



BMJ Open Pattern of contraceptive use, determinants and fertility intentions among tribal women in Kerala, India: a cross-sectional study

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ABSTRACT

Objectives To assess the pattern of contraceptive use and its determinants, knowledge regarding contraceptives including oral contraceptive pills and fertility intentions among tribal women in the reproductive age group.

Design Community-based cross-sectional study.

Setting Community development blocks in a predominantly tribal district of Wayanad in Kerala, India.

Participants Women in the reproductive age group (15–49 years) from the tribal groups in the district numbering 2495.

Outcome measures

Primary Prevalence of contraceptive use and its determinants.

Secondary Knowledge regarding contraceptives in general, oral contraceptives and fertility intentions.

Results The mean age of the study participants was 30.8 years (SD=9.8) and belonged to various tribal groups such as Paniya (59.2%), Kurichiyar (13.6%) and Adiya (10.9%). Current use of contraceptive was reported by about a fourth, 658 (26.4%) (95% CI 27.9 to 24.9) of women. Following logistic regression, belonging to Paniya tribe (adjusted OR (aOR) 2.67, 95% CI 1.49 to 4.77; $p<0.001$) and age at menarche >13 years (aOR 1.69, 95% CI 1.14 to 2.52; $p<0.009$) had significantly higher use of contraceptives whereas social vulnerability as indicated by staying in a kutcha house had a lesser likelihood of use of contraceptive (aOR 0.55, 95% CI 0.31 to 0.95; $p<0.03$). Oral contraceptive use was low (4.8%) among this population and no abuse was observed. Less than half (47%) of the respondents had an above average knowledge on contraception. Multivariable logistic regression indicated that above average knowledge was 2.2 times more likely with higher education (95% CI 1.2 to 3.9), lesser among those who desired more than two children (aOR 0.59; 95% CI 0.38 to 0.94; $p<0.02$). Two children per family was the preferred choice for 1060 (42.5%) women. No gender bias in favour of the male child was observed.

Conclusion Awareness and use of contraceptives are poor though the fertility is not commensurately high. Along with developing targeted responses to contraceptive use among Indigenous people with indigenous data, awareness also requires attention. Ethnographic studies are also necessary to determine the differences in

Strengths and limitations of this study

- It is a community-based study.
- Limited studies have been conducted on contraceptive use among Indigenous tribal women.
- Spatial or temporal association could not be studied.

contraceptive use including traditional methods among the various Indigenous groups.

INTRODUCTION

India is home to one of the largest population of Indigenous persons at 104 million second to China's 106.4 million.¹ Global data is replete with evidence of poorer health and social outcomes for Indigenous peoples than for non-Indigenous populations. However, this is not uniformly the case, and the size of the rate difference varies.²

Tribal people in independent countries are those 'Whose social, cultural and economic conditions distinguish them from other sections of the national community and whose status is regulated wholly or partly by their own customs or traditions or by special laws or regulations; and peoples in independent countries who are regarded as Indigenous because of their descent from the populations who inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonisation or the establishment of present state boundaries and who, irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions'.³

Among the various social groups in India, the tribes are the most socioeconomically deprived groups, with low literacy and poor economic and living conditions.⁴ In India, scheduled tribes (ST) refer to various

aboriginal ethnic minorities, who are concentrated in hilly lands in the Himalayas, Eastern Ghats, Western Ghats, Deccan Plateau and other hilly regions.⁵ The STs, also referred to as Adivasis not only have distinct cultural and linguistic characteristics but are also spatially isolated which is also cited as a reason for deprivation.⁶ In addition fertility indices are found to be high. Though, countries such as India, China and Bangladesh, resist the use of the term Indigenous groups due to contentions in the definition, they have adopted affirmative action and special measures for the 'tribal' or 'Adivasi'.⁷ Several constitutional benefits have been instituted for their upliftment, including various welfare programmes, reserved positions in administration, government bodies and in educational institutions and so on, but these initiatives appear not to have benefitted the entire community.

In India, the southern state of Kerala is home to 0.4% of the total tribal population. The Government of Kerala has identified about 36 scheduled tribes and a majority of them reside in Wayanad district. Until early 1900, they formed the majority in the district. With the roads built by the British, settlers from the other parts of the state reached the area and displaced the original inhabitants further into forests.⁸ They also introduced tobacco and alcohol to the population which they then became dependent on.^{9 10}

In other Latin American and Caribbean countries, coverage with modern contraception (median coverage ratio 0.82, IQR 0.66–0.92), was lower among Indigenous women than in the reference group. These differences persisted after adjustment for wealth, education and residence.¹¹ Due to all of the above reasons and more, the tribes have a very low contraceptive usage and high unmet need for family planning than the other groups.⁵ A microlevel study conducted among Adiya and Kattunayakan tribes in Kerala found low contraceptive usage and high unmet need for family planning at 68% and 62%, respectively.¹² Furthermore, understanding fertility, fertility intentions and contraceptive use can help in the development of population policies. Based on these findings, educational and interventional measures can be carried out to address the prevalent family planning and fertility issues among women.

In the light of sparse knowledge regarding contraceptive use among the tribal groups, this study was initiated to assess contraceptive use and its determinants, knowledge regarding contraceptives in general, oral contraceptives and fertility intentions.

METHODS

The study was conducted among women belonging to tribal groups in the reproductive age group in two of the three randomly selected community development (CD) blocks of Wayanad in Kerala, India, namely Vythiri/Kalpatta and Mananthavady (figures 1 and 2).

From a previous study¹² the sample size was calculated to be 1200 per block (details of sample calculation in

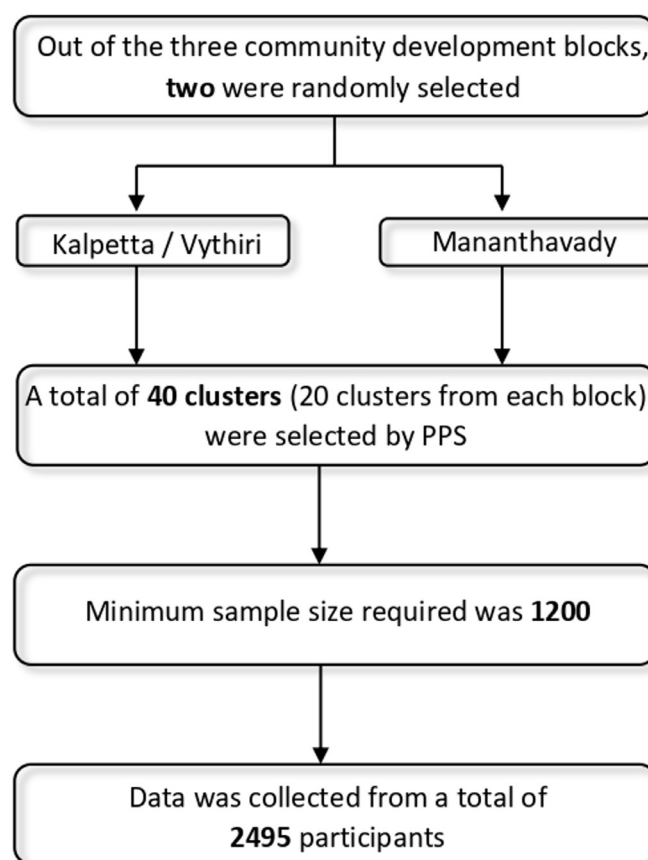


Figure 1 Selection of sample and sample size. PPS, probability proportionate to size.

online supplemental file 1). Informed video consent was obtained from the study participants.

Considering the cluster size to be a minimum of 30, a total of 40 clusters were selected from the two blocks based on the Probability proportionate to size sampling. According to the 2011 census, the total population of tribal origin in the two CD blocks was 46598. The sampling interval was 1165 and the first number randomly selected was 264 which was ward 1 of Thirunelly Grama Panchayat of Mananthavady CD block. Then 40 clusters were selected by adding the sampling interval.

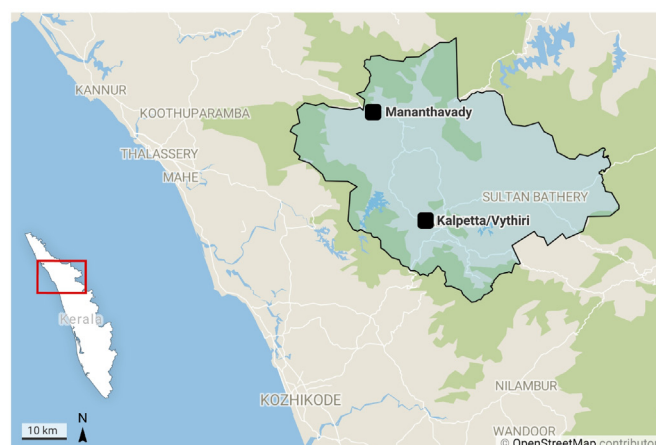


Figure 2 Map of the area.

The women in the 15–49 year age group were interviewed with a semi-structured questionnaire by trained volunteers from the district who underwent a 2-day training on contraception, communication skills, rapport building and questionnaire administration. A total of 2495 women were interviewed; with 1161 from Kalpetta and 1334 from Mananthavady (figure 2). The qualitative variables are expressed as proportion, percentage and the quantitative as mean and SD. The knowledge scores were then categorised into above average and below average. The missing values were in the range of 3%–8%. The occupation variable had a larger missing value at 18% and was interpreted with caution.

Settings

A CD block is a rural area administratively earmarked for planning and development.¹³ Pucca House refers to dwellings with walls made up of burnt bricks, stones, cement concrete, etc, and the roof made of tiles, asbestos cement sheets, reinforced brick cement, reinforced concrete cement, timber, etc. In contrast, a Kutcha House, is one with its walls and/or roof made of material other than those mentioned earlier and may include the use of unburnt bricks, bamboos, mud, grass, thatch, loosely packed stones, etc. The particularly vulnerable tribal group (PVTG) have been classified by the Government of India and are tribal communities who are characterised by (a) forest-based livelihoods, (b) pre-agriculture level of existence, (c) stagnant or declining population, (d) extremely low literacy and (e) subsistence economy. They consist of Cholanaikayan (a section of Kattunaickans), Kadar, Kattunayakan, Kurumbas and Koraga.¹⁴

The healthcare services that women have used to access contraception include district hospitals, health centres, health workers and medical shops (over-the-counter). Other than the medical shops all services are free of cost. All medical care is free of cost to the persons of tribal origin including transport services which is directly reimbursed to the vehicle owner by the Integrated Tribal Development Office (as reported from Tribal office and tribal health promoters).

The conceptual framework for the development of the questionnaire (figure 3) consisted of domains of contraceptive use in line with the objectives such as contraceptive use, knowledge, attitude regarding contraception and its determinants. The questionnaire has been provided as online supplemental file 2. Attitude to reproductive rights and contraception is not discussed here. Questions on knowledge regarding contraceptives in general and on oral contraceptives, emergency contraception in particular were assessed with a total score of 2.5 for general knowledge questions, 3.75 for oral contraceptives and 1.5 for emergency contraceptive. Those who scored above mean scores, 0.8 for general knowledge on contraceptives, 2.2 for oral contraceptives and 0.2 for emergency contraception were considered to have above average knowledge. The independent variables for above average knowledge were considered to be age, marital status,

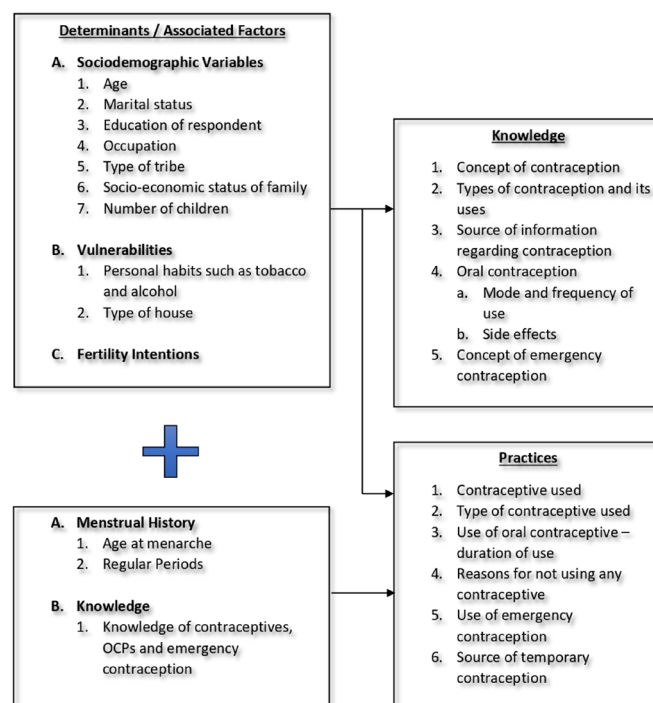


Figure 3 Conceptual framework for the development of questionnaire. OCPs, oral contraceptive pills.

education, occupation, type of house, tribe, number of children, tobacco use, alcohol use, age at menarche, current contraceptive use, knowledge regarding emergency contraception, oral contraception and concept of ideal family size. The menstrual history was also assessed along with some associated gynaecological symptoms in order to determine the relation, if any, with contraceptive use. The independent variables of contraceptive use were age, marital status, education, occupation, type of house, tribe, number of children, tobacco use, alcohol use, age at menarche, knowledge in general regarding contraceptives, knowledge regarding emergency contraception and oral contraception. Multivariate logistic regression model was developed using the variables age at menarche, occupation, type of tribe, type of house, marital status, number of children, knowledge about contraceptives in general and emergency contraception.

Patient and public involvement

Public participation and involvement of tribal persons was brought about by training and involving the members of the indigenous groups in data collection. Before the training, discussions were carried out with the participants representing the tribal groups and some changes were made in the questionnaire. Discussions and necessary permission were obtained from tribal officers and the study was informed by their experience. Dissemination activities were also carried out.

In order to address the bias due to poor rapport, self-reports of contraceptive use, a repeat study was conducted in a subset of 298) to assess the contraceptive prevalence and to determine the presence of menstrual huts which

was reported during the initial study, which has not been discussed here. The study was conducted from October 2019 to October 2020. A follow-up qualitative study was conducted to understand the barriers and facilitators to contraceptive use, fertility intentions and menstrual practices which is beyond the scope of this paper.

RESULTS

The mean age of the study participants was 30.8 (SD=9.8 years). The women belonged to Paniya, Kurichiyar and Adiya tribal groups at 59.2%, 13.6% and 10.9%, respectively. The PVTG constituted 10% of the study population. About 395 (17.2%) persons were illiterate, a third (33.2%) had 12 years of schooling and about a fifth (19.7%) lived in kutchra houses (table 1). The mean per capita income was \$10.66±25.72 from the available responses since many respondents did not reveal their income. The mean age at menarche was 13.21±1.5 years and the mean family size was 4.52±1.62.

Majority of the women 2075 (83.2%) had regular menstrual periods and 97.2% had a menstrual cycle duration of less than 45 days. Abdominal pain associated with periods was experienced by 37.5% of the participants. The majority (86%) did not experience any bleeding or spotting between periods. The mean duration of menstrual periods was 4.07±1.33. Only, 4.7% reported that they had bleeding in between periods and 0.4% said that they had bleeding after intercourse. A small proportion, 3.3% of the women in the reproductive age group were currently pregnant. The mean number of children born to the respondents was 2.34±1.18. About a tenth, 11.6% gave a history of abortion and the mean number of abortions was 1.41±1.08 (table 1).

Initially, only about 41.2% (1027/2495) reported having heard of contraceptives and on further probing this increased to 50.3% (1256/2495). Only more than a third (36.7%) had above average knowledge of contraceptives. Less than a fifth, 433 (17.4%) reported having heard of oral contraceptives. Only 68 answered further knowledge questions on OCP of which about a third (33.8%) of the women had above average knowledge. The mean knowledge scores about contraceptives in general, oral contraceptives and about emergency contraception were uniformly low at 0.8 (maximum 2.5), 2.2 (maximum 3.5) and 0.2 (maximum 1.5). Only 206 (8.3%) had heard of emergency contraception and the knowledge regarding emergency contraception was above average among only a fifth, 21.5% (247/1146).

More than a fourth 658 (26.4%) (95% CI 27.9 to 24.9) of the women reported current use of contraceptive. This was validated by a second study among a subset of 298 reproductive age women where the prevalence of contraceptive use was found to be almost the same at 29%.

Among those who used contraceptives, a majority 420/658 (63.8%) had used permanent methods and a similar percentage of women had used hormonal contraceptive 57/658 (8.7%) and condoms 46/658 (7%).

Table 1 Sociodemographic distribution of the study population

Variables	Frequency	Percentage
Type of house		
Kutchra	491	20.4
Pucca	1690	70.4
Others (*94 missing)	220	9.2
Tribe		
Paniya	1478	59.2
Kurichiyar	339	13.6
Adiya	273	10.9
Others	405	29.8
Age (in years)		
<31	1303	54
>31 (*81 missing)	1111	46
Education		
Illiterate	395	17.2
Literate (*202 missing)	1898	82.8
Occupation		
Employed	1419	69.6
Unemployed (*456 missing)	620	30.4
Marital status		
Currently married	1695	70
Others (*75 missing)	725	30
Number of children		
<3	1232	85.4
>3	211	14.6
Tobacco use		
Yes	1436	57.6
No	1059	42.4
Alcohol use		
Yes	92	3.7
No	2403	96.3
Regular periods		
Yes	2075	83.2
No	420	16.8
Currently pregnant		
Yes	83	3.3
No	2412	96.7
Age at menarche (in years)		
<13	1428	61.7
>13 (*181 missing)	886	38.3
Ideal family size		
≤2	1109	47.6

Continued

Table 1 Continued

Variables	Frequency	Percentage
>2 (*164 missing)	1222	52.4
Desire for a third child if the first two children are of the same sex		
Yes	1519	68.4
No (*273 missing)	703	31.6
Knowledge—general		
Below average	666	53
Above average	590	47
Knowledge—oral contraceptive pill (OCP)		
Below average	28	41.2
Above average	40	58.8
Knowledge—emergency contraception		
Below average	899	78.4
Above average	247	21.6
Ever use of contraceptive		
Yes	658	26.4
No	1837	73.6
Type of contraceptive used		
Permanent	420	63.8
Hormonal (OCP)	57	8.7
Condoms	46	7
Copper T	107	16.3
Others including traditional methods	14	2.1

Intrauterine contraceptive device such as Copper T (CuT) was reported to have been used by 107/658 (16.3 %) and 14/658 (2.1%) reported using other methods including traditional methods. Nobody reported the use of an injectable hormonal contraceptive. Most of them relied on the Government health system for their contraceptive needs and obtained it from the primary health centres, Accredited Social Health Activists, district hospital and a few from medical shops. The most recent use of contraceptives was reportedly for family planning more than half of the time 58.6% (237/404), 7.1% (29/404) for religious reasons and 4.9% (20/404) used it at the partner's insistence. Despite the current use of contraceptive being only 26%, less than 1% (23/2495) women reported accidental pregnancy. About 39 women (1.6%) reported that they had used emergency contraception.

Among those who reported not to have used a contraceptive, worry about the side effects (13.5%) and partner not wanting to use a method (11.8%) were the main reasons. About 4.8% also mentioned that they did not know how to use the contraceptive method and 7.2% did not need to use a contraceptive method as they were below 18. About a fourth, 26.4% mentioned a variety of reasons for not using such as husband's illness, have decided not to use, have not felt its need, wanted pregnancy, divorced,

self-control, need one more child, recently married and not pregnant, natural methods, planning to conceive and planning to do tubectomy, staying away from husband, widow.

Regarding oral contraceptives which was a particular focus of this study, about 61.5% had never used oral contraceptives. Most of the users of oral contraceptives (27/58) had only used it sometimes. About a half 28/58 (48.2%) used OCP for attending religious rituals for not more than a week and 24/58 (41.3%) for contraceptive use. The most reported side effects were irregularity in menstrual cycle (24.64%) and vomiting (15.94%). Overuse or continuous use of contraceptive for non-contraceptive use was not found, although present in other neighbouring tribal communities^{15 16} and this was also corroborated by the tribal officers of the area.

Determinants of knowledge of contraceptive use

After multivariate logistic regression, the educated were found to have a 2.2 times greater likelihood of above average knowledge (95% CI 1.2 to 3.9) about contraceptives. Compared with other Indigenous groups Paniya's had 67% poorer knowledge (adjusted OR (aOR) 0.33 95% CI 0.17 to 0.65). Though the current use of contraceptives was 1.2 times more likely with above average knowledge, this was not significant. Knowledge of emergency contraception was an important determinant of general knowledge of contraceptives (aOR 6.9, 95% CI 3.86 to 12.36; $p < 0.001$).

Though a clustering of risk factors for below average knowledge of contraceptives such as tobacco, alcohol use and illiteracy was observed (table 2A) only education was found to be an independent variable for above average knowledge (aOR 2.2; 95% CI 1.2 to 3.9). Those who desired more than two children irrespective of whether they were boys or girls had significantly lower knowledge (aOR 0.59; 95% CI 0.38 to 0.94; $p < 0.025$) (table 2B). Others such as age >31 years, employed, married women, more than three children having significant association with knowledge disappeared with regression analysis (tables 2A,B). More than half of the women 198 (55.6%) in the reproductive age group with above average knowledge said that another child is not required if existing two children belong to the same sex compared with 360 (44.8%) in those who said yes ($p < 0.001$) indicating no bias for male children.

Determinants of contraceptive use

A multivariate logistic regression of the determinants of current use of contraceptive showed that age at menarche >13 years (aOR 1.69, 95% CI 1.14 to 2.52; $p < 0.009$) and belonging to Paniya tribe had significantly higher use of contraceptive (aOR 2.67, 95% CI 1.49 to 4.77; $p < 0.001$). Though Kattunaickans, a PVTG had lower contraceptive use this was not significant (table 3A). Those who stayed in a kutch house were also less likely to have used a contraceptive (aOR 0.55, 95% CI 0.31 to 0.95; $p < 0.035$) (table 3B). Though the employed had a higher use of contraceptive

Table 2A Determinants of knowledge of contraceptives: univariate analysis

	Above average (%)	Total	P value
Age			
≤31 years	279 (44.9)	622	0.12
>31 years	294 (49.3)	596	
Education			
Illiterate	53 (36.1)	147	0.001
Literate	501 (51)	983	
Occupation			
Employed	319 (45.8)	26	0.02
Unemployed	188 (53.9)	349	
Tribe			
Paniya	66 (34.7)	190	0.00
Kattunaickan	254 (41.6)	610	
Others	270 (59.2)	456	
Type of house			
Kutcha	113 (42)	269	0.09
Pucca	413 (49.5)	835	
Others	50 (50)	100	
Marital status			
Currently married	484 (51.3)	943	0.00
Others	94 (33.6)	280	
Number of children			
≤3	368 (53.6)	687	0.04
>3	49 (43)	114	
Current use of contraceptive			
No	457 (49.7)	919	0.001
Yes	133 (39.5)	337	
Tobacco use			
Yes	269 (40.1)	670	0.00
No	321 (54.8)	586	
Alcohol use			
Yes	9 (18.8)	48	0.002
No	581 (48.1)	1208	
Knowledge regarding emergency contraceptives			
Below average	323 (37.6)	859	0.00
Above average	185 (77.7)	238	
Knowledge regarding oral contraceptives			
Below average	12 (42.9)	28	0.61
Above average	17 (50)	34	
Attitude			
Below average	127 (28)	520	0.00
Above average	463 (57.7)	736	

in univariate analysis after regression the contraceptive use was significantly lesser among the employed. The final multivariate regression model also included variables such as more than three children, marital status, poorer knowledge scores though significantly associated in the univariate

analysis disappeared in the regression analysis done by the enter method (tables 3A,B). Among the different tribes Kattunaickans, a PVTG had the lowest use of contraceptive at 23.8%, followed by other groups at 26.5% and 39.9% among Paniyas.

Table 2B Independent determinants of above average knowledge of contraceptives

	Crude OR	95% CI	P value	Adjusted OR	95% CI	P value
Education						
Literate	1.84	1.28 to 2.64	0.001	2.22	1.23 to 3.98	0.01
Illiterate	1			1		
Tribe						
Paniya	0.36	0.26 to 0.52	0.001	0.33	0.17 to 0.65	0.001
Kattunaickan	0.49	0.38 to 0.62	0.01	0.7	0.41 to 1.17	0.17
Others	1			1		
Occupation						
Employed	0.72	0.55 to 0.93	0.01	1	0.65 to 1.55	0.98
Unemployed	1			1		
Attitude						
Good	3.49	2.72 to 4.48	0.01	4.88	3.11 to 7.65	0.001
Poor	1			1		
Marital status						
Ever married	2.08	1.57 to 2.75	0.01	0.65	0.32 to 1.32	0.24
Others	1			1		
Tobacco Use						
Yes	0.55	0.44 to 0.69	0.01	0.67	0.41 to 1.08	0.1
No	1			1		
Alcohol use						
Yes	0.25	0.12 to 0.52	0.01	0.56	0.11 to 3.05	0.51
No	1			1		
Ever use of contraceptive						
Yes	0.66	0.51 to 0.85	0.01	1.24	0.75 to 2.06	0.4
No	1			1		
Knowledge regarding emergency contraceptive						
Above average	5.79	4.14 to 8.09	0.001	6.9	3.86 to 12.36	0.001
Below average	1			1		
Number of children						
>3	0.65	0.44 to 0.97	0.04	1.07	0.58 to 1.96	0.82
≤3	1			1		
Fertility intention						
Yes	0.65	0.50 to 0.83	0.001	0.59	0.38 to 0.94	0.03
No	1			1		

A larger proportion of women (42.5%) preferred two children per family, closely followed by (38.2%) women desiring three children. The spacing between children suggested was 3 years by 31.2% and 4 years by 17.8%. There did not appear to be a gender bias in favour of the male child as only 98 (3.9%) of women reported that another child was necessary if both the children were girls. Similarly, only about 102 (4.1%) reported that another child was necessary if the children were both boys.

DISCUSSION

The current use of contraceptives was reported by 26.4% of Indigenous women in the reproductive age group.

Knowledge of contraceptives underpins use. The above average knowledge scores were found to be higher among the educated and also aligned with the above average knowledge of emergency contraceptives. Knowledge was lower among those who desired more than two children and among one of the backward tribes, the Paniyas. Contraceptive use was higher among the those belonging to the Paniya tribe and among those with an age of menarche more than 13 years and lesser among those with a kutcha house.

Among the 26.4% contraceptive users, 63.9% used permanent methods, 9% used hormonal contraceptive, 7% used condoms, 16.3% used CuT and 2.1% used other

Table 3A Factors affecting current contraceptive use

		Current contraceptive use		
		Yes	Total	P value
Age	≤31 years	343 (26.3%)	1303	0.88
	>31 years	289 (26%)	1111	
Education	Illiterate	84 (21.3%)	395	0.06
	Others	488 (25.7%)	1898	
Tobacco use	Yes	382 (26.6%)	1436	0.78
	No	276 (26.1%)	1059	
Occupation	Employed	378 (26.6%)	1419	0.02
	Unemployed	134 (21.6%)	620	
Alcohol use	Yes	24 (26.1)	92	1
	No	634 (26.4)	2403	
Age at menarche	≤13 years	344 (24.1)	1428	0.001
	>13	270 (30.5)	886	
Regular periods	Yes	540(26)	2075	0.4
	No	11 (28.1)	420	
Knowledge general	Below average	204 (30.6%)	666	0.001
	Above average	133 (22.5%)	590	
Knowledge of oral contraceptive pill	Below average	9 (32.1%)	28	0.58
	Above average	10 (25%)	40	
Knowledge of emergency contraceptive	Below average	256 (28.5%)	899	0.02
	Above average	52 (21.1%)	247	
Attitude	Poor	422 (29.3%)	1440	0.00
	Good	236 (22.4%)	1055	
Tribe	Paniya	109 (39.9%)	273	0.00
	Kattunaickan	352 (23.8%)	1478	
	Others	197 (26.5%)	744	
Type of house	Kutcha	104 (21.2%)	491	0.004
	Others	554 (27.6)	2004	
Marital status	Currently married	415 (24.5%)	1695	0.01
	Others	213 (29.4%)	725	
Number of children	≤3	295 (23.9)	1232	0.01
	>3	69 (32.7)	211	

methods including traditional methods. This is much less than that the state average of 53%.¹⁷ The contraceptive use varies in other states among the tribals with higher use reported in Assam (36%)¹⁸ and Bengal (40%).¹⁹ In the state of Maharashtra it varied from 18.7%²⁰ to a spacing contraceptive use of 27.7% (10.8% pill, 13.3% condom, 2.0% IUD and 1.6% withdrawal or rhythm).²¹ This also underlines the heterogenous character of the tribal groups across the country varying in population size, language and their interaction with the rest of society²² and thus having different contraceptive use rates. In neighbouring Bangladesh the contraceptive use among tribals was very high at 73% which was also much higher than among the general population of that country.²³

The primary reason for low contraceptive use may be the low access to contraceptive knowledge and services as observed in Maharashtra and Tamil Nadu.^{21 24} Other reasons could be early marriage, childbearing observed among tribal groups in Madhya Pradesh and Rajasthan²⁵ which was in turn associated with low contraceptive use¹¹ and lower education.²⁴ Other studies in central India and Nepal substantiated the role of women and husbands' education, age of women and number of surviving boys in the use of any modern method of contraception.^{5 26} Nevertheless, the different ethnographic backgrounds of the various tribal groups across different parts of India result in a non-uniform pattern of use of contraceptives. The independent determinants of contraceptive use in

Table 3B Independent determinants of current contraceptive use

	Current contraceptive use			
	Crude OR	95% CI	Adjusted OR	95% CI
		P value		P value
Age at menarche (years)				
>13	1.38	1.15 to 1.67	1.69	1.14 to 2.52
≤13	1	0.001	1	0.01
Tribes				
Paniya	1.85	1.38 to 2.47	2.46	1.54 to 3.94
		<0.001		<0.001
Kattunaickan	0.87	0.71 to 1.06	0.98	0.67 to 1.43
		0.17		0.24
Others	1		1	
Occupation				
Employed	1.32	1.05 to 1.65	0.59	0.38 to 0.9
		0.02		0.02
Unemployed	1		1	
Type of house				
Kutcha	0.7	0.55 to 0.89	0.55	0.315 to 0.959
Others	1			0.04
Marital status				
Ever married	0.77	0.64 to 0.94	0.85	0.422 to 1.71
		0.01		0.65
Others	1		1	
Number of children				
>3	1.54	1.12 to 2.11	1.22	0.69 to 2.16
		0.01		0.48
≤3	1		1	
Knowledge—general				
Above average	0.65	0.51 to 0.85	0.93	0.58 to 1.47
		0.001		0.75
Below average	1		1	
Knowledge—emergency contraceptive				
Above average	0.67	0.47 to 0.94	0.86	0.50 to 1.49
Below average	1	0.02	1	0.61

this study were belonging to the Paniya group and a lower use among those staying in a kutcha house. Though, India as a whole has maintained a steady decline in fertility,²⁷ studies among tribal communities' report some of the lowest rates of contraceptive use and an increasing fertility rate.²⁷ With the exception of the scheduled tribes who have a total fertility rate (TFR) of 2.3, the TFR of all population groups in Kerala are below replacement level at 1.6.¹⁷ This also corresponds to the mean number of children in this study at 2.34±1.18. The TFR in central Indian state of Madhya Pradesh among the Indigenous tribes was 2.7.²⁸ Though, the fertility levels in this study are higher than the general population it is not as high

as the other tribal communities indicating the use of perhaps other traditional methods such as withdrawal method, calendar method, etc, which may not have been revealed fully in this cross-sectional study or the influence of the general population. Traditional method use such as rhythm and withdrawal is the highest in this district at 5.6%.¹⁷ Other reasons could be the high prevalence of reproductive tract infections. The few studies among tribal women on reproductive infection in a southern and northern state of Karnataka and Himachal Pradesh found a prevalence of 12%–14%.^{29 30}

Reduced contraceptive use may also be due to the difficult access to healthcare services. The tribal people

rely on the public health system which is in general characterised by low output, low quality and low outcome delivery system.³¹ An ethnographic study in an adjoining district showed that the hesitancy to access services in spite of being provided free services and a comprehensive financial protection package was due to the failure to provide culturally respectful care and the lack of power on the part of the Indigenous community to negotiate with the health system.³² In India, across 10 states with sizeable tribal population, the percentage surplus/deficit of healthcare providers in tribal areas is found to -33% allopathic doctors at primary health centre, and -84% specialists at community health centre which is indicative of the huge deficiency of specialist doctors and thus quality healthcare in the existing primary healthcare system.³¹

Knowledge of contraception is almost universal in Kerala. Among all women, 44% knew about emergency contraception.¹⁷ However, in the current study, only 36.7% had above average knowledge of contraceptives. This is similar to other studies also with Prusty reporting considerably lower knowledge among tribal women compared with their non-tribal counterparts in the three central Indian states.⁵ However, tribal women in the northeastern part of India had good knowledge of contraceptives and correspondingly the contraceptive use was also high.¹⁸ The awareness levels of contraception in general, was closely aligned with the awareness of emergency contraceptives (aOR 6.9, 95% CI 3.86 to 12.3) and educational levels (aOR 2.2, 95% CI 1.2 to 3.9). Findings suggest that lower spacing contraceptive use among tribals is driven by social vulnerabilities such as low education, housing and higher fertility preferences.²¹

Gender norms related to fertility is an important issue determining contraceptive use in the tribal community.²⁴ Gender relations among Indian tribes have historically been more balanced and equitable; however there is an increasing trend of gender bias in tribal culture emerging due to the assimilation and modernising process.^{33,34} The tribes in Kerala seem to be more equitable with a male child preference not indicated with the desire for a third child expressed when the initial two children are of the same sex. In the northeastern state of Meghalaya 86% of the population is tribal and followed a matrilineal system. It had the lowest contraceptive use of 20.2% with a corresponding high total fertility rate of 4.57.^{35,36} Though, tribal women have more independence and fewer restrictions than women belonging to caste Hindu communities, in some states such as Odisha, their status remained low and decision-making regarding issues like seeking healthcare and large expenditures rested with men.³⁷ Even in neighbouring Bangladesh, no preference of son over daughter was observed among tribal communities,²³ whereas women in Kerala are slightly more likely to use contraception if they already have a son.¹⁷

Though the Paniya group had lower knowledge scores compared with the other groups, contraceptive use was higher compared with other tribal groups. This may be

due to the fact that the Paniyas, a marginalised group among the tribals use more of the public health services³⁸ and the subcentres which provide family planning services do not incur an additional travel cost. This is a cross-sectional study and temporal relationships between knowledge and use cannot be studied. Spatial (or geographical) isolation is cited as the major reason for the exclusion and backwardness of indigenous communities in both China and India.⁶ The living conditions, an underprivileged background and social vulnerability may contribute to low contraceptive use.

A limitation of the study is that the contraceptive use was self-reported, which inherently carries the risk of under-reporting as the persons of tribal origin are known to be shy and reclusive. However, trained local personnel were employed, who were able to reduce under-reporting. In addition, the prevalence of contraceptive use has been corroborated by a repeat study using a smaller sample. Though, the findings are generalisable to the persons of tribal origin as a whole, the various tribal/indigenous groups have not been covered equally due to difficult terrain and the possibility of human-wildlife conflict. Other ethnographic studies among the various tribal communities are necessary to understand the use of traditional methods of contraception. Data related to some variables are missing though it is negligible, ranging from 3% to 10%.

Thus, at a policy level more changes are necessary. In spite of the numerous schemes and support such as Tribal Health promoter, Oorumithram (friend of the village) there is a huge gap in understanding the tribal persons belonging to different groups. A more culturally sensitive and respectful approach is necessary. Universal access to family planning services, aligned with Sustainable Development Goals 3.7, data suggests that we are far from achieving this goal when it comes to tribal communities.

CONCLUSION

Awareness and use of contraceptives are poor though the fertility is not commensurately high. Along with developing targeted responses to contraceptive use among Indigenous people with indigenous data,³ awareness also requires attention. This study shows a higher use of contraceptive among Paniyas and ethnographic studies are necessary to determine the differences in contraceptive use including traditional methods among the various Indigenous groups.

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REFERENCES

- Hall GH, Patrinos H. *Indigenous Peoples, Poverty, and Development* [Internet]. Cambridge University Press, 2012. <https://EconPapers.repec.org/RePEc:cup:cbooks:9781107020573>
- Indigenous Peoples at the United Nations, United Nations For Indigenous Peoples [Internet]. Available: <https://www.un.org/development/desa/indigenouspeoples/about-us.html> [Accessed 9 Oct 2021].
- Anderson I, Robson B, Connolly M, et al. Indigenous and tribal peoples' health (The Lancet-Lowitja Institute Global Collaboration): a population study. *The Lancet* 2016;388:131–57.
- Ranjan A. *Studies in population of Madhya Pradesh*. Bhopal: Shyam Institute, 2004: 1–338.
- Prusty RK. Use of contraceptives and unmet need for family planning among tribal women in India and selected hilly states. *J Health Popul Nutr* 2014;32:342–55.
- World Bank. Poverty and Social Exclusion in India [Internet]. Washington, DC: World Bank, 2011. Available: <https://openknowledge.worldbank.org/handle/10986/2289> [Accessed 09 Oct 2021].
- Erni C. *The concept of Indigenous peoples in Asia. A resource book*, 2008: 1–462.
- Aiyappan A. *The Paniyas, an Ex-slave tribe of South India*. Institute of Social Research and Applied Anthropology, 1992.
- Sadath A, Jose K, Meethal ST, et al. Factors associated with alcohol misuse among Indigenous tribal men in Wayanad: a qualitative study. *Indian J Psychol Med* 2019;41:516–22.
- Mohindra KS, Narayana D, Anushreedha SS, et al. Alcohol use and its consequences in South India: views from a marginalised tribal population. *Drug Alcohol Depend* 2011;117:70–3.
- Mesenburg MA, Restrepo-Mendez MC, Amigo H, et al. Ethnic group inequalities in coverage with reproductive, maternal and child health interventions: cross-sectional analyses of national surveys in 16 Latin American and Caribbean countries. *Lancet Glob Health* 2018;6:e902–13.
- Sajitha O. *Need for contraception among tribal women in Kerala, southern state of India*, 2007.
- Maheshwari S. Rural development and bureaucracy in India. *Indian J Public Adm* 1984;30:1093–104.
- Scheme of Development of Particularly Vulnerable Tribal Groups (PVTGs) [Internet]. Available: <https://tribal.nic.in/downloads/NGO/Latter-Notice/14.pdf> [Accessed 11 Oct 2021].
- Idukkki's pill-popping tribals don't menstruate anymore [Internet]. Deccan Herald, 2012. Available: <https://www.deccanherald.com/national/iddukki-pill-popping-tribals-dont-menstruate-anymore-213430.html> [Accessed 11 Oct 2021].
- Mageswari S, Rajan HM, Balusamy M, et al. Childlessness among muthuvan tribes of Tamil Nadu, India: an exploratory study. *Indian J Community Med* 2021;46:141–4.
- International Institute for Population Sciences (IIPS) and ICF. *National family health survey (NFHS-4), India, 2015–16: Kerala*. Mumbai: IIPS, 2018.
- Bharali MD, Baruah R, Ojah J. Comparative study of knowledge, attitude and practices toward contraception among tribal and Non-Tribal wives of eligible couples in a rural area of Assam. *Int J Sci Study* 2016;3.
- Misra R, Lahiri SK, Chaudhuri AN. Contraceptive behaviour of tribal eligible couples in Bankura district of West Bengal. *Int J Innov Res* 2014.
- Jungari S, Paswan B. Male perception and participation in family planning among tribal communities of Maharashtra, India: a Mixed-Method study. *Int J Community Health Educ* 2020;40:163–9.
- Battala M, Raj A, Ghule M, et al. Association between tribal status and spacing contraceptive use in rural Maharashtra, India. *Sex Reprod Healthc* 2016;7:78–80.
- Shrivastava SR, Shrivastava PS, Ramasamy J. Implementation of public health practices in tribal populations of India: challenges and remedies. *Healthc Low Resour Settings* 2013;1:3–e3.
- Kamal SMM, Hassan CH. Socioeconomic correlates of contraceptive use among the ethnic tribal women of Bangladesh: does sex preference matter? *J Family Reprod Health* 2013;7:73.
- Susuman AS. Son preference and contraceptive practice among tribal groups in rural South India. *Stud Tribes Tribals* 2006;4:31–40.
- Khanna T, Chandra M, Singh A, et al. Why ethnicity and gender matters for fertility intention among married young people: a baseline evaluation from a gender transformative intervention in rural India. *Reprod Health* 2018;15:63.
- Bhusal CK, Bhattarai S. Factors affecting unmet need of family planning among married Tharu women of Dang district, Nepal. *Int J Reprod Med* 2018;2018:e9312687:1–9.
- IIPS. *International Institute for population sciences (IIPS) and macro international. National family health survey (NFHS-3), India, 2005–06*. Maharashtra, Mumbai: IIPS, 2008.
- International Institute for Population Sciences (IIPS) and ICF. *National family health survey (NFHS-4), India, 2015–16: Madhya Pradesh*. Mumbai: IIPS, 2017.
- Ghosh S, Pattanshetty SM, Mallya SD, et al. Cervical cytology and associated factors among tribal women of Karnataka, India. *PLoS One* 2021;16:e0248963.
- Bhilwar M, Malik A, Upadhyay R. Knowledge, care-seeking and prevalence of reproductive tract infections in tribal women of Himachal Pradesh, India. *Indian J Matern Child Health Off Publ Indian Matern Child Health Assoc* 2015;17.
- Tribal Health in India: Bridging the Gap and a Roadmap for the Future. Report of the expert committee on Tribal Health. Executive Summary and Recommendations. Ministry of Health and Family Welfare & Ministry of Tribal Affairs, Government of India:1–39.
- George MS, Davey R, Mohanty I, et al. "Everything is provided free, but they are still hesitant to access healthcare services": why does the indigenous community in Attapadi, Kerala continue to experience poor access to healthcare? *Int J Equity Health* 2020;19:105.
- Maharatna A. Fertility, mortality and gender bias among tribal population: an Indian perspective. *Soc Sci Med* 2000;50:1333–51.
- Maharatna A. How can "beautiful" be "backward"? Tribes of India in a long-term demographic perspective. *Econ Polit Wkly* 2011;46:42–52.
- International Institute for Population Sciences. *National family health survey (NFHS-2), 1998–99 (4-From Meghalaya)*. India, Mumbai: International Institute for Population Sciences, 2000: 1–438.
- Narzary PK, Sharma SM. Daughter preference and contraceptive-use in matrilineal tribal societies in Meghalaya, India. *J Health Popul Nutr* 2013;31:278–89.



- 37 Contractor SQ, Das A, Dasgupta J, *et al.* Beyond the template: the needs of tribal women and their experiences with maternity services in Odisha, India. *Int J Equity Health* 2018;17:134.
- 38 Mohindra KS, Narayana D, Haddad S. "My story is like a goat tied to a hook." Views from a marginalised tribal group in Kerala (India) on the consequences of falling ill: a participatory poverty and health assessment. *J Epidemiol Community Health* 2010;64:488–94.

Supplement – 1

Sample size calculation

According to a study conducted in Wayanad the contraceptive use among tribals of Wayanad was 40.7%.⁹ With 95% confidence interval and 10% relative precision using the formula $(Z_{1-\alpha/2})^2 pq/d^2$ the sample size was calculated to be 583. With a design effect of 2 a final sample size of 1166 was obtained rounded to 1200 for each block.

Pattern of contraceptive use, determinants and fertility intentions among tribal women in Kerala, India: A cross sectional study

1. Sl no:
2. Phone no:
3. Ward:
4. Panchayat
5. CD block
6. Age:
7. What is your highest level of education (woman in the reproductive age group)
 - a) Literate b) Illiterate c) Primary d) Graduate/Post Graduate
8. What is your occupation a) Coolie b) Traditional work c) Housewife d) Professional e) Others-specify
9. Income

Sl no	Family members	Income	
Total no of members		Family income	Percapita income

10. Type of house a) Kucha b) Pucca c) Others (specify)
11. Tribal group: a) Adiya b) Paniya c) Kattunaikkan d) Kurichiyan e) Oorali kuruma
- f) Others (Specify)

Personal Information

12. Marital status a) Married b) Divorce c) Widow d) Not married e) Separated
- f) Unmarried mother
13. In the last one month have you used any tobacco product such as Beedi/ Cigarette / Chewing tobacco) ? a) Yes b) No
14. Have you used alcohol in the past one month? a) Yes b) No

Menstrual History

15. Age of attainment of menarche
16. a) Is your menstrual cycles regular? a) Yes b) No
- b) How frequently does your menstruation cycles occur? -----days

17. How many days your cycle last? -----days
18. Do you have dysmenorrhea? a) Yes b) No
19. Do you have intermenstrual bleeding/spotting? a) Yes b) No
20. Ask married woman above 18 yrs: After sexual contact do you have bleeding/spotting?
a) Yes b) No c) Not Applicable(for unmarried woman below 18 yrs)
21. Last menstrual period------(day/month/year)

Obstetric history (Ask to those who were pregnant for at least one time)

22. Are you pregnant now? a) Yes b) No
23. If yes how many times have you been pregnant? (Including current pregnancy)
24. How many newborns (who have completed 7 months/28 weeks of gestation have you given birth to ?
25. How many children do you have?
26. a) History of abortions? a) Yes b) No
b) If yes how many?
27. What type of abortion was the last one ?
a) Modern medical technique b) Traditional c) Natural d) Others (specify)

Knowledge of contraceptives

28. Have you heard about contraceptives a) Yes b) No
29. If yes, what was your source of information about contraception?
(Multiple responses)
a) Friends/Relatives b) Media/Print c) Health workers d) Doctors
e) Others (specify)
30. What does the term contraceptive methods mean ?
31. Which all contraceptive methods are you aware of ? (If there is no response ,pl probe)
(Multiple responses)
a) Hormonal pills/ Injectables b) IUD c) Condom (Nirodh) d) Others (specify)
32. Have you heard about oral contraceptive pills? a) Yes b) No (If no go to Q 37)
33. How should the tablets that are a part of the oral contraceptive pills be taken? (How many days after periods)
a) 1st day b) 5th day c) 10th day d) Don't know

34. How frequently should oral contraceptive pills be taken?
- a) Daily b) Alternate days c) Weekly once d) Monthly once e) Don't know
 - f) Others specify
35. How many tablets are there in a pack of oral contraceptive pills?
36. What are the side effects of oral contraceptive pills?
- a) Infertility b) Irregular periods c) Obesity d) Vomiting e) No side effects
 - f) Don't know g) Others specify
37. Have you heard about emergency contraception? a) Yes b) No
38. What do you understand by the term emergency contraception?
39. Can emergency contraception be a substitute for regular contraception methods? a) Yes b) No c) Don't know
40. Do you think contraceptive methods are completely effective in preventing pregnancy? a) Yes b) No c) Don't know

Attitude

Please mark against each statement the attitude which corresponds to the viewpoint of f the respondent

		Strongly agree	Agree	Don't know	Disagree	Strongly disagree
41	Females should take an active role in the use of contraceptive methods					
42	Females and males have equal role in taking decisions on use of contraceptives					
43	Opinion regarding sexual intercourse without female partners consent					
44	Opinion regarding Sexual contact among adolescents before 18 years of age					
45	Opinion regarding pre-marital sex					
46	Use of contraception by unmarried woman is against woman's morality					
47	Emergency contraception can be used routinely like other contraceptive methods					
48	Contraceptive pills can be used for longer duration (>3 months) to prevent pregnancy					
49	Contraceptive pills can be used for more than 3 months for treatment of menstrual disorders					
50	Contraceptive pills can be used for long duration (>3 months) for delaying menstrual cycle					
51	Contraceptive pills can be used for prolonged periods so that you don't have to follow the practice of staying in "Valaymapura"					

Practices

52. Have you ever used any contraceptive methods?

a) Yes b) No If no go to Q 59

53. Are you currently (within the past one month) using a contraceptive method?

a) Yes b) No

54. Which of the following contraceptive measures are you using?

a) Condom b) Oral pills c) Cu T d) Permanent sterilization e) Others specify

55. Condom-----how many months of use

Oral pills-----how many months of use

CuT-----how many months of use (one that you used last)

56. If you have used any temporary method of contraception, from where did you get it?

57. Why did you choose the contraceptive method which you have used recently?

a) To avoid unwanted pregnancy b) To attend religious function c) By partners
compulsion d) Don't know e) Not applicable

58. Did you have any unplanned pregnancy? a) Yes b) No c) Don't know

59. Have you used any emergency contraceptive methods? a) Yes b) No c) Don't know

60. Reasons for not using any contraceptive methods?

- a) Infrequent sexual contacts wouldn't result in pregnancy
- b) Contraceptive methods are expensive
- c) Worried about side effects
- d) Partners disinterest in contraceptive method usage
- e) Discomfort in buying contraceptive methods
- f) Use of contraceptive methods results in decrease in pleasure during contact
- g) Don't know how to use contraceptives
- h) No sexual contacts
- i) Others (specify)

61. How often have you used oral pills?

a) Always b) Many times c) Rarely d) Once in a while e) Not used

62. If answer is a) what is the reason for continuous use of oral contraceptive pills regularly?

a) To avoid unwanted pregnancy b) To attend religious function c) By partners

- compulsion d) Don't know e) To avoid going to Valaymapura (Menstrual hut)
63. Have you experienced any side effects after using oral pills? a) Yes b) No
64. If yes, which of the following
- a) Infertility b) Irregular periods c) Increase in body weight d) Vomiting e) No side effects f) Others (specify)
65. According to you how many children should be there in a family?
66. What should be the required age gap between 2 children?
67. Does a family with 2 male child/female child require one more child?
- a) Only for family with 2 girl child b) Only for family with 2 male child c) in both cases d) not required for a and b

Filled by - Name:

Sign:

Verified by: