

Supporting Information

Title:

Household water storage management, hygiene practices and associated drinking water quality in rural India

Authors:

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Figure S1: Schematic representation of study design and data collection. HH=household, T1-T5= time periods 1-5.

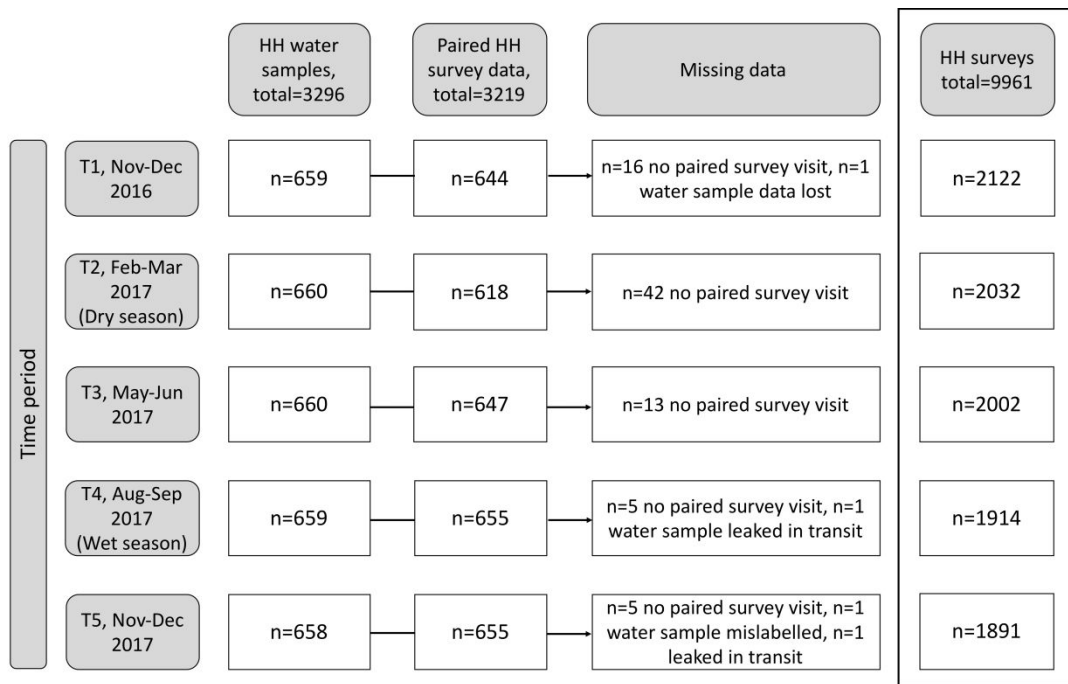


Figure S2: Microbial quality (*E. coli* colony-forming units/100mL by WHO risk category) of household drinking water samples by time period (T1-T5). Numbers within bars represent proportion (%) of samples in each risk category.

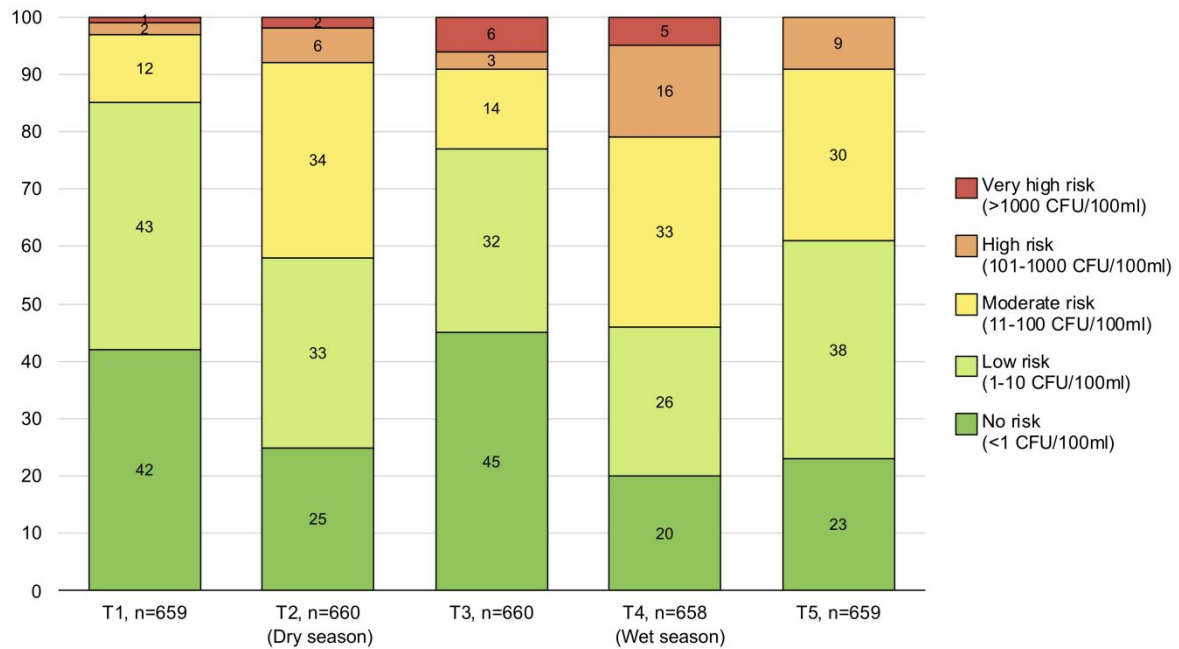


Figure S3: Microbial quality (*E. coli* colony-forming units/100mL by WHO risk category) of household drinking water samples by village. Numbers within bars represent proportion (%) of samples in each risk category.

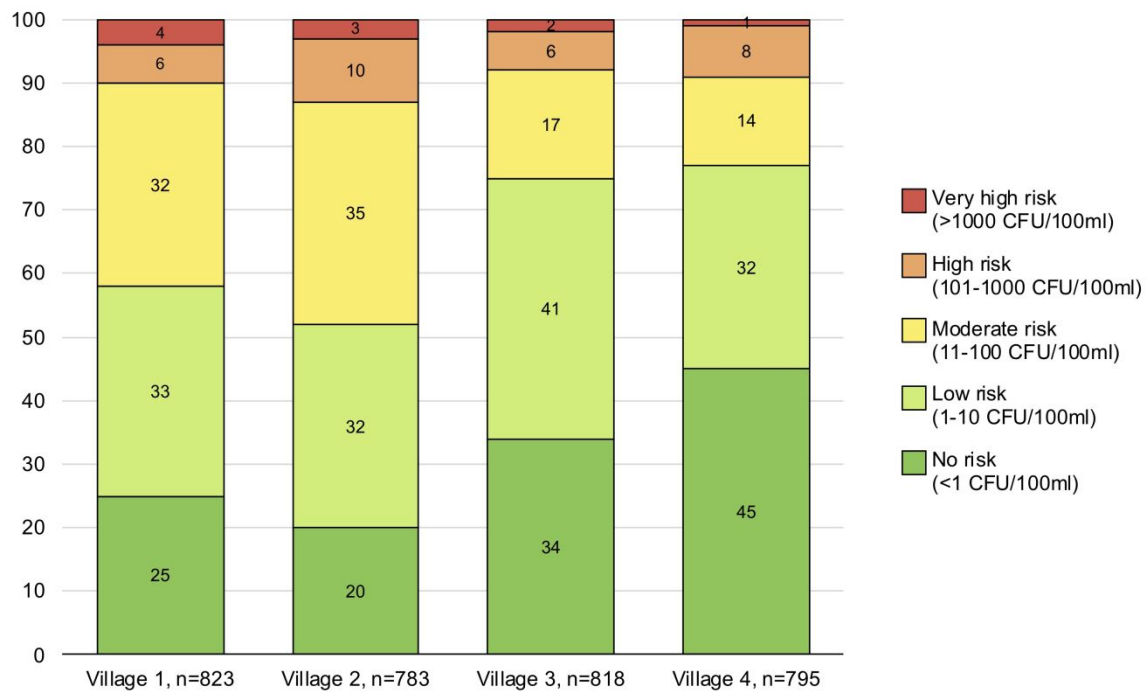


Table 1: Trends in household water sources, water storage and treatment, presence of soap at handwashing station and handwashing practices over time, n=9961 surveys

	Time period					Total surveys
Item	T1	T2	T3	T4	T5	
Number of household surveys conducted, n	2122	2032	2002	1914	1891	9961
Demographics						
Mud, dirt or clay flooring in household, n (%)	725 (34)	695 (34)	683 (34)	651 (34)	642 (34)	3396 (34)
Use of clean fuel (LPG) for cooking, n (%)	967 (46)	913 (45)	907 (45)	869 (45)	857 (45)	4513 (45)
Own refrigerator	76 (4)	67 (3)	67 (3)	65 (3)	65 (3)	340 (3)
Main reported source of household drinking water						
River water, n (%)	1,796 (85)	1,360 (67)	1,792 (90)	1,859 (97)	1,673 (88)	8480 (85)
Reverse osmosis (RO) water, n (%)	127 (6)	124 (6)	143 (7)	8 (0)	21 (1)	423 (4)
Project tank water, n (%)	6 (0)	224 (11)	63 (3)	10 (1)	9 (1)	312 (3)
Bore water, n (%)	192 (9)	310 (15)	3 (0)	2 (0)	174 (9)	681 (7)
Other source, n (%)	1 (0)	14 (1)	1 (0)	34 (2)	14 (1)	64 (1)
Reported use of secondary drinking water sources	640 (30)	862 (42)	798 (40)	822 (43)	962 (51)	4084 (41)
Household drinking water storage and treatment						
Storage of drinking water, n (%)	1981 (93)	1964 (97)	1621 (81)	1340 (70)	1365 (72)	8271 (83)
<i>More than one stored water container</i>	<i>986 (50)</i>	<i>891 (45)</i>	<i>1182 (73)</i>	<i>899 (67)</i>	<i>612 (45)</i>	<i>4570 (55)</i>
<i>Report treating stored water (any method), n (%)^a</i>	<i>1606 (81)</i>	<i>1440 (73)</i>	<i>1434 (88)</i>	<i>1190 (89)</i>	<i>973 (71)</i>	<i>6643 (80)</i>
<i>Report treating stored water with method likely to improve water quality, n (%)^b</i>	<i>348 (18)</i>	<i>272 (14)</i>	<i>302 (19)</i>	<i>117 (9)</i>	<i>66 (5)</i>	<i>1105 (13)</i>
<i>Method of access = dip cup or ladle, n (%)</i>	<i>1260 (64)</i>	<i>1291 (66)</i>	<i>1367 (84)</i>	<i>1193 (89)</i>	<i>1032 (76)</i>	<i>6143 (74)</i>
<i>Water storage vessel covered, n (%)^c</i>	<i>1825 (98)</i>	<i>1764 (97)</i>	<i>1513 (100)</i>	<i>1279 (99)</i>	<i>1356 (99)</i>	<i>7737 (99)</i>
Reported sanitation practices: main location of defecation						
Open defecation	1013 (48)	909 (45)	723 (36)	757 (39)	761 (40)	4163 (42)
Home latrine	853 (40)	922 (45)	1014 (51)	875 (46)	882 (47)	4546 (46)
Shared latrine	256 (12)	200 (10)	265 (13)	279 (15)	248 (13)	1248 (12)
Handwashing station						
Handwashing station observed	1850 (87)	1723 (85)	1587 (79)	1507 (79)	1474 (78)	8141 (82)
<i>Soap or detergent observed at station</i>	<i>1281 (69)</i>	<i>1327 (77)</i>	<i>1509 (95)</i>	<i>1313 (87)</i>	<i>1262 (86)</i>	<i>6692 (82)</i>
Reported “usual” handwashing practices						

After using a toilet	925 (44)	904 (44)	1173 (59)	1010 (53)	1036 (55)	5048 (51)
Before eating	2036 (96)	1940 (95)	1882 (94)	1865 (97)	1755 (93)	9478 (95)
Before food preparation	1042 (49)	1258 (62)	1338 (67)	1432 (75)	887 (47)	5957 (60)

Figures shown in italics represent a subset of households; percentages are calculated from the relevant subset (i.e. amongst households reporting water storage or amongst households where handwashing station was observed). ^aIncluded methods of water treatment include filtering water through cloth, letting water stand and settle, adding flocculant, chlorine or potassium, using an electronic or ceramic water filter or boiling. ^bEncompasses chlorination, boiling, and/or use of an electronic or ceramic filter. ^cHousehold declined to answer at 420 visits (5%)

Table S2: Frequency of reported and observed household characteristics by village

Exposure	Village 1 (n=823), n (%)	Village 2 (n=783), n (%)	Village 3 (n=818), n (%)	Village 4 (n=795), n (%)
<i>Water contaminated with E. coli</i>	617 (75)	627 (80)	542 (66)	437 (55)
<i>Household demographics</i>				
Use of clean fuel (LPG) for cooking	395 (49)	588 (75)	274 (34)	285 (36)
Mud or dirt flooring in home	459 (57)	118 (15)	231 (29)	194 (25)
<i>Reported behaviors & water choices at survey visit</i>				
Open defecation	338 (41)	42 (5)	578 (71)	371 (47)
Handwashing after toileting	546 (66)	2 (<1)	813 (100)	745 (94)
Handwashing before eating	821 (100)	781 (100)	815 (100)	783 (99)
Storage of drinking water in the home	807 (98)	480 (61)	792 (97)	719 (90)
<i>Treatment of stored drinking water</i>	792 (98)	302 (63)	642 (81)	392 (55)
<i>Treatment of stored drinking water using method likely to make water safe</i>	4 (1)	45 (6)	76 (9)	125 (16)
<i>Water storage vessel covered*</i>	807 (100)	360 (100)	741 (100)	617 (88)
<i>Access stored drinking water using cup/dipper</i>	786 (97)	80 (17)	601 (76)	573 (80)
<i>Access stored drinking water using tap/spigot</i>	21 (3)	0 (0)	81 (10)	24 (3)
<i>Access stored drinking water by pouring</i>	0 (0)	391 (92)	110 (14)	122 (17)
Main source of drinking water from river	452 (55)	782 (100)	702 (86)	753 (95)
Main source of drinking water from reverse osmosis facility	33 (4)	0 (0)	77 (9)	18 (2)
Main source of drinking water from project tanks	22 (3)	0 (0)	30 (4)	24 (3)
Main source of drinking water from bore	313 (38)	0 (0)	5 (1)	0 (0)
<i>Observations at survey visit</i>				
Observation of handwashing station permitted	823 (100)	169 (22)	750 (92)	709 (89)
<i>Presence of soap or detergent at handwashing station</i>	600 (73)	127 (75)	728 (97)	451 (64)
<i>Reported behaviors relating to sampled household water at water sampling visit</i>				
Treatment of stored water	563 (69)	685 (88)	62 (8)	284 (36)
Sourced from reverse osmosis facility*	127 (18)	398 (51)	237 (29)	393 (50)

Observations at water sampling visit				
Observation of water collection permitted	727 (88)	783 (100)	817 (100)	785 (99)
<i>Water storage vessel covered</i>	599 (82)	774 (99)	817 (100)	676 (86)
<i>Access stored drinking water using cup/dipper*</i>	302 (77)	474 (79)	607 (86)	601 (83)
<i>Access stored drinking water using tap/spigot*</i>	52 (13)	66 (11)	94 (13)	57 (8)
<i>Access stored drinking water by pouring*</i>	36 (9)	61 (10)	7 (1)	68 (9)
<i>Water storage container located on floor*</i>	156 (22)	696 (89)	290 (36)	514 (67)
<i>Water storage container located on bench*</i>	257 (36)	81 (10)	509 (63)	179 (23)
<i>Water storage container located outside*</i>	309 (43)	5 (1)	16 (2)	78 (10)

*Exposures with missing responses for some visits: Reported water storage vessel kept covered (n=186); Reported sourced from reverse osmosis facility (n=110); Observed stored water access method (n=795); Observed water storage container location (n=104)

Figures shown in italics represent a subset of households; percentages are calculated from the relevant subset (i.e. amongst households reporting water storage or amongst households where handwashing station was observed)

Table S3 Relationship between reported water treatment behaviors and household stored water contamination

Exposure	Visits with exposure	Visits where water contaminated with <i>E. coli</i>			Adjusted risk ratio (95% CI) ^a	P value
		With exposure, n (%)	Without exposure, n (%)	Unadjusted risk ratio		
<i>Reported behaviors & water choices at survey visit</i>						
<i>Treatment with method likely to improve water quality^c</i>	9%	140 (56)	1785 (70)	0.80	1.02 (0.94 – 1.10)	0.67
<i>Treat stored water by boiling*</i>	<1%	8 (62)	5 (38)	0.89	1.07 (0.81 – 1.42)	0.63
<i>Treat stored water by electronic filter*</i>	5%	72 (48)	77 (52)	0.69	1.03 (0.94 – 1.14)	0.54
<i>Treat stored water by candle filter*</i>	3%	60 (67)	29 (33)	0.98	1.05 (0.93 – 1.19)	0.43
<i>Treat stored water by adding chlorine/bleach*</i>	<1%	1 (50)	1 (50)	0.72	0.96 (0.37 – 2.44)	0.92

*Results of these analyses should be interpreted with caution, as low numbers of exposed participants precludes meaningful analysis.