r_s(3955) = 0.352, P < .001$], vulvodinia [$r_s(3946) = 0.142, P < .001$], and polycystic ovary syndrome (PCOS) [$r_s(3951) = 0.342, P < .001$]. Slightly

Table 3
Contraceptive Use

	Total	At School	Uni/TAFE/Other
Total, n (%)	4202 (100%)	2421 (57.6%)	1781 (42.4%)
Currently using an oral contraceptive, n (%)			
Yes	1486 (35.4%)	624 (25.8%)	862 (48.4%)
No	2695 (64.1%)	1778 (73.4%)	917 (51.5%)
Not Sure	18 (0.4%)	16 (0.7%)	2 (0.1%)
Blank	3 (0.1%)	3 (0.1%)	0 (0%)
Reasons for contraceptive use, n (%)			
Contraceptive	634 (42.7%)	173 (27.7%)	461 (53.5%)
Making cycle more regular	592 (39.8%)	248 (39.7%)	344 (39.9%)
Reducing period pain	854 (57.5%)	363 (58.2%)	491 (57%)
Acne/skin problems	415 (27.9%)	199 (31.9%)	216 (25.1%)
Reduce heavy bleeding	636 (42.8%)	267 (42.8%)	369 (42.8%)
Skip and shift period	391 (26.3%)	150 (24%)	241 (28%)
Other	124 (8.3%)	53 (8.5%)	71 (8.2%)
Contraceptive advice source, n (%)			
Doctor	921 (62%)	372 (59.6%)	549 (36.9%)
School nurse	5 (0.3%)	4 (0.6%)	1 (0.1%)
Family	329 (22.1%)	166 (26.6%)	163 (11%)
Friends	86 (5.8%)	34 (5.4%)	52 (3.5%)
PDHP	25 (1.7%)	10 (1.6%)	15 (1%)
Internet	77 (5.2%)	22 (3.5%)	55 (3.7%)
Other	43 (2.9%)	16 (2.6%)	27 (1.8%)
Learning in PDHPE* class, n (%)			
Yes	3291 (78.3%)	1932 (79.8%)	1359 (76.3%)
No	420 (10%)	235 (9.7%)	185 (10.4%)
Have not yet done PDHPE* class	488 (11.6%)	250 (10.3%)	238 (13.4%)
Blank	3 (0.1%)	3 (0.1%)	0 (0%)

Blank means that responses to question were not provided.

* PDHPE denotes Personal Development, Health and Physical Education class, a mandatory class for public schools in New South Wales.

Table 4
Sources of Knowledge

	Total	At School	Uni/TAFE/Other
Total, n (%)	4202 (100%)	2421 (57.6%)	1781 (42.4%)
How did you decide if your period was normal? n, (%)			
Asked mother	1527 (36.3%)	940 (38.8%)	587 (33%)
Asked father	40 (1%)	27 (1.1%)	13 (0.7%)
Asked sister	303 (7.2%)	156 (6.4%)	147 (8.3%)
Asked other female relative	337 (8%)	176 (7.3%)	161 (9%)
Asked friends	1114 (26.5%)	655 (27.1%)	459 (25.8%)
Learned in school	853 (20.3%)	576 (23.8%)	277 (15.6%)
Asked PDHPE* teacher	77 (1.8%)	60 (2.5%)	17 (1%)
Asked another teacher	30 (0.7%)	19 (0.8%)	11 (0.6%)
Asked a doctor	1308 (31.1%)	565 (23.3%)	743 (41.7%)
Asked a school nurse	49 (1.2%)	37 (1.5%)	12 (0.7%)
Online search	2092 (49.8%)	1183 (48.9%)	909 (51%)
Magazine	312 (7.4%)	191 (7.9%)	121 (6.8%)
Other	378 (9%)	209 (8.6%)	169 (9.5%)
What sources are trustworthy? n (%)			
Internet	2295 (54.6%)	1321 (54.6%)	974 (54.7%)
Family	2383 (56.7%)	1512 (62.5%)	871 (48.9%)
Friends	1613 (38.4%)	999 (41.3%)	614 (34.5%)
School programs	1632 (38.8%)	1121 (46.3%)	511 (28.7%)
School teachers/university lecturers	868 (20.7%)	562 (23.2%)	306 (17.2%)
Magazines	464 (11%)	292 (12.1%)	172 (9.7%)
Health apps	1458 (34.7%)	947 (39.1%)	511 (28.7%)
Health professionals	3028 (72.1%)	1595 (65.9%)	1433 (80.5%)
Social media	311 (7.4%)	215 (8.9%)	96 (5.4%)
Independent health organization	535 (12.7%)	293 (12.1%)	242 (13.6%)
Television shows	120 (2.9%)	68 (2.8%)	52 (2.9%)
Blogs	284 (6.8%)	175 (7.2%)	109 (6.1%)
Have you heard of endometriosis? n (%)	2688 (64%)	1279 (52.8%)	1409 (79.1%)

* PDHPE denotes Personal Development, Health and Physical Education class, a mandatory class for public schools in New South Wales.

more than one-half (51%) thought that their period either “might be” or “definitely” was normal (see [Supplementary Table 1](#)).

There was a significant relationship between women’s pain scores and perception of the normality of their period ($P < .0001$). Women with higher pain scores were more likely to rate their periods as “abnormal” than were those with lower pain scores, but were not any more likely to have spoken to a doctor about their symptoms ($P = .13$).

Discussion

Our study found, similar to our previous meta-analysis, that most young women managed their period pain primarily with over-the-counter (OTC) pain medications rather than seeking medical advice.²⁰ Paracetamol (51.4%) and ibuprofen (51.7%) were the most common over-the-counter analgesics used, whereas mefenamic acid was rated as the most effective. Although nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen are considered to be effective first-line treatment for dysmenorrhea,²¹ the prevalence of paracetamol use is a concern, as clinical trials have shown paracetamol alone to be a less effective choice than NSAIDs^{22,23} and, similar to our findings, rated as less effective than NSAIDs by those with primary dysmenorrhea.²⁴ Consistent with previous observations, our study found that in the absence of prior medical consultation, adolescent self-medication tends to lead to subtherapeutic doses being administered,²⁰ resulting in suboptimal pain relief, which in turn has a significant negative impact on academic engagement and

extracurricular activities.^{1,4} This is a serious concern, as higher pain levels are strongly correlated with negative impact in academic performance and extracurricular activities.⁴ Improved awareness and education on safe and effective use, as well as how to choose potentially effective analgesics, is of vital importance and reflects concerns previously raised.^{25,26}

As outlined in our previous work on this dataset,⁴ the majority of respondents (92.2%) reported moderate or greater period pain on a regular basis and, subsequently, significant disruption of their academic and extracurricular activities. Despite the pain severity and impact, more than one-half of young women thought that their period was “normal.” This is consistent with the concept that women “assemble” an idea of a normal period from their own experiences.²⁷ Wood et al found that even if women with consistent menstrual pain knew from other sources that pain was “abnormal,” they would still consider pain part of their normal cycle, as that is what they had always known. Therefore, the presence of pain or other bothersome symptoms every cycle often becomes normalized over time. However, our study found that women were less likely to believe that their periods were “normal” as pain became more severe. Unfortunately, this did not translate into formal health-seeking behaviors, such as visiting a doctor. This may be due, at least in part, to the widely accepted idea that having to endure menstrual symptoms, even if severe, is an integral part of female life, a belief that seems to have persisted over time.^{6,8,28–30} Another factor may be that when young women do present to a doctor to discuss their pain, it is often normalized or ignored,²⁶ which can lead to

disillusionment, a common feeling for many women with dysmenorrhea.²⁸ Banikarim et al found, in a US study, that although almost 50% of adolescent girls had visited the school nurse, 77% did not find that this visit provided them with satisfactory relief.⁷ Similarly, Hewison and van den Akker found that less than one-third of women with dysmenorrhea visited their general practitioner for this condition, but of those who did, two-thirds were not satisfied with the result.³¹ Indigenous Australians (including ATSI peoples) generally consider menstruation to be “private ‘women’s business’” and not discussed in public, with little information on traditional management and understanding available.³² In addition, Indigenous Australians often have other significant health burdens in their communities (such as diabetes and other chronic illness), and therefore menstrual health education is not prioritized.³² Our findings and those of others therefore highlight the need for awareness raising and educational strategies on menstrual pain management that target not only adolescents and young people, but also health care professionals, including those embedded within education settings, and parents or caregivers.

Oral contraceptive use was relatively common and higher overall (35.4%) than previously reported in this population in other high-income countries (22%),²⁰ with the majority of individuals using the contraceptives for menstrual pain management. The OCP is a common second-line treatment for primary dysmenorrhea,^{33,34} although it may be used as a first-line treatment when long-term contraception is required.³⁵ The OCP’s primary mechanism for reducing the symptoms of primary dysmenorrhea is via the direct reduction in thickness of the uterine lining, by suppression of ovulation.³⁵ A Cochrane review of the OCP with both medium- and low-dose estrogen showed a significant reduction in pain (odds ratio 2.99, 95% confidence interval 1.76–5.07) compared to placebo. However, the authors concluded that “oral contraceptives are widely advocated as standard treatment for women with primary dysmenorrhea, yet this review has found only scant rigorous clinical evidence to support this practice.”³⁵ Although surveys examining menstrual health among women have shown an inverse relationship between contraceptive use and self-reported menstrual pain^{36–38} our study found that those taking the OCP reported greater pain than those not taking the OCP. Caution must be taken with this finding, as there is no way to determine the direction of this effect, and it is likely that individuals with severe period pain are also more likely to be currently taking the OCP. This is supported by the fact that those with a diagnosis of endometriosis were much more likely to be using the OCP compared to those without a diagnosis. Use of OCP in those with suspected endometriosis during adolescence may result in less persistent pain in adulthood.³⁹

Menstruation has often been reframed as an illness, with a primary focus on physical and psychological symptoms, rather than a natural physiological process.⁴⁰ It is important to balance knowing when to seek medical help with increasing women’s own agency around their health. Increasing health literacy through menstrual education can assist women’s understanding, have a positive effect on

their ability to engage in self-care, and help identify symptoms that require further investigation.^{41,42} Health literacy is paramount in supporting the health of young people. The HPE curriculum affords the opportunity to develop student knowledge of menstrual health. Previous qualitative²⁶ and quantitative⁴³ studies have shown that improved menstrual education is a priority for young people and their parents, who often feel that they do not have access to suitable information on menstruation.⁴⁴ Of concern, and consistent with other studies in adolescents,^{45,46} in this study there was a poor understanding of the need to seek formal medical help for symptoms suggestive of endometriosis or other forms of secondary dysmenorrhea, such as noncyclical pelvic pain and/or severe dysmenorrhea.⁴⁷ In conjunction with the “normalization” of menstrual symptoms, this may mean that women do not seek help for this condition for several years,⁴⁸ leading to a variety of negative impacts on social life,⁴⁸ academic performance,⁴⁸ work,⁴⁹ fertility,⁵⁰ and sexual relationships⁴⁸ that may have otherwise been reduced with proper diagnosis and management.

It is imperative that HPE teachers improve their own knowledge of menstrual health in order to provide students with relevant information to make informed decisions. The availability and access to resources is important to ensure that teachers have up-to-date information and guidance to focus on a holistic approach as opposed to the more commonly used biological approach. A variety of educational programs, both in-person and online, designed to improve awareness of menstruation and symptoms of secondary dysmenorrhea have been developed in Australia and elsewhere,^{42,51–54} and early identification of abnormal menstrual symptoms in education programs⁴² may allow for earlier intervention that could change the course of disease. Despite such programs existing in Australia, we still found that our sample of adolescents and young adults had limited health literacy in managing menstrual pain. This highlights the need for rigorous evaluation of such education programs to determine how efficacious they are, as well as assessing process measures such as the reach of programs into the intended target population, program acceptability in the intended audience, the feasibility of wider roll-out of programs, and how likely they are to be sustained over time.

As outlined in our previous work, because of the use of an online survey platform and advertising via social media, we were able to reach very large geographical and socioeconomic areas, giving us, to our knowledge the largest dataset for this Australian demographic. Nevertheless, there are some limitations that must be acknowledged. One of the limitations of this research is that we have targeted only those individuals who identify as women and girls who menstruate. Albeit a smaller population, the experiences of individuals who menstruate who do not identify as girl/woman/female may have been missed in the recruitment for this research. More research is required from this untapped cohort to guide evidence-based health promotion interventions that target the educational needs of, and supports for, these individuals. This would help to ensure comprehensive sexual health education and support is

potentially available to all young people, regardless of identity. Additionally, further knowledge is required about what boys/young men understand about menstruation and menstrual pain, and what learnings have been acquired from their educational context. For a meaningful sexual health education for all, it is critical that issues pertaining to health literacy around menstruation and dysmenorrhea transcend being a “girls'/women's-only” issue to include all genders as well as parents and caregivers, who are often called on to support and inform young people on menstruation. We also are unsure how representative our sample is of menstrual health literacy and practices in the wider Australian population, because of the lack of nationally representative population-level datasets; however, our results are broadly consistent with previous studies in this group for more than 20 years,^{2,3,12} and representation of ATSI peoples (3.2%) was similar to the most recent 2016 census data (3.3%).⁵⁵

In conclusion, young women in Australia have relatively poor menstrual health literacy despite learning about menstruation during their HPE classes, with the majority identifying their period as “normal” despite having a significant negative impact on their academic and extracurricular lives. Use of OTC medication for pain control was common, but potentially ineffective choices such as paracetamol were frequent. OTC medication in general was often underdosed, taken after pain was already severe, and, with the exception of mefenamic acid, reported as not usually providing the necessary pain relief. Teacher education programs need to better prepare teachers to teach menstrual health, and consideration needs to be given to how sexuality education, specifically with a focus on menstrual health, is taught within the HPE curriculum and within the later schooling years. A number of promising school-based or online programs aimed at improving menstrual health literacy for both students and parents have been developed, and although these are promising, it is unclear what effect these will have on menstrual health literacy at this time.

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Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jpjag.2020.11.007>.

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