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Paternal understanding of menstrual concerns in young women

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Abstract:	<p>STUDY OBJECTIVE: No studies have specifically considered paternal understanding of menstruation. This study aimed to establish the degree of understanding of fathers of adolescent girls with menstrual symptoms relative to mothers.</p> <p>DESIGN AND SETTING: This is a cross-sectional survey-based study. Adolescent patients attending an outpatient gynaecology clinic for dysmenorrhoea and/or heavy menstrual bleeding (HMB) and their parents were invited to complete surveys.</p> <p>PARTICIPANTS: 60 surveys were completed (24/40 daughters, 20/40 mothers, 16/40 fathers).</p> <p>INTERVENTIONS AND MAIN OUTCOME MEASURES: Surveys aimed to test parents' understanding of menstrual symptoms and potential medications, as well as fathers' concerns with their daughters' health.</p> <p>RESULTS: The fathers' knowledge of menstrual symptoms was poorer than mothers, although most knew HMB (93%) and mood swings (87%). Many parents answered 'don't know' or did not answer questions about potential consequences of medications, although parents were clearly concerned about side effects.</p> <p>Most fathers (80%) were open to discussing menstrual concerns with daughters; however, only 52% of daughters were open to such discussions. Of fathers, 80% felt sympathetic/concerned, 53% helpless and 13% frustrated when daughters were in pain. When asked about impacts, 93% of fathers (79% of mothers) were worried about their daughter's welfare and 60% (21%) about schooling.</p> <p>CONCLUSIONS: We present the first insight into fathers' knowledge of their daughters' menstrual health. Overall, parents have an incomplete picture of menstrual symptoms. Even in this cohort, which could be expected to be well informed due to their daughters' attendance at a tertiary hospital, it is clear that further knowledge would assist them caring for their daughters.</p>

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STRUCTURED ABSTRACT

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DESIGN AND SETTING: This is a cross-sectional survey-based study. Adolescent patients attending an outpatient gynaecology clinic for dysmenorrhoea and/or heavy menstrual bleeding (HMB) and their parents were invited to complete surveys.

PARTICIPANTS: 60 surveys were completed (24/40 daughters, 20/40 mothers, 16/40 fathers).

INTERVENTIONS AND MAIN OUTCOME MEASURES: Surveys aimed to test parents' understanding of menstrual symptoms and potential medications, as well as fathers' concerns with their daughters' health.

RESULTS: The fathers' knowledge of menstrual symptoms was poorer than mothers, although most knew HMB (93%) and mood swings (87%). Many parents answered 'don't know' or did not answer questions about potential consequences of medications, although parents were clearly concerned about side effects.

Most fathers (80%) were open to discussing menstrual concerns with daughters; however, only 52% of daughters were open to such discussions. Of fathers, 80% felt sympathetic/concerned, 53% helpless and 13% frustrated when daughters were in pain. When asked about impacts, 93% of fathers (79% of mothers) were worried about their daughter's welfare and 60% (21%) about schooling.

CONCLUSIONS: We present the first insight into fathers' knowledge of their daughters' menstrual health. Overall, parents have an incomplete picture of menstrual symptoms. Even in

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68

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INTRODUCTION

Menstruation can be distressing for young women, particularly when complicated by heavy menstrual bleeding (HMB) or dysmenorrhoea (menstrual pain). HMB affects approximately 12-37% of girls,¹ while dysmenorrhoea affects 80-90% of Australian secondary school-aged students and young women.²⁻⁴ With misconceptions about menstruation common, a girl's access to parental guidance is invaluable.

Within traditional heteronuclear families, mothers remain the primary providers of childcare.⁵ It is not surprising, therefore, that little is known about a father's understanding of menstruation problems, his perception of their impact on his daughter's and family's life, or his understanding of treatment options for menstrual pathologies. Previous studies have exclusively examined maternal aspects of care⁶ or reported insufficient information to extend any findings to the father.^{7,8}

A father's influence on health decisions is of particular relevance given the increasing proportion of single father households. As of June 2016, there were ~184,000 single father families in Australia (19% of all single parent families).⁹ Single father households in the United States have increased nine-fold since the 1960s.⁶ This increase may necessitate further paternal involvement in children's healthcare. However, the extent of paternal involvement in menstrual-related health is unknown.

In order to address the lack of data regarding fathers' experience of menstrual healthcare, we aimed to explore their understanding, involvement, and attitudes towards menstrual health. We hypothesised that fathers would have poor understanding of menstrual symptoms and treatment methods relative to mothers, and have little involvement in their daughters' menstrual health care.

4 **95 MATERIALS AND METHODS**
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6 **96** A cross-sectional survey of adolescents (aged 13 to 19) and their parents who attended the
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9 **97** Adolescent Gynaecology Outpatient Clinic at the Royal Children's Hospital, Victoria, Australia
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12 **98** was conducted between March and June 2015. Ethical approval was provided by the Royal
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14 **99** Children's Hospital's Human Research Ethics Committee (Approval Number: HREC 34294A).
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16 **100** The three participant groups were:
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19 **101** 1. Young women 13 years of age and over who were attending the clinic for dysmenorrhoea
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21 **102** and/or HMB as new or review patients with at least one living father. Patients who were
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24 **103** seeing their clinician primarily for another symptom or illness were also eligible, provided
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26 **104** that they were also experiencing the symptoms within the inclusion criteria.
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29 **105** 2. The participant's father/s, including biological, adoptive, foster or stepfathers.
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31 **106** 3. The participant's mother/s, including biological, adoptive, foster or stepmothers.
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34 **107** Participants were excluded if they were non-English speaking, had an intellectual disability
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36 **108** that would prevent them from completing the survey, or if the young woman had a known
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38 **109** history of sexual assault or abuse of any kind, or had witnessed violence in the home.
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41 **110** The daughter and attending parent/s were introduced to a researcher by their treating
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43 **111** clinician if they wished to hear about the study. Informed consent was obtained by the attending
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45 **112** parent/s for their own participation and for their daughter's participation if she was under 18
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48 **113** years and had provided assent. Daughters were also permitted to take part individually should
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50 **114** they not wish their parents to participate. Daughters aged 18 years and over provided their own
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53 **115** consent. Surveys were completed by attending participants at the hospital or taken home and
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55 **116** returned by mail in a postage-paid addressed envelope.
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58 **117** For parents not in attendance during the appointment, information sheets, consent forms
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and surveys were provided to the young woman to take home with her, along with a postage-paid addressed envelope for return of the consent forms and surveys if parents elected to participate.

All surveys collected basic demographic data (Tables 1 and 2). The daughters' surveys contained questions regarding their own menstrual periods from the Menstrual Disorder of Teenagers (MDOT) questionnaire, developed to assess symptoms in Australian adolescents.³ Characteristics of menstruation measured included: age at menarche; frequency, regularity, and heaviness of menstruation; intra-menstrual bleeding; interference of menstruation with work, school, social life, relationships and sport; past-year physical and emotional symptoms associated with menstruation; use and effectiveness of analgesia; and perceptions and experiences with menstruation (Table 2).³ Each daughter was also asked about her perceptions of her father's attitude and feelings regarding her menstrual symptoms and of his opinions of her treatments.

Surveys given to the fathers asked about: knowledge of menstrual period symptoms in general and as experienced by daughters (yes/no/don't know); the father's feelings and attitudes towards his daughter's symptoms (yes/no/don't know); the extent to which the father was involved in his daughter's care (three items, often/sometimes/rarely/never/others in the family do; attending medical appointments often/sometimes/rarely/never); knowledge of side effects from the daughter's use of hormonal medications, pain killers, and neuropathic pain medications (yes/no/don't know); and where fathers had received information about menstrual periods (high school sex education classes/internet/partner/daughter/other female relative/doctor/other). Fathers' concerns about the three classes of medications (hormonal, pain killers, and neuropathic medications) were assessed with eleven Likert-scored items. Fathers were asked an overall question about their comfort with daughters being prescribed each class of medication

(yes/no/maybe).

Each mother received the same survey, with questions changed to assess her perception of the father's attitude, understanding and degree of comfort with the topic of menstrual periods (i.e. where a father was asked "how closely do these statements reflect your concerns about your daughter using each of these medications," a mother was asked "how closely do you think these statements reflect your daughter's father's concerns," etc.)

For all surveys, a mixture of question types was used, including single and multiple response, rating scales, and open-ended items.

Data were entered using EpiData Entry v. 3.1 (EpiData Association, Odense, Denmark); and statistical analyses were conducted using Microsoft Excel 2010 (Microsoft, Redmond, WA, USA) and Stata 14 (StataCorp, College Station, TX, USA); graphs were created using Graphpad Prism 5 (GraphPad Software, La Jolla, CA, USA). Continuous data were summarised with medians, interquartile ranges, and ranges.

Frequency distributions were used to summarize nominal variables (knowledge of menstrual symptoms; side effects of menstrual medications; fathers' comfort with daughters' medication use; and fathers' feelings about daughters' menstrual pain), with missing items treated as a separate category. These distributions were compared between fathers and mothers using chi-squared tests.

Likert-scored items (Fathers' concerns related to the use of medications, and the mothers' perception of Fathers' concerns) were summarised graphically with means and standard error bars to indicate data variation, with medians presented to illustrate skewness. Fathers' actual concerns were compared to mothers' perceptions of paternal concerns using Wilcoxon matched-pairs signed-ranks tests.

The daughter's pain was assessed by self and parent report with a numerical rating scale anchored at 0 (no pain) and 10 (worst pain).¹⁰ Data are shown as a difference between each parent's and daughter's scores (<1 indicates that the parent underestimated and >1 that the parent overestimated the daughter's reported pain). Agreement of pain ratings between daughter and each parent was assessed with Cohen's kappa statistic, with quadratic weighting.

~~Frequency distributions were used to summarize nominal variables (knowledge of menstrual symptoms; side effects of menstrual medications; fathers' comfort with daughters' medication use; and fathers' feelings about daughters' menstrual pain), with missing items treated as a separate category. These distributions were compared between fathers and mothers using chi-squared tests. All hypothesis tests were two-sided and p-values<0.05 were considered statistically significant. The daughter's pain was assessed by self and parent report with a numerical rating scale anchored at 0 (no pain) and 10 (worst pain).¹⁰ Data are shown as a difference between each parent's and daughter's scores (<1 indicates that the parent underestimated and >1 that the parent overestimated the daughter's reported pain). Agreement of pain ratings between daughter and each parent was assessed with Cohen's kappa statistic, with quadratic weighting.~~

RESULTS

A total of 74 patients with dysmenorrhoea or heavy menstrual bleeding attended the clinic, of whom 40 were invited to complete questionnaires (7 were excluded for intellectual disability, 7 for history of sexual assault, abuse, or family violence, 3 for deceased father, and 17 patients were not introduced to the survey by their clinician).

A total of 60 surveys were received: 24 from daughters (24/40, 60%) of whom only two

did not want their parents involved in the study, 20 from mothers (20/38, 53%) and 16 from fathers (16/38, 42%; total response rate = 60/116 = 52%) (Table 1). Participant families included 13 daughter-mother-father trios, 7 daughter-mother dyads, 3 daughter-father dyads, and one individual daughter. All parents were living with their daughters and were biological parents of the daughters. Parents fell into a range of income brackets and all had at least secondary school education. The majority were born in Australia, were English speaking, and held Christian or no religious beliefs (Table 1).

Both mothers and fathers were asked whether they recognised a list of common menstrual-related symptoms. Many fathers reported ‘don’t know’ when asked if they recognised thigh pain (75%), pain with stool (63%) and pain on urination (69%) as menstruation-related (Figure 1A). However, most fathers did recognise that both mood swings (88%) and heavy menstrual bleeding (94%) are common problems associated with menstruation. In general, mothers were more likely to recognise menstrual-related symptoms (Figure 1A, B) ($p < 0.05$ for appetite change, back pain, bloating, constipation, fatigue, feeling faint/fainting, headache/migraine, nausea, pain in thighs, pain passing stool, pelvic pain, and shivers/shakes; all other $p \geq 0.05$).

There was considerable variability in the parents’ answers with a proportion answering ‘don’t know’ (minimum of 20% per health impact) or not answering (minimum of 13% per health impact) questions (Figure 1C,D). Of the fathers, 37% thought there were no potential long term impacts of their daughter’s symptoms and 13% felt that their daughter’s menstrual problems were normal. Of the mothers, 25% thought there were no potential long-term impacts and 20% felt that their daughter’s problems were normal. There was no difference between mothers and fathers in awareness of potential long-term health impacts (all $p > 0.05$).

Both mothers and fathers were asked whether they were aware of side effects associated

with the different groups of medications. Parents exhibited a lack of knowledge of side effects associated with each of the types of medication with a large proportion answering ‘don’t know’ or skipping questions, particularly for neuropathic medications (Figure 2).

Fathers were asked about their overall comfort with their daughters’ potential use of hormonal contraceptive therapies, pain medications or neuropathic medications to regulate symptoms. While the majority of fathers would be comfortable with their daughters taking hormonal contraceptive therapies (69%) and pain medications (81%), they were less comfortable with the idea of neuropathic medications (13%) (Figure 3). The mothers’ perception of the fathers’ comfort was concordant with that of fathers for hormonal contraceptive therapies (75%) and pain medications (85%), but they were less consistent with their perception of the fathers’ thoughts about neuropathic medications (35%) (Figure 3). Maternal perception of father’s comfort differed significantly by medication type ($p=0.003$), as did father’s self-reported comfort ($p=0.004$).

The degree to which fathers expressed specific concerns about each class of medication was highly variable (Figure 4). For all three classes, the greatest concern was for side effects. For hormonal contraceptive therapies, additional concerns were effects on mood and fertility; for pain medications, possible addiction; for neuropathic medications, effects on mood. Mothers were also asked to score what they thought the fathers’ concerns were with side effects. Despite the variability in answers between individuals, the fathers’ actual concerns and the mothers’ perceptions of their concerns were very similar, with ~~significant some differences between the father’s actual concerns and the mother’s perceptions of his concerns only~~ discordance for neuropathic medications, ~~and only~~ (whether the father had heard of them ($p=0.02$), and whether he was worried about mood ($p=0.04$) or blood pressure ($p=0.03$)).

Parents were asked whether they thought alternative therapies and other strategies would be useful to help improve their daughters' menstrual symptoms (Figure 5). While a proportion of parents answered 'don't know' to the potential usefulness of alternative strategies, most thought that exercise (mothers: 70%, fathers: 81%), healthy eating (mothers: 65%, fathers: 94%) and improving sleep patterns (mothers: 65%, fathers: 69%) would improve symptoms (Figure 5). Other strategies parents thought would be useful included reducing stress (mothers: 55%, fathers: 69%) and strengthening support networks (mothers: 50%, fathers: 75%). Most parents did not think that acupuncture (mothers: 0%, fathers: 25%) or fish oil (mothers: 15%, fathers: 19%) would be useful; very few mothers thought physiotherapy (mothers: 10%, fathers: 31%) would be useful.

In this study, parents were aware of and largely recognised the extent of their daughters' pain. Only one participating parent (a mother) did not answer the pain rating item. Parental perception of daughters' pain was comparable within families (n=13 daughter-mother-father trios), with mothers more likely to overestimate and fathers to underestimate daughters' reported pain levels (Figure 6). Agreement was high between daughters and both parents (weighted kappa: 0.80 for mothers versus daughters, 0.71 for fathers versus daughters.) Of the 20 mothers, 19 (95%) provided examples of symptoms experienced by their daughter. Of these, 15 (75%) indicated several symptoms covering the diversity of symptoms experienced by daughters. In contrast, only 11 of the 16 (69%) fathers provided examples of symptoms, with 8 (50%) providing several symptoms. The remaining 5 fathers indicated they did not know, were not aware of any symptoms, or did not provide an answer.

When given a list of feelings about their daughters' pain, most fathers endorsed "sympathetic/concerned for her" (13/16, 81%) and several endorsed "helpless" (7/16, 56%).

None of the fathers endorsed “annoyed” or “indifferent/does not affect me”. The mothers’ beliefs about fathers’ feelings corresponded well to the fathers’ reports; 85% (17/20) thought fathers felt sympathetic or concerned, 5-10% thought fathers felt annoyed (1/20) or indifferent (2/20), and 55% (11/20) thought fathers felt helpless. When the daughters were asked what they thought their father felt, 65% (15/24) felt their fathers were sympathetic about their period symptoms, 22% (5/24) felt their fathers were annoyed or 35% (8/24) indifferent; and 30% (7/24) thought their fathers felt helpless.

Just under half (7/16, 44%) of fathers reported that they talk to their daughters about period symptoms at least every six months (6/7, 86%). Most fathers indicated they would be comfortable (13/16, 81%) talking to their daughter about her menstrual symptoms. Of the fathers, 37% (6/16) said they spoke to the mothers often about their daughter’s symptoms; 31% (5/16) spoke sometimes, 19% (3/16) rarely (once a year) and 13% (2/16) did not answer.

Of the daughters, 54% (13/24) said they were comfortable talking to their fathers about their period symptoms.

Most mothers and fathers felt that their daughters’ symptoms affected her quality of life (fathers 11/16, 69%; mothers 16/20, 80%). Parents noted that daughters’ symptoms had impacts on their going to school (mothers: 70%, fathers: 56%), joining in physical activities (mothers: 70%, fathers: 63%), joining in family activities (mothers: 60%, fathers: 38%), interacting with friends (mothers: 45%, fathers: 31%). Parents also thought that daughters’ menstrual symptoms caused daughters to be anxious (mothers: 70%, fathers: 50%).

While most mothers and fathers felt that their daughters’ symptoms often or sometimes had an impact on their family’s day to day routine (mothers: 18/20, 90%; fathers 12/16, 75%), some fathers felt there was no impact (4/16, 25%). When asked about how their daughters’ symptoms

affected the family (Figure 7), both parents were particularly concerned about the impact of symptoms on their daughters' welfare (mothers: 75%, fathers: 88%) and schooling (mothers: 55%, fathers: 63%), as well as how symptoms affected family activities (mothers: 65%, fathers: 56%).

The majority of fathers rarely or never took leave from work because of their daughters' menstrual problems (10/14, 71%) or picked up their daughters' medical prescriptions (9/16, 56%), mainly because others in the family were able to care for the daughters when needed (leave: 4/10, 40%; meds: 4/9, 44%). About half of fathers sometimes (47%, 7/15) picked their daughters up from school or other locations because of menstrual symptoms, and only a few of the half who rarely or never did so relied on other family members to do it (2/8, 25%).

Fathers (n=16) were asked to indicate where they had received information about menstrual periods (multiple answers possible). Fathers indicated they received information from their wives or partners (13/15, 86%), their daughters (4/16, 25%), other female relatives (4/16, 25%) or from doctors or medical staff (6/16, 38%). Only one had received information from sex education classes or the internet. When asked if they would like to get further information about their daughters' menstrual problems, five (31%) thought it was not necessary, four (25%) would have liked an information sheet from the clinic, four (25%) felt a personal discussion with a doctor would be helpful, two (13%) would find a website useful, and one (6%) each thought a forum, information session, or a Dads support group would be useful.

DISCUSSION

This study provides the first insight into fathers' knowledge of their daughters' menstrual period symptoms and treatment, and the mothers' and daughters' perceptions of the father's knowledge.

Despite small numbers, it demonstrated that fathers and mothers lacked complete knowledge of menstrual symptoms and their consequences, and had potential concerns associated with medical treatment options.

It is difficult to assess existing knowledge that fathers have about menstruation as the topic is taboo in many cultures.^{11,12} Evidence of this taboo can be seen in the wealth of euphemisms related to menstruation.^{12,13} This cultural phenomenon has also prevented boys accessing adequate and accurate information about menstruation.¹⁴ This is problematic considering the rise in non-traditional family structures, including single father households.

In our study, parents, particularly fathers, were unclear on the specifics of menstrual symptoms and the potential long-term consequences associated with menstrual problems. Menstrual dysfunction is very common in the teenage years due to anovulation or prostaglandin-mediated pain.^{15,16} The vast majority of these symptoms are self-limiting with no long-term consequences. However, women with chronic dysmenorrhea can develop altered pain processing relative to women without dysmenorrhea, and may be predisposed to development of other chronic pain conditions.¹⁵

In our study, parents had various knowledge gaps related to medications used to treat menstrual disturbance, especially neuropathic medications. Hormonal contraceptives are commonly used to treat dysmenorrhoea and HMB (e.g. oral contraceptive pill, OCP).^{4,17} While this form of therapy is effective, the non-contraceptive use of the OCP can be difficult for some families to accept.^{18,19} Parents may express fears that such treatment is giving their daughter implicit approval to become sexually active.²⁰

Although not specific to menstrual pain, previous studies have reported that parents often underestimate the extent of their children's pain.^{21,22} In the current study, while perception of

daughters' pain was comparable between parents within families, mothers were more likely to overestimate and fathers underestimate the extent of pain. This discrepancy may reflect the inherent unfamiliarity fathers have with menstrual pain, the coping style or reduced communication between father and daughter on this topic. Consistent with our observations, in a preliminary study of parental perception, mothers were more likely to overestimate the impact of dysmenorrhea and HMB on their daughters' quality of life relative to the girls report of the impact.²³ Fathers reported being largely sympathetic of their daughter's pain and concerned about their welfare and schooling.

It was evident that fathers were more open to communication about menstrual symptoms than expected. In our cohort, only 19% of fathers indicated that they would be uncomfortable discussing menstruation with their daughters, whereas 47% of daughters were uncomfortable or unsure about such a conversation. This lack of comfort may stem from daughters believing fathers are unaware of their experience. Kalman analysed interviews with 13 adolescent girls in the United States living exclusively with their fathers.²⁴ The majority of the girls reported feeling too embarrassed to discuss menstruation with their fathers. Only two participants in the study had brought up the subject of their menarche with their fathers; one of these girls was then told to speak with her estranged mother. A common reason given in this and other studies for the lack of discussion was that fathers were "clueless" about such matters.^{24,25} This finding is consistent with anecdotal beliefs; however, no further detail was obtained about the extent of this lack of knowledge as the study did not extend to consulting fathers.

The results from our study suggest the need for additional educational material related to menstrual health; however, around a third of fathers indicated they did not require/want further health information. Of those wanting further information, most preferred to see medical staff,

with provision of an information sheet the next most popular option. The use of an information pamphlet following attendance at clinic may lead to increased knowledge of symptoms as has been shown in other specialities.²⁶ Furthermore, education may help fathers gain confidence and credibility when communicating with their daughters, and may assist them to make informed health care decisions when required.

There were several key limitations associated with the current study. The small sample size, and short study duration, limited analysis, and the 52-60% response rates and 45% exclusion rate may have introduced bias, limiting generalizability. Recruitment from a specialist gynaecology clinic may have selected for families with a greater understanding of menstrual symptoms, overestimating paternal knowledge and involvement relative to the general population. The response rates amongst mothers and fathers were somewhat lower than that of daughters, as expected in a study where parental recruitment was contingent on the participation of the daughter, but response rates were similar between mothers and fathers. Still, families, particularly fathers, uncomfortable discussing menstrual issues may not have participated, resulting in further overestimation of paternal involvement. In spite of these limitations, this work has identified parental knowledge gaps about menstrual period symptoms.

Further research must recognise the multifactorial nature of the problem and the deeply ingrained community attitudes to menstruation. These data will help to provide further assistance to fathers who may not have others to help support them in their support of their daughters.

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REFERENCES

1. Foran KA: Managing adolescent menorrhagia. Aust Doctor. 2015.
2. Hillen TI, Grbavac SL, Johnston PJ, et al: Primary dysmenorrhea in young Western Australian women: prevalence, impact, and knowledge of treatment. J Adolesc Health. 1999; 25:40
3. Parker MA, Sneddon AE, Arbon P: The menstrual disorder of teenagers (MDOT) study: determining typical menstrual patterns and menstrual disturbance in a large population-based study of Australian teenagers. Br J Obstet Gynaecol. 2010; 117:185
4. Subasinghe AK, Happo L, Jayasinghe YL, et al: Prevalence and severity of dysmenorrhoea, and management options reported by young Australian women. Aust Fam Physician. 2016; 45:829
5. Craig L, Mullan K, Blaxland M: Parenthood, policy and work-family time in Australia 1992 - 2006. Work, Employment & Society. 2010; 24:27
6. Livingston G: The rise of single fathers: A ninefold increase since 1960. Pew Research Center Report. July 2013.
7. Kalman M: Taking a different path: menstrual preparation for adolescent girls living apart from their mothers. Health Care Women Int. 2003; 24:868
8. Vaughn J: Confidence that bleeds. Jon Vaugh. Full time daddy. 2013.
<http://blog.fulltimedaddy.com/confidence-that-bleeds/>
9. Labour force status and other characteristics of families. Australian Bureau of Statistics: June 2016.
10. Bourdel N, Alves J, Pickering G, et al: Systematic review of endometriosis pain assessment: how to choose a scale? Hum Reprod Update. 2015; 21:136

11. Jarrah SS, Kamel AA: Attitudes and practices of school-aged girls towards menstruation. Int J Nurs Pract. 2012; 18:308
12. Johnston-Robledo I, Chrisler JC: The Menstrual Mark: Menstruation as Social Stigma. Sex Roles. 2013; 68:9
13. Murray S: `Keeping their secret safe': Menstrual etiquette in Australia, 1900-1960. Hecate. 1998; 24:62.
14. Allen KR, Kaestle CE, Goldberg AE: More Than Just a Punctuation Mark: How Boys and Young Men Learn About Menstruation. J Fam Issues. 2011; 32:129
15. Iacovides S, Avidon I, Baker FC: What we know about primary dysmenorrhea today: a critical review. Hum Reprod Update. 2015; 21:762
16. Rosenfield RL: Clinical review: Adolescent anovulation: maturational mechanisms and implications. J Clin Endocrinol Metab. 2013; 98:3572
17. Harel Z: Dysmenorrhea in adolescents and young adults: an update on pharmacological treatments and management strategies. Expert Opin Pharmacother. 2012; 13:2157
18. Davis AR, Westhoff C, O'Connell K, et al: Oral contraceptives for dysmenorrhea in adolescent girls: a randomized trial. Obstet Gynecol. 2005; 106:97
19. Lam C, Zaenglein AL: Contraceptive use in acne. Clin Dermatol. 2014; 32:502
20. Greenfield M: Oral contraceptive therapy in teens: addressing objections, encouraging communication. Contemporary OBGyn. 2011; May 1.
21. Goubert L, Vervoort T, Cano A, et al: Catastrophizing about their children's pain is related to higher parent-child congruency in pain ratings: an experimental investigation. Eur J Pain. 2009; 13:196

22. Kamper SJ, Dissing KB, Hestbaek L: Whose pain is it anyway? Comparability of pain reports from children and their parents. *Chiropr Man Therap*. 2016; 24:24
23. Azurah AGN, Sanci L, Moore E, et al: Parents' Perception of the Impact of Menstrual Problems on Adolescents' Quality of Life. *Journal of Pediatric and Adolescent Gynecology*. 2010. 23:e66.
24. Kalman MB: Adolescent girls, single-parent fathers, and menarche. *Holist Nurs Pract*. 2003; 17:36
25. Gardner MC: Understanding men's attitudes about the menstrual cycle. PhD Thesis, Saybrook Graduate School and Research Center, San Francisco; 2008.
26. Huth MM, Broome ME, Mussatto KA, et al: A study of the effectiveness of a pain management education booklet for parents of children having cardiac surgery. *Pain Manag Nurs*. 2003; 4:31

TABLES

Table 1: Demographic data

Demographic ^a	Daughters (n=24)	Fathers (n=16)	Mothers (n=20)
Age in years [mean (range)]	16 (13-19)		
Parental Relationship			
Married		13 (81%)	18 (90%)
Not married		2 (13%)	3 (15%)
Divorced		1 (6%)	1 (5%)
Country of birth			
Australia	22 (92%)	13 (81%)	16 (80%)
Not Australia	2 (8%)	3 (19%)	4 (20%)
Language spoken at home			
English	23 (96%)	13 (81%)	18 (90%)
Non-English	1 (4%)	3 (19%)	2 (10%)
Household income			
\$20,001-\$50,000		1 (6%)	1 (5%)
\$50,001-\$80,000		4 (25%)	4 (20%)
\$80,001-\$120,000		2 (13%)	1 (5%)
>\$120,000		4 (25%)	6 (30%)
Prefer not to say or didn't answer		5 (31%)	8 (40%)

Demographic ^a	Daughters (n=24)	Fathers (n=16)	Mothers (n=20)
Education			
Still at School	21 (88%)		
Not studying	1 (4%)		
Secondary School		5 (31%)	7 (35%)
TAFE/Vocational	2 (8%)	5 (31%)	6 (30%)
University	0 (0%)	6 (38%)	7 (35%)
Employment			
Not working	11 (48%)		
Full-time	0 (0%)		
Part-time	8 (35%)		
Seeking work	4 (17%)		
Religion			
No religion	9 (38%)	8 (50%)	8 (40%)
Christian	9 (38%)	6 (38%)	11 (55%)
Buddhist	1 (4%)	1 (6%)	1 (5%)
Islam	1 (4%)	0 (0%)	0 (0%)
Didn't know	2 (8%)	0 (0%)	0 (0%)
Prefer not to say	1 (4%)	0 (0%)	0 (0%)
Not answered	1 (4%)	1 (6%)	0 (0%)

^aData are number of participants (percentage of participants) unless otherwise stated.

Table 2: Menstrual characteristics in a cohort of girls attending the Adolescent

Gynaecology Outpatient Clinic at the Royal Children's Hospital because of dysmenorrhea and/or heavy menstrual bleeding. Data are presented as median, interquartile range and range unless otherwise stated.

Characteristic	Daughters (N=24)
Age at visit, years ^a	16, 14.5-16.5, 13-19
Age at menarche, years ^a	12, 11-13, 10-14
Years since menarche ^a	4, 3-4, 1-6
Iatrogenic amenorrhea (percentage of girls) ^b	7/24 (29)
Cycle regularity, past year (percentage of girls) ^b	
Regular	6/24 (25)
Irregular	17/24 (71)
Don't know	1/24 (4)
Cycle length [number of girls answering question] ^c	21, 14-28, 7-31, [7]
Bleeding days ^a	7, 6-11, 2-25
Clots present (percentage of girls) ^b	18 (75)
Clot frequency (among those with clots only) (percentage of girls) ^b	
Sometimes	9/18 (50)
Most of the time	6/18 (33)
All of the time	3/18 (17)
Misses school or work (percentage of girls) ^b	
No	6 (25)
With some periods	13 (54)

Characteristic	Daughters (N=24)
Every period	5 (21)
Number of days missed (among those who miss only) [number of girls answering question] ^c	2, 1-3, 1-5, [17]
Reasons for missing (among those who miss only) ^{b,d} (percentage of girls)	
Pain	14/18 (78)
Heavy flow	16/18 (89)
Nausea	6/18 (33)
Vomiting	2/18 (11)
Other (headaches, lack of sleep due to pain, passing out)	3/18 (17)
Symptoms worsened over past year (percentage of girls) ^b	13/21 (62)
Uses medication to address pain (percentage of girls) ^b	21 (88)
Medication type used (among those who used meds only) (percentage of girls) ^b	
Panadol (paracetamol)	14/21 (67)
Aspirin (acetylsalicylic acid)	2/21 (10)
Ponstan (mefenamic acid)	12/21 (43)
Naprosyn (naproxen)	5/21 (24)
Nurofen (ibuprofen)	9/21 (43)
Oral Contraceptive Pill	8/21 (38)
Implanon (etonogestrel)	3/21 (14)
Other	6/21 (29)
Any NSAID	17/21 (80)
Tranexamic acid	2/21 (10)

Characteristic	Daughters (N=24)
Effectiveness of medication in pain relief ^a	6, 4-8, 0-10
Levonorgestrel Intra-uterine system (percentage of girls) ^b	6 (25)

^aMedian, Interquartile range, range

^bNumber of girls relative to total (percentage of girls)

^cMedian, Interquartile range, range, number of girls answering question

^dPatients could choose more than one option

FIGURE LEGENDS

Figure 1. Percentage of fathers (n=16) (A, C) and mothers (n=20) (B, D) answering either ‘yes’ (black), ‘no’ (white), [‘maybe’ (purple) in C and D only], ‘don’t know’ (blue) or not answering (grey) questions about whether or not they believe certain symptoms are commonly associated with menstrual periods (A, B) or whether they believe menstrual problems are associated with certain long term health impacts (C, D).

Figure 2. Percentage of mothers (n=20) (A, C, E) and fathers (n=16) (B, D, F) answering either ‘yes’ (black), ‘no’ (white), ‘don’t know’ (blue) or not answering (grey) questions about their awareness of side-effects associated with use of hormonal contraceptives (A, B), pain medications (C, D) or neuropathic medications (E, F).

Figure 3. Percentage of mothers (n=20) (A) and fathers (n=16) (B) answering either ‘yes’ (black), ‘no’ (white), ‘don’t know’ (blue) or not answering (grey) questions about whether they would be comfortable with their daughter taking hormonal contraceptive therapies, pain medications or neuropathic medications to help minimise menstrual-related symptoms.

Figure 4. Mean scores ($\pm$ standard error) provided by fathers ($\square$) to questions about their concerns related to daughters’ possible use of hormonal contraceptive therapies, pain medications and neuropathic medications (scores 1=Disagree, 5=Agree). Scores are also provided for the mothers ($\bullet$) responses re what they think the fathers’ concerns are about daughters’ possible use of various medications. Answers ranged from 1 (disagree) to 5 (agree) for all questions except “I am worried about the costs of treatment” (ranged from 1-3). A median is also provided directly alongside each mean and standard error. Values in brackets to the left of each graph reflect the number of either fathers (from a total n=20) or mothers (from a total n=16) that did not complete that particular question.

Figure 5. Percentage of mothers (n=20) (A) and fathers (n=16) (B) answering either ‘yes’ (black), ‘no’ (white), ‘don’t know’ (blue) or not answering (grey) questions about whether they believe specific alternative treatments or strategies will help relieve their daughters’ symptoms.

Figure 6. Parental perception (n=13 families) of daughters’ menstrual pain on a scale of 0 (no pain) to 10 (worst pain). Data are shown as a difference between the parents’ and daughters’ score (<1 indicates that the parent underestimated and >1 that the parent overestimated the daughter’s reported pain. Note: There are four overlapping data points in the centre of the graph indicating that four pairs of parents gave the same pain scores as their daughters.

Figure 7. Percentage of mothers (n=20) (A) and fathers (n=16) (B) answering either ‘yes’ (black), ‘no’ (white), ‘don’t know’ (blue) or not answering (grey) questions about how their daughters’ symptoms impact on their family. Note, ‘leave from work’ applies to family members other than the daughter.

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Paternal understanding of menstrual concerns in young women

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STRUCTURED ABSTRACT

STUDY OBJECTIVE: No studies have specifically considered paternal understanding of menstruation. This study aimed to establish the degree of understanding of fathers of adolescent girls with menstrual symptoms relative to mothers.

DESIGN AND SETTING: This is a cross-sectional survey-based study. Adolescent patients attending an outpatient gynaecology clinic for dysmenorrhoea and/or heavy menstrual bleeding (HMB) and their parents were invited to complete surveys.

PARTICIPANTS: 60 surveys were completed (24/40 daughters, 20/40 mothers, 16/40 fathers).

INTERVENTIONS AND MAIN OUTCOME MEASURES: Surveys aimed to test parents' understanding of menstrual symptoms and potential medications, as well as fathers' concerns with their daughters' health.

RESULTS: The fathers' knowledge of menstrual symptoms was poorer than mothers, although most knew HMB (93%) and mood swings (87%). Many parents answered 'don't know' or did not answer questions about potential consequences of medications, although parents were clearly concerned about side effects.

Most fathers (80%) were open to discussing menstrual concerns with daughters; however, only 52% of daughters were open to such discussions. Of fathers, 80% felt sympathetic/concerned, 53% helpless and 13% frustrated when daughters were in pain. When asked about impacts, 93% of fathers (79% of mothers) were worried about their daughter's welfare and 60% (21%) about schooling.

CONCLUSIONS: We present the first insight into fathers' knowledge of their daughters' menstrual health. Overall, parents have an incomplete picture of menstrual symptoms. Even in

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66 this cohort, which could be expected to be well informed due to their daughters' attendance at a
67 tertiary hospital, it is clear that further knowledge would assist them caring for their daughters.

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69 **Keywords:** Adolescents, dysmenorrhea, fathers, mothers, menstruation, parents

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INTRODUCTION

Menstruation can be distressing for young women, particularly when complicated by heavy menstrual bleeding (HMB) or dysmenorrhoea (menstrual pain). HMB affects approximately 12-37% of girls,¹ while dysmenorrhoea affects 80-90% of Australian secondary school-aged students and young women.²⁻⁴ With misconceptions about menstruation common, a girl's access to parental guidance is invaluable.

Within traditional heteronuclear families, mothers remain the primary providers of childcare.⁵ It is not surprising, therefore, that little is known about a father's understanding of menstruation problems, his perception of their impact on his daughter's and family's life, or his understanding of treatment options for menstrual pathologies. Previous studies have exclusively examined maternal aspects of care⁶ or reported insufficient information to extend any findings to the father.^{7,8}

A father's influence on health decisions is of particular relevance given the increasing proportion of single father households. As of June 2016, there were ~184,000 single father families in Australia (19% of all single parent families).⁹ Single father households in the United States have increased nine-fold since the 1960s.⁶ This increase may necessitate further paternal involvement in children's healthcare. However, the extent of paternal involvement in menstrual-related health is unknown.

In order to address the lack of data regarding fathers' experience of menstrual healthcare, we aimed to explore their understanding, involvement, and attitudes towards menstrual health. We hypothesised that fathers would have poor understanding of menstrual symptoms and treatment methods relative to mothers, and have little involvement in their daughters' menstrual health care.

MATERIALS AND METHODS

A cross-sectional survey of adolescents (aged 13 to 19) and their parents who attended the Adolescent Gynaecology Outpatient Clinic at the Royal Children's Hospital, Victoria, Australia was conducted between March and June 2015. Ethical approval was provided by the Royal Children's Hospital's Human Research Ethics Committee (Approval Number: HREC 34294A).

The three participant groups were:

1. Young women 13 years of age and over who were attending the clinic for dysmenorrhoea and/or HMB as new or review patients with at least one living father. Patients who were seeing their clinician primarily for another symptom or illness were also eligible, provided that they were also experiencing the symptoms within the inclusion criteria.
2. The participant's father/s, including biological, adoptive, foster or stepfathers.
3. The participant's mother/s, including biological, adoptive, foster or stepmothers.

Participants were excluded if they were non-English speaking, had an intellectual disability that would prevent them from completing the survey, or if the young woman had a known history of sexual assault or abuse of any kind, or had witnessed violence in the home.

The daughter and attending parent/s were introduced to a researcher by their treating clinician if they wished to hear about the study. Informed consent was obtained by the attending parent/s for their own participation and for their daughter's participation if she was under 18 years and had provided assent. Daughters were also permitted to take part individually should they not wish their parents to participate. Daughters aged 18 years and over provided their own consent. Surveys were completed by attending participants at the hospital or taken home and returned by mail in a postage-paid addressed envelope.

For parents not in attendance during the appointment, information sheets, consent forms

and surveys were provided to the young woman to take home with her, along with a postage-paid addressed envelope for return of the consent forms and surveys if parents elected to participate.

All surveys collected basic demographic data (Tables 1 and 2). The daughters' surveys contained questions regarding their own menstrual periods from the Menstrual Disorder of Teenagers (MDOT) questionnaire, developed to assess symptoms in Australian adolescents.³ Characteristics of menstruation measured included: age at menarche; frequency, regularity, and heaviness of menstruation; intra-menstrual bleeding; interference of menstruation with work, school, social life, relationships and sport; past-year physical and emotional symptoms associated with menstruation; use and effectiveness of analgesia; and perceptions and experiences with menstruation (Table 2).³ Each daughter was also asked about her perceptions of her father's attitude and feelings regarding her menstrual symptoms and of his opinions of her treatments.

Surveys given to the fathers asked about: knowledge of menstrual period symptoms in general and as experienced by daughters (yes/no/don't know); the father's feelings and attitudes towards his daughter's symptoms (yes/no/don't know); the extent to which the father was involved in his daughter's care (three items, often/sometimes/rarely/never/others in the family do; attending medical appointments often/sometimes/rarely/never); knowledge of side effects from the daughter's use of hormonal medications, pain killers, and neuropathic pain medications (yes/no/don't know); and where fathers had received information about menstrual periods (high school sex education classes/internet/partner/daughter/other female relative/doctor/other). Fathers' concerns about the three classes of medications (hormonal, pain killers, and neuropathic medications) were assessed with eleven Likert-scored items. Fathers were asked an overall question about their comfort with daughters being prescribed each class of medication

(yes/no/maybe).

Each mother received the same survey, with questions changed to assess her perception of the father's attitude, understanding and degree of comfort with the topic of menstrual periods (i.e. where a father was asked "how closely do these statements reflect your concerns about your daughter using each of these medications," a mother was asked "how closely do you think these statements reflect your daughter's father's concerns," etc.)

For all surveys, a mixture of question types was used, including single and multiple response, rating scales, and open-ended items.

Data were entered using EpiData Entry v. 3.1 (EpiData Association, Odense, Denmark); and statistical analyses were conducted using Microsoft Excel 2010 (Microsoft, Redmond, WA, USA) and Stata 14 (StataCorp, College Station, TX, USA); graphs were created using Graphpad Prism 5 (GraphPad Software, La Jolla, CA, USA). Continuous data were summarised with medians, interquartile ranges, and ranges.

Frequency distributions were used to summarize nominal variables (knowledge of menstrual symptoms; side effects of menstrual medications; fathers' comfort with daughters' medication use; and fathers' feelings about daughters' menstrual pain), with missing items treated as a separate category. These distributions were compared between fathers and mothers using chi-squared tests.

Likert-scored items (Fathers' concerns related to the use of medications, and the mothers' perception of Fathers' concerns) were summarised graphically with means and standard error bars to indicate data variation, with medians presented to illustrate skewness. Fathers' actual concerns were compared to mothers' perceptions of paternal concerns using Wilcoxon matched-pairs signed-ranks tests.

The daughter's pain was assessed by self and parent report with a numerical rating scale anchored at 0 (no pain) and 10 (worst pain).¹⁰ Data are shown as a difference between each parent's and daughter's scores (<1 indicates that the parent underestimated and >1 that the parent overestimated the daughter's reported pain). Agreement of pain ratings between daughter and each parent was assessed with Cohen's kappa statistic, with quadratic weighting.

All hypothesis tests were two-sided and p-values<0.05 were considered statistically significant.

RESULTS

A total of 74 patients with dysmenorrhoea or heavy menstrual bleeding attended the clinic, of whom 40 were invited to complete questionnaires (7 were excluded for intellectual disability, 7 for history of sexual assault, abuse, or family violence, 3 for deceased father, and 17 patients were not introduced to the survey by their clinician).

A total of 60 surveys were received: 24 from daughters (24/40, 60%) of whom only two did not want their parents involved in the study, 20 from mothers (20/38, 53%) and 16 from fathers (16/38, 42%; total response rate = 60/116 = 52%) (Table 1). Participant families included 13 daughter-mother-father trios, 7 daughter-mother dyads, 3 daughter-father dyads, and one individual daughter. All parents were living with their daughters and were biological parents of the daughters. Parents fell into a range of income brackets and all had at least secondary school education. The majority were born in Australia, were English speaking, and held Christian or no religious beliefs (Table 1).

Both mothers and fathers were asked whether they recognised a list of common menstrual-related symptoms. Many fathers reported 'don't know' when asked if they recognised thigh pain

(75%), pain with stool (63%) and pain on urination (69%) as menstruation-related (Figure 1A). However, most fathers did recognise that both mood swings (88%) and heavy menstrual bleeding (94%) are common problems associated with menstruation. In general, mothers were more likely to recognise menstrual-related symptoms (Figure 1A, B) ($p < 0.05$ for appetite change, back pain, bloating, constipation, fatigue, feeling faint/fainting, headache/migraine, nausea, pain in thighs, pain passing stool, pelvic pain, and shivers/shakes; all other $p \geq 0.05$).

There was considerable variability in the parents' answers with a proportion answering 'don't know' (minimum of 20% per health impact) or not answering (minimum of 13% per health impact) questions (Figure 1C,D). Of the fathers, 37% thought there were no potential long term impacts of their daughter's symptoms and 13% felt that their daughter's menstrual problems were normal. Of the mothers, 25% thought there were no potential long-term impacts and 20% felt that their daughter's problems were normal. There was no difference between mothers and fathers in awareness of potential long-term health impacts (all $p > 0.05$).

Both mothers and fathers were asked whether they were aware of side effects associated with the different groups of medications. Parents exhibited a lack of knowledge of side effects associated with each of the types of medication with a large proportion answering 'don't know' or skipping questions, particularly for neuropathic medications (Figure 2).

Fathers were asked about their overall comfort with their daughters' potential use of hormonal contraceptive therapies, pain medications or neuropathic medications to regulate symptoms. While the majority of fathers would be comfortable with their daughters taking hormonal contraceptive therapies (69%) and pain medications (81%), they were less comfortable with the idea of neuropathic medications (13%) (Figure 3). The mothers' perception of the fathers' comfort was concordant with that of fathers for hormonal contraceptive therapies (75%)

and pain medications (85%), but they were less consistent with their perception of the fathers' thoughts about neuropathic medications (35%) (Figure 3). Maternal perception of father's comfort differed significantly by medication type ($p=0.003$), as did father's self-reported comfort ($p=0.004$).

The degree to which fathers expressed specific concerns about each class of medication was highly variable (Figure 4). For all three classes, the greatest concern was for side effects. For hormonal contraceptive therapies, additional concerns were effects on mood and fertility; for pain medications, possible addiction; for neuropathic medications, effects on mood. Mothers were also asked to score what they thought the fathers' concerns were with side effects. Despite the variability in answers between individuals, the fathers' actual concerns and the mothers' perceptions of their concerns were very similar, with some discordance for neuropathic medications (whether the father had heard of them ($p=0.02$), and whether he was worried about mood ($p=0.04$) or blood pressure ($p=0.03$)).

Parents were asked whether they thought alternative therapies and other strategies would be useful to help improve their daughters' menstrual symptoms (Figure 5). While a proportion of parents answered 'don't know' to the potential usefulness of alternative strategies, most thought that exercise (mothers: 70%, fathers: 81%), healthy eating (mothers: 65%, fathers: 94%) and improving sleep patterns (mothers: 65%, fathers: 69%) would improve symptoms (Figure 5). Other strategies parents thought would be useful included reducing stress (mothers: 55%, fathers: 69%) and strengthening support networks (mothers: 50%, fathers: 75%). Most parents did not think that acupuncture (mothers: 0%, fathers: 25%) or fish oil (mothers: 15%, fathers: 19%) would be useful; very few mothers thought physiotherapy (mothers: 10%, fathers: 31%) would be useful.

In this study, parents were aware of and largely recognised the extent of their daughters' pain. Only one participating parent (a mother) did not answer the pain rating item. Parental perception of daughters' pain was comparable within families (n=13 daughter-mother-father trios), with mothers more likely to overestimate and fathers to underestimate daughters' reported pain levels (Figure 6). Agreement was high between daughters and both parents (weighted kappa: 0.80 for mothers versus daughters, 0.71 for fathers versus daughters.) Of the 20 mothers, 19 (95%) provided examples of symptoms experienced by their daughter. Of these, 15 (75%) indicated several symptoms covering the diversity of symptoms experienced by daughters. In contrast, only 11 of the 16 (69%) fathers provided examples of symptoms, with 8 (50%) providing several symptoms. The remaining 5 fathers indicated they did not know, were not aware of any symptoms, or did not provide an answer.

When given a list of feelings about their daughters' pain, most fathers endorsed "sympathetic/concerned for her" (13/16, 81%) and several endorsed "helpless" (7/16, 56%). None of the fathers endorsed "annoyed" or "indifferent/does not affect me". The mothers' beliefs about fathers' feelings corresponded well to the fathers' reports; 85% (17/20) thought fathers felt sympathetic or concerned, 5-10% thought fathers felt annoyed (1/20) or indifferent (2/20), and 55% (11/20) thought fathers felt helpless. When the daughters were asked what they thought their father felt, 65% (15/24) felt their fathers were sympathetic about their period symptoms, 22% (5/24) felt their fathers were annoyed or 35% (8/24) indifferent; and 30% (7/24) thought their fathers felt helpless.

Just under half (7/16, 44%) of fathers reported that they talk to their daughters about period symptoms at least every six months (6/7, 86%). Most fathers indicated they would be comfortable (13/16, 81%) talking to their daughter about her menstrual symptoms. Of the

fathers, 37% (6/16) said they spoke to the mothers often about their daughter's symptoms; 31% (5/16) spoke sometimes, 19% (3/16) rarely (once a year) and 13% (2/16) did not answer.

Of the daughters, 54% (13/24) said they were comfortable talking to their fathers about their period symptoms.

Most mothers and fathers felt that their daughters' symptoms affected her quality of life (fathers 11/16, 69%; mothers 16/20, 80%). Parents noted that daughters' symptoms had impacts on their going to school (mothers: 70%, fathers: 56%), joining in physical activities (mothers: 70%, fathers: 63%), joining in family activities (mothers: 60%, fathers: 38%), interacting with friends (mothers: 45%, fathers: 31%). Parents also thought that daughters' menstrual symptoms caused daughters to be anxious (mothers: 70%, fathers: 50%).

While most mothers and fathers felt that their daughters' symptoms often or sometimes had an impact on their family's day to day routine (mothers: 18/20, 90%; fathers 12/16, 75%), some fathers felt there was no impact (4/16, 25%). When asked about how their daughters' symptoms affected the family (Figure 7), both parents were particularly concerned about the impact of symptoms on their daughters' welfare (mothers: 75%, fathers: 88%) and schooling (mothers: 55%, fathers: 63%), as well as how symptoms affected family activities (mothers: 65%, fathers: 56%).

The majority of fathers rarely or never took leave from work because of their daughters' menstrual problems (10/14, 71%) or picked up their daughters' medical prescriptions (9/16, 56%), mainly because others in the family were able to care for the daughters when needed (leave: 4/10, 40%; meds: 4/9, 44%). About half of fathers sometimes (47%, 7/15) picked their daughters up from school or other locations because of menstrual symptoms, and only a few of the half who rarely or never did so relied on other family members to do it (2/8, 25%).

Fathers (n=16) were asked to indicate where they had received information about menstrual periods (multiple answers possible). Fathers indicated they received information from their wives or partners (13/15, 86%), their daughters (4/16, 25%), other female relatives (4/16, 25%) or from doctors or medical staff (6/16, 38%). Only one had received information from sex education classes or the internet. When asked if they would like to get further information about their daughters' menstrual problems, five (31%) thought it was not necessary, four (25%) would have liked an information sheet from the clinic, four (25%) felt a personal discussion with a doctor would be helpful, two (13%) would find a website useful, and one (6%) each thought a forum, information session, or a Dads support group would be useful.

DISCUSSION

This study provides the first insight into fathers' knowledge of their daughters' menstrual period symptoms and treatment, and the mothers' and daughters' perceptions of the father's knowledge. Despite small numbers, it demonstrated that fathers and mothers lacked complete knowledge of menstrual symptoms and their consequences, and had potential concerns associated with medical treatment options.

It is difficult to assess existing knowledge that fathers have about menstruation as the topic is taboo in many cultures.^{11,12} Evidence of this taboo can be seen in the wealth of euphemisms related to menstruation.^{12,13} This cultural phenomenon has also prevented boys accessing adequate and accurate information about menstruation.¹⁴ This is problematic considering the rise in non-traditional family structures, including single father households.

In our study, parents, particularly fathers, were unclear on the specifics of menstrual symptoms and the potential long-term consequences associated with menstrual problems.

Menstrual dysfunction is very common in the teenage years due to anovulation or prostaglandin-mediated pain.^{15,16} The vast majority of these symptoms are self-limiting with no long-term consequences. However, women with chronic dysmenorrhea can develop altered pain processing relative to women without dysmenorrhea, and may be predisposed to development of other chronic pain conditions.¹⁵

In our study, parents had various knowledge gaps related to medications used to treat menstrual disturbance, especially neuropathic medications. Hormonal contraceptives are commonly used to treat dysmenorrhoea and HMB (e.g. oral contraceptive pill, OCP).^{4,17} While this form of therapy is effective, the non-contraceptive use of the OCP can be difficult for some families to accept.^{18,19} Parents may express fears that such treatment is giving their daughter implicit approval to become sexually active.²⁰

Although not specific to menstrual pain, previous studies have reported that parents often underestimate the extent of their children's pain.^{21,22} In the current study, while perception of daughters' pain was comparable between parents within families, mothers were more likely to overestimate and fathers underestimate the extent of pain. This discrepancy may reflect the inherent unfamiliarity fathers have with menstrual pain, the coping style or reduced communication between father and daughter on this topic. Consistent with our observations, in a preliminary study of parental perception, mothers were more likely to overestimate the impact of dysmenorrhea and HMB on their daughters' quality of life relative to the girls report of the impact.²³ Fathers reported being largely sympathetic of their daughter's pain and concerned about their welfare and schooling.

It was evident that fathers were more open to communication about menstrual symptoms than expected. In our cohort, only 19% of fathers indicated that they would be uncomfortable

discussing menstruation with their daughters, whereas 47% of daughters were uncomfortable or unsure about such a conversation. This lack of comfort may stem from daughters believing fathers are unaware of their experience. Kalman analysed interviews with 13 adolescent girls in the United States living exclusively with their fathers.²⁴ The majority of the girls reported feeling too embarrassed to discuss menstruation with their fathers. Only two participants in the study had brought up the subject of their menarche with their fathers; one of these girls was then told to speak with her estranged mother. A common reason given in this and other studies for the lack of discussion was that fathers were “clueless” about such matters.^{24,25} This finding is consistent with anecdotal beliefs; however, no further detail was obtained about the extent of this lack of knowledge as the study did not extend to consulting fathers.

The results from our study suggest the need for additional educational material related to menstrual health; however, around a third of fathers indicated they did not require/want further health information. Of those wanting further information, most preferred to see medical staff, with provision of an information sheet the next most popular option. The use of an information pamphlet following attendance at clinic may lead to increased knowledge of symptoms as has been shown in other specialities.²⁶ Furthermore, education may help fathers gain confidence and credibility when communicating with their daughters, and may assist them to make informed health care decisions when required.

There were several key limitations associated with the current study. The small sample size, and short study duration, limited analysis, and the 52-60% response rates and 45% exclusion rate may have introduced bias, limiting generalizability. Recruitment from a specialist gynaecology clinic may have selected for families with a greater understanding of menstrual symptoms, overestimating paternal knowledge and involvement relative to the general

population. The response rates amongst mothers and fathers were somewhat lower than that of daughters, as expected in a study where parental recruitment was contingent on the participation of the daughter, but response rates were similar between mothers and fathers. Still, families, particularly fathers, uncomfortable discussing menstrual issues may not have participated, resulting in further overestimation of paternal involvement. In spite of these limitations, this work has identified parental knowledge gaps about menstrual period symptoms.

Further research must recognise the multifactorial nature of the problem and the deeply ingrained community attitudes to menstruation. These data will help to provide further assistance to fathers who may not have others to help support them in their support of their daughters.

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REFERENCES

1. Foran KA: Managing adolescent menorrhagia. Aust Doctor. 2015.
2. Hillen TI, Grbavac SL, Johnston PJ, et al: Primary dysmenorrhea in young Western Australian women: prevalence, impact, and knowledge of treatment. J Adolesc Health. 1999; 25:40
3. Parker MA, Sneddon AE, Arbon P: The menstrual disorder of teenagers (MDOT) study: determining typical menstrual patterns and menstrual disturbance in a large population-based study of Australian teenagers. Br J Obstet Gynaecol. 2010; 117:185
4. Subasinghe AK, Hapoo L, Jayasinghe YL, et al: Prevalence and severity of dysmenorrhoea, and management options reported by young Australian women. Aust Fam Physician. 2016; 45:829
5. Craig L, Mullan K, Blaxland M: Parenthood, policy and work-family time in Australia 1992 - 2006. Work, Employment & Society. 2010; 24:27
6. Livingston G: The rise of single fathers: A ninefold increase since 1960. Pew Research Center Report. July 2013.
7. Kalman M: Taking a different path: menstrual preparation for adolescent girls living apart from their mothers. Health Care Women Int. 2003; 24:868
8. Vaughn J: Confidence that bleeds. Jon Vaugh. Full time daddy. 2013.
<http://blog.fulltimedaddy.com/confidence-that-bleeds/>
9. Labour force status and other characteristics of families. Australian Bureau of Statistics: June 2016.
10. Bourdel N, Alves J, Pickering G, et al: Systematic review of endometriosis pain assessment: how to choose a scale? Hum Reprod Update. 2015; 21:136

11. Jarrah SS, Kamel AA: Attitudes and practices of school-aged girls towards menstruation. Int J Nurs Pract. 2012; 18:308
12. Johnston-Robledo I, Chrisler JC: The Menstrual Mark: Menstruation as Social Stigma. Sex Roles. 2013; 68:9
13. Murray S: `Keeping their secret safe': Menstrual etiquette in Australia, 1900-1960. Hecate. 1998; 24:62.
14. Allen KR, Kaestle CE, Goldberg AE: More Than Just a Punctuation Mark: How Boys and Young Men Learn About Menstruation. J Fam Issues. 2011; 32:129
15. Iacovides S, Avidon I, Baker FC: What we know about primary dysmenorrhea today: a critical review. Hum Reprod Update. 2015; 21:762
16. Rosenfield RL: Clinical review: Adolescent anovulation: maturational mechanisms and implications. J Clin Endocrinol Metab. 2013; 98:3572
17. Harel Z: Dysmenorrhea in adolescents and young adults: an update on pharmacological treatments and management strategies. Expert Opin Pharmacother. 2012; 13:2157
18. Davis AR, Westhoff C, O'Connell K, et al: Oral contraceptives for dysmenorrhea in adolescent girls: a randomized trial. Obstet Gynecol. 2005; 106:97
19. Lam C, Zaenglein AL: Contraceptive use in acne. Clin Dermatol. 2014; 32:502
20. Greenfield M: Oral contraceptive therapy in teens: addressing objections, encouraging communication. Contemporary OBGyn. 2011; May 1.
21. Goubert L, Vervoort T, Cano A, et al: Catastrophizing about their children's pain is related to higher parent-child congruency in pain ratings: an experimental investigation. Eur J Pain. 2009; 13:196

22. Kamper SJ, Dissing KB, Hestbaek L: Whose pain is it anyway? Comparability of pain reports from children and their parents. *Chiropr Man Therap*. 2016; 24:24
23. Azurah AGN, Sanci L, Moore E, et al: Parents' Perception of the Impact of Menstrual Problems on Adolescents' Quality of Life. *Journal of Pediatric and Adolescent Gynecology*. 2010. 23:e66.
24. Kalman MB: Adolescent girls, single-parent fathers, and menarche. *Holist Nurs Pract*. 2003; 17:36
25. Gardner MC: Understanding men's attitudes about the menstrual cycle. PhD Thesis, Saybrook Graduate School and Research Center, San Francisco; 2008.
26. Huth MM, Broome ME, Mussatto KA, et al: A study of the effectiveness of a pain management education booklet for parents of children having cardiac surgery. *Pain Manag Nurs*. 2003; 4:31

TABLES

Table 1: Demographic data

Demographic ^a	Daughters (n=24)	Fathers (n=16)	Mothers (n=20)
Age in years [mean (range)]	16 (13-19)		
Parental Relationship			
Married		13 (81%)	18 (90%)
Not married		2 (13%)	3 (15%)
Divorced		1 (6%)	1 (5%)
Country of birth			
Australia	22 (92%)	13 (81%)	16 (80%)
Not Australia	2 (8%)	3 (19%)	4 (20%)
Language spoken at home			
English	23 (96%)	13 (81%)	18 (90%)
Non-English	1 (4%)	3 (19%)	2 (10%)
Household income			
\$20,001-\$50,000		1 (6%)	1 (5%)
\$50,001-\$80,000		4 (25%)	4 (20%)
\$80,001-\$120,000		2 (13%)	1 (5%)
>\$120,000		4 (25%)	6 (30%)
Prefer not to say or didn't answer		5 (31%)	8 (40%)

Demographic ^a	Daughters (n=24)	Fathers (n=16)	Mothers (n=20)
Education			
Still at School	21 (88%)		
Not studying	1 (4%)		
Secondary School		5 (31%)	7 (35%)
TAFE/Vocational	2 (8%)	5 (31%)	6 (30%)
University	0 (0%)	6 (38%)	7 (35%)
Employment			
Not working	11 (48%)		
Full-time	0 (0%)		
Part-time	8 (35%)		
Seeking work	4 (17%)		
Religion			
No religion	9 (38%)	8 (50%)	8 (40%)
Christian	9 (38%)	6 (38%)	11 (55%)
Buddhist	1 (4%)	1 (6%)	1 (5%)
Islam	1 (4%)	0 (0%)	0 (0%)
Didn't know	2 (8%)	0 (0%)	0 (0%)
Prefer not to say	1 (4%)	0 (0%)	0 (0%)
Not answered	1 (4%)	1 (6%)	0 (0%)

^aData are number of participants (percentage of participants) unless otherwise stated.

Table 2: Menstrual characteristics in a cohort of girls attending the Adolescent

Gynaecology Outpatient Clinic at the Royal Children's Hospital because of dysmenorrhea and/or heavy menstrual bleeding. Data are presented as median, interquartile range and range unless otherwise stated.

Characteristic	Daughters (N=24)
Age at visit, years ^a	16, 14.5-16.5, 13-19
Age at menarche, years ^a	12, 11-13, 10-14
Years since menarche ^a	4, 3-4, 1-6
Iatrogenic amenorrhea (percentage of girls) ^b	7/24 (29)
Cycle regularity, past year (percentage of girls) ^b	
Regular	6/24 (25)
Irregular	17/24 (71)
Don't know	1/24 (4)
Cycle length [number of girls answering question] ^c	21, 14-28, 7-31, [7]
Bleeding days ^a	7, 6-11, 2-25
Clots present (percentage of girls) ^b	18 (75)
Clot frequency (among those with clots only) (percentage of girls) ^b	
Sometimes	9/18 (50)
Most of the time	6/18 (33)
All of the time	3/18 (17)
Misses school or work (percentage of girls) ^b	
No	6 (25)
With some periods	13 (54)

Characteristic	Daughters (N=24)
Every period	5 (21)
Number of days missed (among those who miss only) [number of girls answering question] ^c	2, 1-3, 1-5, [17]
Reasons for missing (among those who miss only) ^{b,d} (percentage of girls)	
Pain	14/18 (78)
Heavy flow	16/18 (89)
Nausea	6/18 (33)
Vomiting	2/18 (11)
Other (headaches, lack of sleep due to pain, passing out)	3/18 (17)
Symptoms worsened over past year (percentage of girls) ^b	13/21 (62)
Uses medication to address pain (percentage of girls) ^b	21 (88)
Medication type used (among those who used meds only) (percentage of girls) ^b	
Panadol (paracetamol)	14/21 (67)
Aspirin (acetylsalicylic acid)	2/21 (10)
Ponstan (mefenamic acid)	12/21 (43)
Naprosyn (naproxen)	5/21 (24)
Nurofen (ibuprofen)	9/21 (43)
Oral Contraceptive Pill	8/21 (38)
Implanon (etonogestrel)	3/21 (14)
Other	6/21 (29)
Any NSAID	17/21 (80)
Tranexamic acid	2/21 (10)

Characteristic	Daughters (N=24)
Effectiveness of medication in pain relief ^a	6, 4-8, 0-10
Levonorgestrel Intra-uterine system (percentage of girls) ^b	6 (25)

^aMedian, Interquartile range, range

^bNumber of girls relative to total (percentage of girls)

^cMedian, Interquartile range, range, number of girls answering question

^dPatients could choose more than one option

FIGURE LEGENDS

Figure 1. Percentage of fathers (n=16) (A, C) and mothers (n=20) (B, D) answering either ‘yes’ (black), ‘no’ (white), [‘maybe’ (purple) in C and D only], ‘don’t know’ (blue) or not answering (grey) questions about whether or not they believe certain symptoms are commonly associated with menstrual periods (A, B) or whether they believe menstrual problems are associated with certain long term health impacts (C, D).

Figure 2. Percentage of mothers (n=20) (A, C, E) and fathers (n=16) (B, D, F) answering either ‘yes’ (black), ‘no’ (white), ‘don’t know’ (blue) or not answering (grey) questions about their awareness of side-effects associated with use of hormonal contraceptives (A, B), pain medications (C, D) or neuropathic medications (E, F).

Figure 3. Percentage of mothers (n=20) (A) and fathers (n=16) (B) answering either ‘yes’ (black), ‘no’ (white), ‘don’t know’ (blue) or not answering (grey) questions about whether they would be comfortable with their daughter taking hormonal contraceptive therapies, pain medications or neuropathic medications to help minimise menstrual-related symptoms.

Figure 4. Mean scores ($\pm$ standard error) provided by fathers ($\square$) to questions about their concerns related to daughters’ possible use of hormonal contraceptive therapies, pain medications and neuropathic medications (scores 1=Disagree, 5=Agree). Scores are also provided for the mothers ($\bullet$) responses re what they think the fathers’ concerns are about daughters’ possible use of various medications. Answers ranged from 1 (disagree) to 5 (agree) for all questions except “I am worried about the costs of treatment” (ranged from 1-3). A median is also provided directly alongside each mean and standard error. Values in brackets to the left of each graph reflect the number of either fathers (from a total n=20) or mothers (from a total n=16) that did not complete that particular question.

Figure 5. Percentage of mothers (n=20) (A) and fathers (n=16) (B) answering either ‘yes’ (black), ‘no’ (white), ‘don’t know’ (blue) or not answering (grey) questions about whether they believe specific alternative treatments or strategies will help relieve their daughters’ symptoms.

Figure 6. Parental perception (n=13 families) of daughters’ menstrual pain on a scale of 0 (no pain) to 10 (worst pain). Data are shown as a difference between the parents’ and daughters’ score (<1 indicates that the parent underestimated and >1 that the parent overestimated the daughter’s reported pain. Note: There are four overlapping data points in the centre of the graph indicating that four pairs of parents gave the same pain scores as their daughters.

Figure 7. Percentage of mothers (n=20) (A) and fathers (n=16) (B) answering either ‘yes’ (black), ‘no’ (white), ‘don’t know’ (blue) or not answering (grey) questions about how their daughters’ symptoms impact on their family. Note, ‘leave from work’ applies to family members other than the daughter.

Figure 1

Figure 5

(A) Fathers

(B) Mothers

Figure 7