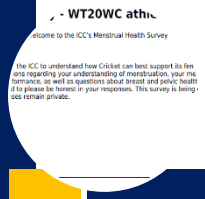
MENSTRUAL HEALTH SURVEY

Menstrual health characteristics, knowledge, and perceived effects on performance in female athletes competing at the 2023 ICC Women's T20 World Cup.

Demographics

10 TEAMS
- 4 representing developed countries
- 6 representing developing countries

198 PARTICIPANTS
- 133 athletes; 26.0±1.0 yr
- 65 support staff; 19 women, 46 men



Survey

MENSTRUAL HEALTH
- Knowledge, Education, & Communication
- Perceived effects

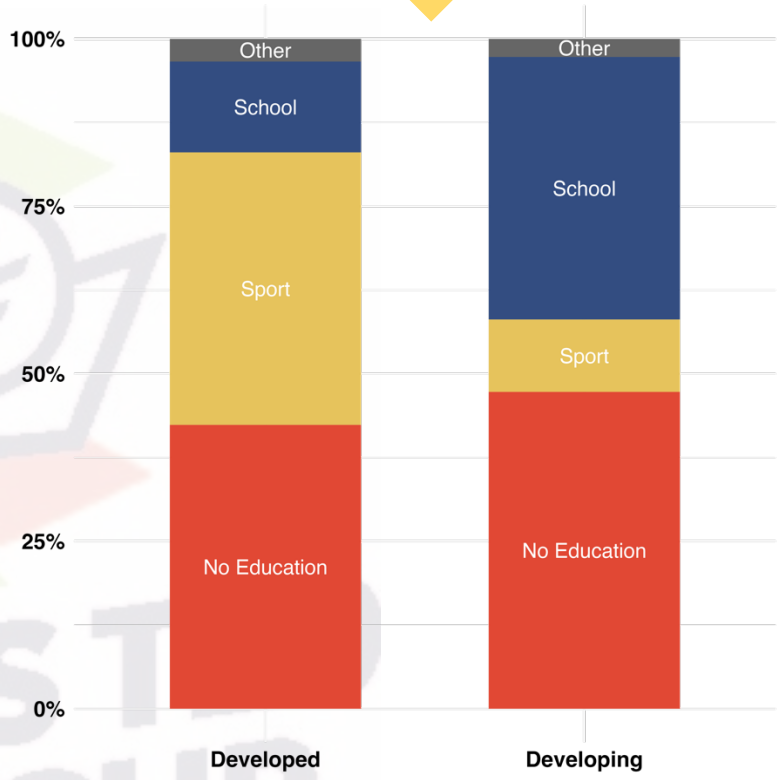
QUESTIONS
- Yes/No; True/False; Select; Scale
- Free response

KEY OBSERVATIONS

Athletes are 13 times more likely to talk with male support staff (SS) if they are comfortable talking with female SS

69% of support staff believe their athletes are comfortable discussing the menstrual cycle with them; **only 43% of athletes agree!**

Athlete attendance in menstrual cycle education



The data

These data were collected from athletes and support staff (including coaches) from teams competing at the 2023 ICC Women's World Cup who participated in the ICC Menstrual Health Survey using Red Cap software. De-identified data are reported for all athletes or support staff (COHORT), athletes or support staff from teams representing developing countries (DVLPing group), and athletes or support staff from teams representing developed countries (DVLPed group), as defined according to the Department of Foreign Affairs and Trade, Australian Government (2023). Individual team data is also presented. Where observations are similar, no distinction between the DVLPing and the DVLPed groups is made, and the observation of the COHORT is reported.

Group abbreviation	Definition
COHORT	All athletes or support staff
DVLPing	Athletes or support staff from teams representing developing countries
DVLPed	Athletes or support staff from teams representing developed countries

The analysis

Across the athlete and support staff surveys, both descriptive and inferential statistics were performed. For binary data, Bayesian regressions were performed with a Bernoulli distribution, while a cumulative link model were used for any ordinal variables. In most cases, the mean proportion as well as the 95% credible interval (i.e., confidence interval; CI) from the posterior distribution of the proportion are reported. For significance testing, generalised linear models and chi-squared tests were used, with α set at 0.05.

For more information

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Athlete demographics, general health, and menstrual characteristics

Group	Participants (#)	Age (yr)	First period (age, yr)
COHORT	133	26.0±1.0	13.6±0.8
DVLPed	59	26.4±1.1	13.6±0.5
DVLPing	74	27.4±0.9	13.6±1.0
Australia	14	27.4	13.7
England	15	27.0	14.2
Ireland	15	24.9	13.1
New Zealand	15	26.3	13.4
Bangladesh	8	26.3	13.3
India	15	26.5	14.2
Pakistan	7	26.7	15.0
South Africa	15	27.6	13.4
Sri Lanka	14	28.6	13.6
West Indies	15	27.5	11.9

Values are mean (±standard deviation; range). DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au). Athletes who did not identify their country or report their age are not included in the analysis.

General health and pregnancy. One third of athletes from the DVLPed group reported having been diagnosed with iron deficiency which was significantly higher ($X^2 = 13.2$, $p < 0.001$) than in the DVLPing group (5%). Less than 4% of the COHORT reported any another health condition. Only two athletes reported ever being pregnant and both had one child. Most (>95%) athletes in the COHORT had not frozen their eggs or undergone IVF, but 37% of athletes in the DVLPed group were thinking about it compared to just 4% in the DVLPing group. One third of the DVLPed group would consider having children during their cricket career, this is compared with just 12% in the DVLPing group. ***Menstrual characteristics.*** The average age of all athletes (i.e., the COHORT) was 26.0±1.0 yr with the youngest and oldest athlete being 17 and 38 yr, respectively. The COHORT reported getting their first period at 13.6±0.8 yr. Almost 85% of the COHORT experienced more than 10 periods in the last 12 months while only three athletes reported current amenorrhea. 16% of the COHORT reported that the length of their menstrual cycle (MC) was greater than 35 days or irregular. While 60% of the COHORT reported an average period duration of 5-7 days with their heaviest flow requiring sanitary products being changed every 2-4 h, 30% reported a menstrual period of less than 4 days and another 20% requiring sanitary products being changed every more frequently than every 2 h. Pelvic pain, lack of energy, bloating and irritability were symptoms reported by over half of the COHORT. ***Menstrual management.*** About half of the COHORT reported no practical difficulties regarding menstruation and many athletes (45%) report carrying extra sanitary products to manage menstruation. Pads (89%) and then tampons (18%) were the most common type of sanitary product for athletes in the DVLPing group while 95% and 37% of the DVLPed group used tampons and pads, respectively. 27% of the DVLPed group were using hormonal contraception (HC; predominately oral contraceptive) and no athlete reported using HC in the DVLPing group. ***Menstrual-cycle tracking.*** On average, 63% of the COHORT tracked their MC, with no significant differences when comparing the DVLPed (67%; 95% CI: 54-78%) compared to the DVLPing group (59%; 95% CI: 48-71%). Tracking MC cycle was most prevalent in Bangladesh (100%; 95% CI: 83-100%), South Africa with (94%; 95% CI: 75-99%), and Ireland (87%; 95% CI: 64-98%) while only two athletes from Pakistan reported tracking their MC.

No athlete from the DVLPing group was using hormonal contraception

Athletes' basic knowledge about sex hormones and gender policy

Group	Name the two main female-sex hormones				Name the main male-sex hormone	
	E2 & P4	E2	Incl. Test	Other or NR	Test	Other or NR
COHORT	7	4	2	1	11	50
DVLPed	7	4		4	11	9
DVLPing	10	5			14	41
Australia	6	9			14	3
England				8		4
Ireland	9			6	10	1
New Zealand	3			4	2	1
Bangladesh	7	1	1	6	9	8
India	1	1	1	11	3	5
Pakistan	10	1		4	9	5
South Africa	7	4	2	1	11	6
Sri Lanka	7	4		4	11	11
West Indies	10	5			14	6

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au). E2 = Estrogen, P4 = Progesterone, Incl. Test = any answer that included testosterone, NR = No response; NB: all spellings were accepted as a correct answer.

Basic knowledge. Just 45% of the COHORT could name both female-sex hormones, while 85% (95% CI: 75-93%) of athletes in the DVLPed group named the male-sex hormone (DVLPing group significantly lower at 44%, $X^2 = 20.9$, $p < 0.001$). Athletes from Ireland (67%; 95% CI: 42-87%) and West Indies (67%; 95% CI: 42-87%) were most likely to correctly identify the female-sex hormones, while less than 10% of athletes from Bangladesh and Sri Lanka were able to correctly identify both female hormones. ***Identifying menstrual disturbance.*** When asked, "*When an athlete misses their period during a heavy training block, this is normal and a sign they are training well*", 92% of the DVLPed group correctly answered 'False'. Just 34% of the DVLPing group answered 'False' with most athletes being unsure or not responding. Interestingly, there was no significant association ($X^2 = 1.7$, $p = 0.198$) between athletes attending an education session and correctly responding 'False'. ***Gender policy.*** Very few athletes (7%) were aware of the ICC's Gender Eligibility Regulations in relation to transgender. When asked if, *"If fairness, safety, and integrity of women's cricket was assured would you welcome the participation of transgender athletes in women's cricket?,* athletes from both DVLPed and DVLPing groups were evenly split among the four responses of, "Yes" (22%), "Maybe" (27%), "No" (25%), and "Do not know" (25%). Athletes representing the DVLPing group (42%) were more likely to agree to sharing their thoughts on the participation of Transgender individuals in cricket when compared with athletes from the DVLPed group (22%).

The DVLPing group were more likely to share their thoughts on the participation of Transgender individuals

Athlete attendance in education session(s) about menstrual health

Group	Attendance		Location		
	Yes	No or NR	School	Sport	Other or NR
COHORT	66	67	37	32	4
DVLPed	30	29	8	24	2
DVLPing	36	38	29	8	2
Australia	8	6	4	8	
England	3	12	1	2	1
Ireland	9	6	2	6	1
New Zealand	10	5	1	8	
Bangladesh	6	2	5		
India	7	8	7		
Pakistan	2	5	1	1	
South Africa	5	10	3	1	1
Sri Lanka	10	4	9	2	1
West Indies	6	9	4	4	

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au); NR = No response.

Rate of menstrual-health education. Half of the COHORT had attended an education session on menstrual health and the rate of attendance was similar among athletes representing developed (51%) compared to developing (49%) countries. England was the notable exception with only three athletes (20%) having attended education about the MC. Despite a high rate of attendance in education about the MC (75%), no athlete representing Bangladesh could correctly name the two main female-sex hormones. ***Menstrual-health education location.*** The majority of education sessions occurred within the sport system for the DVLPed group (41%) while the DVLPing group were most likely to be educated about the MC at school (39%). There is little evidence to suggest that sport is delivering education sessions about menstrual health for athletes representing teams in the DVLPing group (11%).

Sport is not delivering education about menstrual health for athletes in DVLPing teams

Communication among athletes and their support network

Group	Do you feel comfortable talking to people about your period?						
	Family	Friends	Teammates	Coaching staff		Support staff	
				Male	Female	Male	Female
COHORT	88	98	74	20	59	31	85
DVLPed	42	51	46	9	31	19	41
DVLPing	46	47	28	11	28	12	44
Australia	10	10	7	3	5	3	10
England	9	15	15	1	10	7	9
Ireland	11	12	12	1	8	1	11
New Zealand	12	14	12	4	8	8	11
Bangladesh	3	1	1	1	2		6
India	10	13	9	7	9	8	11
Pakistan	4	3	4		3		4
South Africa	10	9	5	1	5	1	6
Sri Lanka	8	12	2		4		9
West Indies	11	9	7	2	5	3	8

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au).

Communication with family and peers. For athletes in the DVLPed group at least 70% reported feeling comfortable talking with their family (71%), friends (86%), and teammates (78%) about their menstrual period. For the DVLPing group, athletes were more comfortable talking with their family (62%) and friends (64%) about their menstrual period as compared to their teammates (38%). Almost all (98%) of the COHORT reported that someone, most likely their mother (~60% of 'yes' respondents), had spoken to them about what a period was before they reached menarche. ***Communication with support staff.*** Few athletes in the COHORT felt comfortable talking to male coaching (15%) and support staff (23%) about their menstrual period compared to female coaching (44%) and support staff (64%). Interestingly, statistics concerning male coaching staff were consistent between athletes from teams representing developed countries and athletes from teams representing developing countries. However, more athletes in the DVLPed group (32%) felt comfortable talking with male support staff when compared with athletes in the DVLPing group (16%). When compared with men, more athletes felt comfortable talking with female coaching (53 and 38%) and support staff (70 and 60%) in both the DVLPed and DVLPing groups, respectively. Only 5% of all athletes were not comfortable talking with any staff, regardless of sex. Regarding male staff, the COHORT felt most comfortable talking about their menstrual period with the physiotherapist (18%), doctor (17%), and dietitian (11%). Of the female support staff, the COHORT were most comfortable talking to the physiotherapist (53%) and doctor (44%) about their menstrual period. Within each group there were clear difference between countries regarding communication to male support staff. For example, while half of all athletes representing India were comfortable talking with male coaching and support staff about their MC, no athlete representing Pakistan or Sri Lanka reported feeling comfortable talking to male staff about their MC.

Only 15% of the COHORT felt comfortable talking to male coaching staff about their MC

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Athletes' perceived effects of menstrual period

Group	Regarding your menstrual period…						
	Are you worried wearing whites?	Does it stop you playing matches?	Do you tell staff if unwell?		Are you given the option of not participating if feeling unwell?		Is your performance affected?
	Yes	Yes	Yes or Sometimes	No, never	Yes or Sometimes	No	Yes
COHORT	87	5	87	26	80	48	49
DVLPed	49		36	16	26	31	29
DVLPing	38	5	51	10	54	17	20
Australia	11		9	3	9	4	6
England	13		13	1	8	7	6
Ireland	12		3	9		14	10
New Zealand	13		11	3	9	6	7
Bangladesh	3	2	6		7		6
India	6		15		14	1	5
Pakistan	5		3		6	1	1
South Africa	10	1	7	5	5	9	4
Sri Lanka	2		10	3	11	3	1
West Indies	12	2	10	2	11	3	3

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au).

Athletes' perceived effects of menstrual period, cont.

Participation during menstruation. Menstruating does not prevent most of the COHORT from participating in matches (5%), whereas 41% report missing training due to their MC, although it appears to affect a greater proportion of athletes in the DVLPing (54%) compared to the DVLPed (25%) group. About 20% of the COHORT do not tell their coach/support staff if they are feeling unwell while menstruating and only 35% of the COHORT report that they are always given the option of not participating in training or matches if they are unwell or unfit owing to their period. Overall, 37% of athletes believed that their performance is affected by their MC, and this belief is higher in the DVLPed (49%) compared with the DVLPing (27%) group. ***Wearing whites.*** 86% (95% CI: 76-93%) of the DVLPed group worried about their menstrual period and wearing whites which was significantly more ($X^2 = 15.1$, $p < 0.001$) than 52% (95% CI: 40-63%) of the DVLPing group. Few athletes across the COHORT (<5%) report stopping or missing training or a match because of their menstrual period.

Overall, 37% of athletes believed that their performance is affected by their MC

Breast and pelvic floor health

Group	Number of direct blows to breast			Pelvic health assessment	Urinary incontinence
	Never	Few (1-10)	>10	Yes	Yes
COHORT	68	59	3	8	19
DVLPed	27	29	2	4	17
DVLPing	41	30	1	4	2
Australia	2	11		2	2
England	9	6			8
Ireland	5	8	2	1	3
New Zealand	11	4		1	4
Bangladesh	4	4			
India	10	3	1	2	1
Pakistan	4	3			
South Africa	8	7		1	
Sri Lanka	9	5			
West Indies	6	8		1	1

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au).

Breast injury and bra support. While half of all athletes had not had a direct blow to the breast, nearly one third of athletes reported having a few incidences where their breast had direct impact from the ball, bat, ground, or another athlete of which the prevalence was about even (120-140 total incidences of each impact). Only 17 athletes reported feeling the need to wear breast protective equipment during cricket training/competition, many of whom were from Sri Lanka (n=8). Most athletes from DVLPing countries reported being able tell if their bra fits correctly (88%), is supportive enough (77%), and identify the features of a high-support sports bra (66%). This contrasted with the DVLPed group of which only 39, 46, 40% of athletes reported being able tell if their bra fits correctly, is supportive enough, and identify the features of a high-support sports bra. ***Pelvic health.*** Few athletes (6%) report having had a pelvic health assessment. The prevalence of urinary incontinence reported by the DVLPed group (29%) was significantly higher (X^2 = 16.1, $p < 0.001$) than the DVLPing group (3%) and the majority of these athletes reported 'exercise' as the main trigger.

Only 3% of athletes from the DVLPing group reported urinary incontinence.

Support staff demographics and background

Group	Participants	Gender		Role in the team					
		Woman	Man	Physiotherapist	Doctor	Dietitian	Psychologist	Team manager	Coach
COHORT	67	19	46	7	3		4	9	21
DVLPed	36	11	24	3	2		3	4	13
DVLPing	31	8	22	4	1		1	5	8
Australia	9	2	6	1	1		1	1	2
England	12	4	8	1			1	1	5
Ireland	7	3	4	1			1	1	3
New Zealand	8	2	6		1			1	3
Bangladesh	1		1		1				
India	9	3	6	1				2	1
Pakistan	3	2	1					1	
South Africa	8	1	7	1			1	1	3
Sri Lanka	7	1	5	1					3
West Indies	3	1	2	1				1	1

Values are number of participant responses. DVLPed = support staff of athletes from teams representing developed countries; DVLPing = support staff of athletes from teams representing developing countries (Source: www.dfat.gov.au).

Working with female athletes. 90% of the COHORT reported regularly working with female athletes and about 20% of those participants had at least 10 yr of experience working with female athletes.

Support staff basic knowledge about sex hormones and gender policy

Group	Name the two main female-sex hormones			Name the main male-sex hormone
	E2 & P4	E2	Incl. Test	Test.
COHORT	29	16	5	52
DVLPed	15	7	5	28
DVLPing	14	9		24
Australia	3	1	1	5
England	4	3	2	10
Ireland	5	2		6
New Zealand	3	1	2	7
Bangladesh	1			1
India	4	1		5
Pakistan	1	1		2
South Africa	3	3		6
Sri Lanka	2	4		7
West Indies	3			3

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au). E2 = Estrogen, P4 = Progesterone, Incl. Test = any answer that included testosterone, NR = No response; NB: all spellings were accepted as a correct answer.

Basic knowledge and identifying menstrual disturbance. 40% (95% CI: 29-52%) and 75% (95% CI: 64-84%) of support staff in the COHORT named both female-sex hormones or at least 'Estrogen', respectively, which was not different between the DVLPed (42 and 78%) and DVLPing (45 and 77%) groups (p = 0.967, 0.988 respectively). Almost 80% of the COHORT was able to identify 'Testosterone' as the main male-sex hormone. Interestingly, a similar proportion of female (74%) and male (75%) support staff named 'Testosterone' which was in contrast to the high proportion of female (60%) but not male (34%) staff that named the female-sex hormones. When asked to comment on the statement, *"When an athlete misses their period during a heavy training block, this is normal and a sign they are training well"*, 72% of COHORT correctly answered 'False'' with others responding, 'I don't know' and two male support staff from the DVLPed group answering, 'True'. ***Gender policy.*** Only 18% of support staff were aware of the ICC's Gender Eligibility Regulations in relation to transgender. When asked if, *"If fairness, safety, and integrity of women's cricket was assured would you welcome the participation of transgender athletes in women's cricket?,* support staff from the DVLPed group (36%) were most likely to report, 'No' which was different to the DVLPing group who were most likely to respond, 'Yes' (29%).

Group	Transgender athletes in cricket			
	Yes	Maybe	No	Do not know
COHORT	21	19	31	22
DVLPed	14	22	36	28
DVLPing	29	16	26	16

Support staff representing the DVLPing group (58%) were more likely to agree to sharing their thoughts on the participation of Transgender individuals in cricket when compared with support staff from the DVLPed group (36%). Australian (89%) support staff were particularly against the idea of sharing their thoughts.

More support staff can name the main male-sex hormone than the main female-sex hormones

Support staff attendance in education session(s) about menstrual health

Group	Attendance		Type				
	Yes	No	Formal course	Tertiary education	Cricketing board	Other sporting org.	Self-researched
COHORT	21	46		12	4	7	8
DVLPed	13	23	3	9	3	5	7
DVLPing	8	23		3	1	2	1
Australia	4	5	1	1	2	2	1
England	3	9		2	1	1	2
Ireland	2	5	1	2		2	2
New Zealand	4	4	1	4			2
Bangladesh	1						
India	3	6			1	1	1
Pakistan		3					
South Africa	2	6		1		1	
Sri Lanka		7					
West Indies	2	1		2			

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au).

Rate of menstrual-health education. Despite less than half (31%) of the COHORT having undergone formal education on menstrual health, over half of the COHORT (54%) rated their understanding of menstrual health/periods as 'good' or excellent (i.e., 4 or 5/5). ***Menstrual-health education location.*** Just 8% and 3% of support staff from the DVLPed and DVLPing groups received education about menstrual health from their cricketing board, respectively. The COHORT was most likely to receive MC education via 'Tertiary Education'.

One third of the COHORT believe that understanding women's health issues is critical or important

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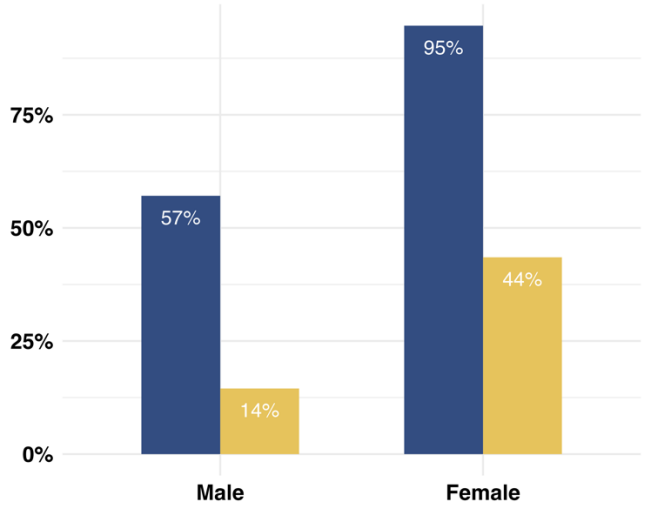
Support staff conversations about menstrual health in athletes

Group	How many athletes have spoken to you about their MC?				Do you believe players are comfortable discussing menstruation with you?		
	None	Few	Most	All	Yes	Sometimes	No
COHORT	42	16	5	3	19	26	20
DVLPed	20	10	4	1	11	13	12
DVLPing	22	6	1	2	8	13	8
Australia	6	2			2	3	4
England	7	3	2		3	8	1
Ireland	2	4	1		2	2	3
New Zealand	5	1	1	1	4		4
Bangladesh		1			1		
India	8			1	4	1	2
Pakistan	3					2	1
South Africa	4	3		1	2	5	1
Sri Lanka	6	1			1	2	4
West Indies	1	1	1			3	

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au).



57% of male support staff believe athletes are comfortable talking with them about their MC whereas only 14% of athletes are comfortable talking to male support staff

95% of female support staff believe athletes are comfortable talking with them about their MC whereas only 44% of athletes are comfortable talking to female support staff

ICC WOMEN'S T20 WORLD CUP SOUTH AFRICA 2023

Support staff management of menstrual health in athletes

Group	How would you manage players who struggle to train/compete during menstruation?					
	Allow them to sit it out	Provide a modified training session	Continue to train with the rest of the team	Recommend they use pain medication to manage symptoms	Recommend they use hormonal contraceptives to manage symptoms	Recommend they follow up with a doctor
COHORT	28	47	16	21	4	42
DVLPed	17	28	11	10	3	24
DVLPing	11	19	5	11	1	18
Australia	2	6	4	3	1	5
England	5	10	2	3	1	7
Ireland	2	5	2	2		5
New Zealand	8	7	3	2	1	7
Bangladesh		1				
India	1	4		1		3
Pakistan	1	3		1		1
South Africa	2	3	4	5	1	7
Sri Lanka	5	5		3		5
West Indies	2	3	1	1		2

Values are number of participant responses. DVLPed = athletes from teams representing developed countries; DVLPing = athletes from teams representing developing countries (Source: www.dfat.gov.au).

Management of menstrual health. Support staff were most likely (70%) to provide a modified training session to athletes struggling to train/compete during menstruation. Support staff from the DVLPed group (28%) were less likely to recommend athletes use pain medication to manage symptoms when compared with support staff from the DVLPing group (35%), while the greatest disparity between the DVLPed (31%) and DVLPing (16%) groups was a recommendation to continue to train with the team. About two thirds of the COHORT recommended following up with a doctor which was slightly higher in the DVLPed (67%) compared with the DVLPing (58%) group.

Menstrual issues? 'Continue to train with the team': DVLPed group = 31%; DVLPing group = 16%...