

**Supplementary Materials 2.** Author reported concepts measured in trials and nested studies, assessment modality and development

<b>Trials Study ID</b>	<b>Trial outcomes (O) and descriptive measures (D)*</b>	<b>Assessment method</b>	<b>Measure development or validation</b>
Abedian 2011 <sup>12</sup>	(O) Menstrual cycle characteristics (pain and symptoms) (O) Menstrual knowledge  (O) Menstrual attitudes	Self-report written survey	Designed by investigators, and criteria from DSM-IV-TR premenstrual syndrome Designed by investigators based on textbooks. Menstrual Attitude Questionnaire
Beksinska 2015 <sup>13</sup>	(O) Acceptability and performance of products  (O) Adverse events (D) Household WASH  (D) Menstrual practices and experience	Self-report questionnaire (format NR) Product use diary Self-report Self-report questionnaire (format NR)	NR  NR NR  NR
Blake 2018 <sup>14</sup>	(O) Menstrual and puberty knowledge  (O) Attitudes towards menstruation (O) Menstrual fear and shame (D) Menstrual practices (D) WASH observations	Self-report written survey with verbal description in class    Observational checklist	Adapted from existing evaluations of puberty education materials.  Field tested with girls in other schools.
Dhanalakshmi 2015 <sup>15</sup>	(O) Menstrual/puberty knowledge (O) Beliefs about menstruation (O) Menstrual practices (and sexual behaviours) (D) Menstrual symptoms	Self-administered [NR]	NR
Djalalinia 2012 <sup>16</sup>	(O) Menarche experience  (O) Menstrual information (source acceptability) (O) Menstrual and hygiene practices (D) Menstrual pain and symptoms	Self-report written survey	Designed by scientific committee and sent to 10 experts. Stated reliability but not reported.
El-Mowafy 2014 <sup>17</sup>	(O) Knowledge  (O) Self-care practices (including menstrual practices)	Self-report in interview	Developed by investigators. Reviewed by 3 experts. Piloted on 10% of sample
Fakhri 2012 <sup>18</sup>	(O) Menstrual health	Self-report in interview	Developed by investigators, tested via input from adolescents, scientists and community experts. Test-retest reliability with 20 students.
Fetohy 2007 <sup>19</sup>	(O) Menstrual knowledge  (O) Menstrual attitudes	Self-report written survey	Designed by investigators, pilot-testing stated with no further detail.

	(O) Menstrual behaviour		
Leventhal 2016 <sup>20</sup>	(O) Overarching trial outcomes included general health knowledge, gender equality attitudes, WASH, hand washing and health care utilisation (O) Psychosocial wellbeing, resilience, social-emotional assets (O) Menstrual hygiene	Self-report written surveys in groups with assistants to help with reading/understanding	Pre-tested questionnaires including investigator-developed and previously established measures. Piloted with 74 girls in neighbouring area.
Mbizvo 1997 <sup>21 22</sup>	(O) Reproductive health and menstrual knowledge	Self-report written survey	NR
Mohamed 2014 <sup>23</sup>	(O) Discomfort/comfort with products after physical activity (O) Physical exertion	Self-report on visual analogy scale and survey. Heart rate variability measured using electrocardiograph. Self-reported exertion. Heart rate low-frequency to high-frequency ratio.	NR Previously validated measures/ biomarkers.
Montgomery 2012 <sup>24 25</sup>	(O) School attendance  (D) Menstrual cycle and product use (O) Subjective shame and well-being  (O) Classroom participation	Attendance registers  Self-completed menstrual diaries Self-report with interviewer  Self-report with interviewer	Attendance registers were compared with spot-checks and found to be reliable. NR Adapted from established/ recommended dimensions of noneconomic poverty. NR
Montgomery 2016 <sup>26</sup>	(O) School attendance  (O) Wellbeing  (O) Subjective shame (O) Menstrual knowledge (D) WASH facilities	Attendance registers/ spot-checks Self-report with interviewer (responses entered electronically)  Observational checklist	Tools piloted in Ghana during pilot (Montgomery 2012)  NR
Oster 2011 <sup>29</sup>	(O) School attendance (during menstruation)	School registers combined with self-completed menstrual diaries	NR.
Phillips-Howard 2016 <sup>31</sup>	(O) School attendance  (O) School drop out (O) Sexually transmitted or reproductive tract infection (O) Adverse events (D) Menstrual characteristics  (D) Wellbeing  (D) WASH facilities	Self-completed calendars  Absence from nurse visits Self-taken vaginal swabs.  TSS - vaginal swabs Self-report survey. NR further details Self-report survey.  Observation checklist	NR Lab testing for presence of STI/RTI  NR Paediatric Quality of Life Inventory (PEDSQL) NR
Sener 2019 <sup>37</sup>	(O) Hygiene skills and behaviours (including menstrual hygiene)	Self-report in interview with study staff + study staff repeated observations.	Researcher developed based on past literature with review by 10 experts. Piloted on 5 non-participating teens and parents.

Setyowati 2019	(O) Knowledge about menstruating and puberty (O) Emotional responses to menarche (O) Menstrual attitude questionnaire	NR.	Developed in past research and adapted for context. Questions developed from past studies Previously validated measure: Menstrual Attitude Questionnaire
Sharma 2015 <sup>39</sup>	(O) Menstrual knowledge  (O) Menstrual hygiene practices	Survey. NR.	Researcher developed questionnaire with input from expert. Post-hoc reliability calculated.
Shrestha 2018 <sup>40</sup>	(O) Demand for menstrual products  (D) Menstrual knowledge  (D) Menstrual stigma and norms (D) Health and sanitation (incl. Menstrual practices)	Coupon redemption in local stores.  Self-report with interviewer	Researcher spot checks on store-recorded coupon redemption and physical storage of coupons. NR
Stadler 2006 <sup>41</sup>	(O) Physical discomfort  (O) Product acceptance (D) Product use and menstrual practices	Self-reported questionnaire  Product use diary (self-completed)	NR  NR
Valizadeh 2017 <sup>42,43</sup>	(O) Menstrual knowledge  (O) Menstrual practices (O) Menstrual attitudes	Self-report survey (NR methodology)	Questionnaires adapted from past studies and checked by 11 faculty. Post-hoc reliability reported.
Wilson 2014 <sup>44,45</sup>	(O) School attendance  (D) Acceptability of intervention (D) Menstrual hygiene practices	Self-reported written survey with facilitator providing verbal translation	NR
Womana 2018 <sup>46</sup>	(D) Menstrual practices  (D) Menstrual factors (D) Menstrual product preference and experience (D) Menstrual knowledge (O) Experiences of the intervention/products	Self-reported in interview recorded electronically Self-completed diaries Surveys and diaries  Self-completed form test Self-reported in interview recorded electronically	Pilot evaluation designed to test the acceptability of tools
<b>Nested Study ID</b>	<b>Variables measures as Predictors (P), Outcomes (O) or for Description (D)</b>	<b>Assessment method</b>	<b>Measure development or validation</b>
Hennegan 2016a <sup>27</sup>	(P) Menstrual practice  (O) Product preference and experiences (O) Menstrual restrictions	Self-report with interviewer (responses entered electronically)	Tools piloted past study (Montgomery 2012)
Hennegan 2016b <sup>28</sup>	(P/O) Menstrual hygiene  (O) Health and symptoms	Self-report with interviewer (responses entered electronically)	Tools piloted past study (Montgomery 2012)

	(O) Education engagement (O) Psychosocial wellbeing		
Oster 2012 <sup>30</sup>	(P) Peer product use (O) Menstrual cup use/adoption	Self-report survey Interview with nurse Monthly diaries	NR NR
Nyothach 2015 <sup>32</sup>	(O) Handwashing during menstrual practices (P) Menstrual product used	Self-completed electronic survey	Piloted paper questionnaires prior to use in electronic netbooks
Odour 2015 <sup>33</sup>	(O) Dropping menstrual items and disposal (P) Menstrual product use	Self-completed electronic survey	Piloted paper questionnaires prior to use in electronic netbooks
Juma 2017 <sup>34</sup>	(O) Adverse health outcomes	Self-collected vaginal swabs with lab testing	N/A
Van Eijk 2018 <sup>35</sup>	(O) Observed menstrual cup colour change (O) Observed menstrual cup damage (P) Self-reported menstrual cup use (P) Menstrual characteristics (time since menarche)	Nurse observation Nurse observation Self-reported interview with nurse Self-completed electronic survey	NR NR Piloted paper questionnaires prior to use in electronic netbooks
Alexander 2018 <sup>36</sup>	(O) Observed WASH facilities (O) Teacher-reported WASH	Observational checklist Teacher interview	NR
Tolonen 2019	(O) School attendance  (D) Menstrual characteristics	School registers and spot checks Self-report survey	Two methods compared. Spot checks were unannounced. Piloted paper questionnaires prior to use in electronic netbooks

\*Excludes demographic characteristics.