

Knowledge, Attitude and Perceptions Regarding Infertility Among General Public in Tamilnadu - An Online Survey

Abishek Annamalai¹, Jayendiran Kamalakkannan², Cindy Jose^{3*}

^{1,2}Pharm. D, Department of Pharmacy Practice, J.K.K.Nattraja College of Pharmacy, Kumarapalayam, Tamil Nadu, India.

^{*3}Assistant Professor, Department of Pharmacy Practice, J.K.K.Nattraja College of Pharmacy, Kumarapalayam, Tamil Nadu, India.

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Abstract

Context: Infertility, an issue of great concern with rising number of cases every year, can affect anyone in the reproductive age.

Aims: To assess the knowledge, attitude and perception regarding infertility among common people.

Settings and Design: Web based Cross-sectional observational study.

Methods and Material: The cross-sectional study was conducted using an online survey questionnaire. 583, from 749 responses were included, excluding responses from infertile participants.

Statistical analysis: Statistical analysis was done using IBM.SPSS. Statistics.v22. Chi square and Spearman correlation tests were applied to appropriate data.

Results: Among 583 responses, majority were from females (60.21%), and non-medical/paramedical educational background (51.46%). 64.84% of the participants had above average knowledge about infertility. However, respondents lacked adequate knowledge about the influence of moderate and intense exercise, menstrual cycle and contraceptive pills on fertility. Majority of the participants (66.38%) had a positive attitude regarding infertility. Majority of the respondents believed that infertility is 100% curable (43.22%) and that it is socially acceptable to have a test- tube baby (68.26%).

Conclusions: There is a significant difference in knowledge, attitude and perception, among males and females and also among participants with medical/paramedical and other educational backgrounds. Awareness about infertility and certain ways to improve reproductive health, were spread using video and pamphlets. However, further measures should be taken to give a proper education regarding sex and reproductive health, from adolescence, so as to encourage the young generation to be conscious about their reproductive health.

Key-Words: Infertility, Awareness, Attitude, Perception.

INTRODUCTION:

Infertility is a global public health concern that affects more than 10% of the world's population. It is defined as the inability to conceive after one year of unprotected sexual intercourse.^[1] The fertility rate has plummeted in practically all parts of the world in recent years, with a recent UN report claiming that the fertility rate of Indians has dropped by half in the last 40 years.^[2] In India, there existed a trend of early marriage and having a first child before the age of 25 years, until the recent past. But now due to socio-economic development and greater interest in education, job and financial settlement, there is a delay in parenthood. Most of the women now plan their first pregnancy after 30 years of age.^[2] Lifestyle factors such as obesity, diet, smoking and alcohol use along with environmental chemical exposures have been increasingly examined as additional modifiers of fertility.^[4] It has been proposed that a high rate of infertility is mostly due to a large gap in people's awareness of infertility risk factors and

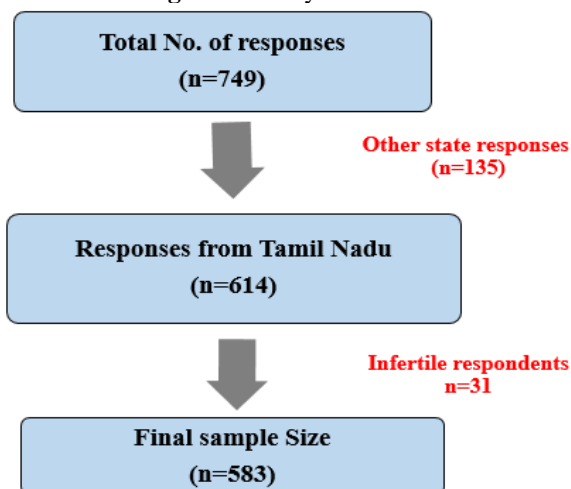
causes. The awareness of infertility as a medical issue among married and single people would aid them in understanding its causes and preventing its development.⁴ Infertility is a reproductive system disorder that is quickly growing in prevalence. Though the causes of infertility are not fully understood, various factors clearly contribute to this condition. Changes in lifestyle and living environment affect reproductive health to a major extent. The impacts of infertility are widespread, ranging from loss of happiness in married life, to physical and mental torture faced by infertile women. Infertility is clearly not only a medical issue, but also a severe social concern in our culture, as cultural norms and religious dictums may associate infertility with failure on a personal, interpersonal, or social level. It is critical that individuals have a thorough understanding of infertility so that affected couples can seek medical help as soon as possible and misconceptions can be rectified. Our aim is to analyse the knowledge, attitude, and perceptions about

infertility among general public and we correlate knowledge, attitude and perceptions with socio-demographic variables and lifestyle pattern of the respondents. We also create awareness about infertility using e-pamphlet and video.

SUBJECTS AND METHODS:

We conducted Prospective observational study for 6 months from (April 2021 to September 2021) using an online survey questionnaire. Both males and females of age group 18 to 60 years were included in the study. People those who were not willing to participate and those who were diagnosed as infertile were excluded. The bilingual (English and Tamil) survey form was circulated on social networking sites, requesting for participation. The purpose of the survey was briefed in the description. E-Consent form was included in the beginning of the form to ensure voluntary participation. The questionnaire comprised of 4 domains, namely, demographics (1section), awareness (2sections), attitude and perception (1section each). Awareness section consisted of 16 questions. Each right answer was given 1 mark, and wrong/don't know (wherever applicable) were given 0 marks. Mean score for 583 participants was found to be 9.44. An awareness pamphlet and a video on infertility were sent to the respondent's mail with an objective of creating awareness in them.

Figure 1: Study Procedure



STATISTICAL ANALYSIS:

Statistical analysis was done using IBM.SPSS. Statistics.v22. Chi square and Spearman correlation tests were applied to appropriate data.

RESULTS:

Among 583 participants, 351(60.21%) were females, and 232(39.79%) were males. Mean (SD) age of the participants was found to be $18.01 \pm (0.25)$ in years. The majority of the participants 352(60.38%) belonged to the urban and 231(39.62%) belonged to the rural area. 338(57.98%) participants were Under Graduates, followed by 202(34.65%) Post Graduates, 30(5.15%) HSC, 6(1.03%) SSLC, 6(1.03%) Primary education. 300(51.46%) were from Non-Medical or Non-Paramedical educational background and 283(48.54%)

were from Medical and Paramedical educational background. Majority of the participants were non-smokers (95.33%), non-alcoholics (93.11%), exercised regularly (64.18%), non-users of betelnut or tobacco (99.43%), and not obese (80.48%). 23 participants were smokers, among them 16 responded that smoking will reduce fertility. Similarly, 35 participants have habit of consuming alcohol, among them 23 responded that alcohol will reduce fertile health. Awareness section consisted of 16 questions. Each right answer was given 1 mark, and wrong/don't know (wherever applicable) were given 0 marks. Mean score for 583 participants was found to be 9.44. Participants who scored less than 9 were considered to have 'Below-average' knowledge and those who scored 9 or more were considered to have 'Above-average' knowledge. On analysing the awareness about infertility using the questions mentioned so far, it was found that, 56.03% of male and 70.66% of female participants had good knowledge about infertility when compared to the remaining 146(41.17%) participants. A positive correlation ($r = 0.176$, $p = 0.000$) was observed between age of the participants and their knowledge about infertility. 56.9% of male and 60.11% of female participants believed that choosing to adopt if a couple cannot have a child is the preference of that couple, among them 165 were from medical background and 178 were from non-medical background. 47.84% of male and 69.23% of female participants responded that wives are being blamed for infertility, among them 177 were from medical background and 177 from non-medical background. Internet was found to be the major source of information on infertility, followed by textbook (45.63%), experience of affected family member or friend (36.02%), Gynaecologist or family doctor (34.48%), television (26.93%), Newspaper/magazines (25.04%).

DISCUSSION:

Infertility is a condition requiring significant consideration, as various factors like one's lifestyle habits and health could affect their fertility. Various studies have proved that lifestyle habits like smoking, alcoholism, sedentary lifestyle, etc influence reproductive health. Alcohol intake has been associated to various detrimental side effects in men, including testicular atrophy, decreased libido, and lower sperm count, according to a study conducted by Sharma R et al. Alcohol appears to have a significant impact on sperm morphology and motility.^[5] According to studies conducted by Eggert J et al., and Hakim RB et al., there is a link between higher alcohol use and an increased risk of female infertility and a 50% reduction in the probability of pregnancy.^[6,7] Cigarette smoking has been shown to have a deleterious impact on fertility by a strong body of research. A detrimental impact of female smoking on the quality of follicular/ oocyte maturation and ovarian ageing, tubal function and overall uterine receptiveness is documented. Soares SR et al., concluded that in males, tobacco consumption has been associated with a reduction in sperm production and quality and increased genetic abnormalities with reduced

Table 1: DEMOGRAPHIC CHARACTERISTICS

Demographic characteristics		n=583	Percentage (%)
Gender	Male	232	39.79 %
	Female	351	60.21 %
Age group (in years)	18-27	477	81.82%
	28-37	67	11.49%
	38-47	21	3.60%
	48-60	18	3.09%
Area of residence	Rural	231	39.62%
	Urban	352	60.38%
Educational Qualification	Primary education	6	1.03%
	SSLC	7	1.2%
	HSC	30	5.15%
	UG	338	57.97%
	PG	202	34.65%
Educational Background of the Participant	Medical/ Paramedical	283	48.54%
	Others	300	51.46%
Marital Status	Unmarried	430	73.76%
	Married	152	26.07%
	Divorced	1	0.17%

Table 2: KNOWLEDGE REGARDING INFERTILITY

Do you think the following are the causes for infertility?	Response	Gender			Educational Background		
		Male n (%)	Female n (%)	p value ^b	Medical / Paramedical n (%)	Others n (%)	p value ^b
Abnormal menses	Yes ^a	144 (62.07%)	281 (80.06%)	0.000*	222 (78.45%)	203 (67.67%)	0.003*
	No	43 (18.53%)	57 (16.24%)		42 (14.84%)	58 (19.33%)	
	Don't Know	45 (19.40%)	13 (3.70%)		19 (6.71%)	39 (13.00%)	
Genital tract infection in Male	Yes ^a	131 (56.47%)	209 (59.54%)	0.503	172 (60.78%)	168 (56.00%)	0.211
	No	64 (27.59%)	96 (27.35%)		84 (29.68%)	76 (25.33%)	
	Don't Know	37 (15.95%)	46 (13.11%)		27 (9.54%)	56 (18.67%)	
Genital tract infection in Female	Yes ^a	124 (53.45%)	221 (62.96%)	0.022*	179 (63.25%)	166 (55.33%)	0.052
	No	58 (25.00%)	95 (27.07%)		79 (27.92%)	74 (24.67%)	
	Don't Know	50 (21.55%)	35 (9.97%)		25 (8.83%)	60 (20.00%)	
Previous use of contraceptive pills by female	Yes	133 (57.33%)	261 (74.36%)	0.070	201 (71.02%)	193 (64.33%)	0.800
	No ^a	56 (24.14%)	63 (17.95%)		59 (20.85%)	60 (20.00%)	
	Don't Know	43 (18.53%)	27 (7.69%)		23 (8.13%)	47 (15.67%)	
Psychological stress	Yes ^a	175 (75.43%)	292 (83.19%)	0.022*	236 (83.39%)	231 (77.00%)	0.053
	No	39 (16.81%)	48 (13.68%)		37 (13.07%)	50 (16.67%)	
	Don't Know	18 (7.76 %)	11 (3.13%)		10 (3.53%)	19 (6.33%)	

Depression	Yes ^a	172 (74.14%)	280 (79.77%)	0.111	229 (80.92%)	223 (74.33%)	0.057
	No	42 (18.10%)	56 (15.95%)		42 (14.84%)	56 (18.67%)	
	Don't Know	18 (7.76%)	15 (4.27%)		12 (4.24%)	21 (7.00%)	
Being obese	Yes ^a	119 (51.29%)	263 (74.93%)	0.000*	198 (69.96%)	184 (61.33%)	0.028*
	No	85 (36.64%)	69 (19.66%)		69 (24.38%)	85 (28.33%)	
	Don't Know	28 (12.07%)	19 (5.41%)		16 (5.65%)	31 (10.33%)	
Age at which there is a marked decrease in women's ability to become pregnant?	20- 25	18 (7.76%)	8 (2.28%)	0.156	12 (4.24%)	14 (4.67%)	0.032*
	26- 30	10 (4.31%)	20 (5.70%)		22 (7.77%)	8 (2.67%)	
	31-35	32 (13.79%)	79 (22.51%)		56 (19.79%)	55 (18.33%)	
	36- 40 ^a	113 (48.71%)	192 (54.70%)		161 (56.89%)	144 (48.00%)	
	I don't know	59 (25.43%)	52 (14.81%)		32 (11.31%)	79 (26.33%)	
Age at which there is decrease in male fertility?	20- 25	09 (3.88%)	5 (1.42%)	0.789	7 (2.47%)	7 (2.33%)	0.005*
	26- 30	08 (3.45%)	5 (1.42%)		11 (3.89%)	2 (0.67%)	
	31-35	20 (8.62%)	24 (6.84%)		20 (7.07%)	24 (8.00%)	
	36-40 ^a	113 (48.71%)	167 (47.58%)		153 (54.06%)	127 (42.33%)	
	I don't know	82 (35.34%)	150 (42.74%)		92 (32.51%)	140 (46.67%)	
Fertile Phase of menstrual cycle	Just after the periods	52 (22.44%)	91 (25.93%)	0.004*	63 (22.26%)	80 (26.67%)	0.000*
	Just before the periods	19 (8.19%)	29 (8.26%)		27 (9.54%)	21 (7.00%)	
	Halfway between two ^a periods	84 (36.21%)	170 (48.43%)		151 (53.36%)	103 (34.33%)	
	It doesn't matter	11 (4.74%)	17 (4.84%)		8 (2.83%)	20 (6.67%)	
	I don't know	66 (28.45%)	44 (15.54%)		34 (12.01%)	76 (25.33%)	

^a Correct answer ^b Chi square test performed at 95% CI * Significance

Table 3: KNOWLEDGE ABOUT INFERTILITY

Knowledge about infertility	Gender		Educational Background	
	Male n (%)	Female n (%)	Medical / Paramedical n (%)	Others n (%)
Below average	102 (43.97%)	103 (29.34%)	86 (30.39%)	119 (39.67%)
Above average	130 (56.03%)	248 (70.66%)	197 (69.61%)	181 (60.33%)
p value ^b	0.000*		0.019*	

fertilizing capacity. Embryos implant less often and ongoing pregnancy rates in IVF cycles are lower. Due to all these, couples in reproductive age should be strongly discouraged to smoke.^[8] Lalinde-Acevedo PC et al., conducted a cross-sectional study, where semen samples of physically active men and men's following sedentary

lifestyle were analyzed according to WHO guidelines and found that there is no oxidative stress reaction associated with physical activity, but there is an increase in semen parameters like progressive motility, concentration, viability in physically active men (exercising for 1-2 hours) when compared to those who follow a sedentary lifestyle.^[9] A systematic review and

meta-analysis conducted by Mena GP et al., on the effect of physical activity on reproductive health, showed that physical activity improved the menstrual patterns, increased conception rates and improvement in ovulation in anovulatory patients.^[10] Jozkow P et al., conducted a literature review on impact of intense exercise in semen quality and reported that the parameters such as sperm concentration, percentage of motile spermatozoa, and percentage of morphologically normal spermatozoa are most often reduced by intense training.^[11] Gudmundsdottir SL et al., conducted a population-based health study on physical activity and fertility on women, where it was reported that women with higher intensity of physical activity are associated with infertility.^[12] Panth N et al conducted a literature review on the influence of a healthy balanced diet on fertility. Unsaturated fats, whole grains, vegetables, and fish have all been linked to increased fertility in both men and women. While there is conflicting evidence on the role of dairy, alcohol, and caffeine, saturated fats and sugar have been linked to lower reproductive outcomes in both women and men.^[13] Ovulatory abnormalities account for 25% of all known causes of infertility in women. As no oocyte is released monthly, oligo-ovulation or anovulation causes infertility. There is no chance of fertilization or pregnancy in the absence of an oocyte.^[14] Post-inflammatory alterations of the oviduct or surrounding peritoneum interfere with tubo-ovarian function in around 35 percent of women with infertility issues. The majority of these changes are caused by infection. Salpingitis affects about 15% of reproductive-age women, and salpingitis causes infertility in 2.5 percent of all women by the age of 35.^[15] Post-inflammatory alterations of the oviduct or surrounding

peritoneum interfere with tubo-ovarian function in around 35 percent of women with infertility issues. The majority of these changes are caused by infection. Salpingitis affects about 15% of reproductive-age women, and salpingitis causes infertility in 2.5 percent of all women by the age of 35.^[16] In a prospective investigation evaluating the impact of oral contraceptive use on time to conception in a large group of women, Farrow A et al. discovered that 74 percent conceived in 6 months, 14 percent in 6-12 months, and 12 percent after a year. There was a statistically significant link between previous long-term oral contraceptive use and a lower chance of delayed conception.^[17] Bhongade MB et al., conducted a cross sectional study on the effect of psychological stress on male fertility hormones and seminal quality in male partners of infertile couples and concluded that psychological stress primarily lowers the serum testosterone level and thereby affects the seminal quality by decreasing the sperm count, motility and morphology.^[18] Palomba S et al conducted a review on the influence of stress and quality of life in female fertility and stated that both in general and infertile population, distress was respectively associated with decreased conception rates and long menstrual cycles (≥ 35 days) and lower outcomes of reproductive medicine, including oocytes retrieved, fertilization, pregnancy and live birth rates.^[19] Wang Y et al., conducted a cross sectional study on association of depression on sperm quality and concluded that depression was associated with lower levels of semen concentration, semen volume, total sperm count, and progressive motility, which could affect male reproductive health.^[20]

Table 4: ATTITUDE ABOUT INFERTILITY

Questions	Response	Gender			Educational Background		
		Male n (%)	Female n (%)	p value ^b	Medical / Para medicaln (n%)	Others n (%)	p value ^b
Do you think infertility is a disease?	Yes	30 (12.93%)	55 (15.67%)	0.359	58 (20.49%)	27 (9.00%)	0.000*
	No	202 (87.07%)	296 (84.33%)		225 (79.51%)	273 (91.00%)	
Do you think taking measure to protect your fertility is very important?	Yes	207 (89.22%)	319 (90.88%)	0.509	259 (91.52%)	267 (89.00%)	0.306
	No	25 (10.78%)	32 (9.12%)		24 (8.48%)	33 (11.00%)	
Do you think infertility should be treated medically?	Yes	179 (77.16%)	300 (85.47%)	0.010*	236 (83.39%)	243 (81.00%)	0.451
	No	53 (22.84%)	51 (14.53%)		47 (16.61%)	57 (19.00%)	
Do you think that if a couple aborts they might have problems conceiving again?	Yes	122 (52.59%)	218 (62.11%)	0.022*	171 (60.42%)	169 (56.33%)	0.317
	No	110 (47.41%)	133 (37.89%)		112 (39.58%)	131 (43.67%)	

Will you hesitate to ask for information on infertility?	Yes	54 (23.28%)	73 (20.80%)	0.478	58 (20.49%)	69 (23.00%)	0.464
	No	178 (76.72%)	278 (79.20%)		225 (79.51%)	231 (77.00%)	
Whom do you think should be investigated first?	Husband	11 (4.74%)	9 (2.56%)	0.311	8 (2.83%)	12 (4.00%)	0.620
	Wife	11 (4.74%)	21 (5.98%)		14 (4.95%)	18 (6.00%)	
	Both	210 (90.52%)	321 (91.45%)		261 (92.23%)	270 (90.00%)	
Primary preference of treatment for infertility?	Gynaecologist	203 (87.5%)	330 (94.02%)	0.006*	262 (92.58%)	271 (90.33%)	0.333
	Others (Siddha, ayurvedic, homeopathic)	29 (12.5%)	21 (5.98%)		21 (7.42%)	29 (9.67%)	

^b Chi square test performed at 95% CI * Significance

Table 5: PERCEPTION ABOUT INFERTILITY

Questions	Response	Gender			Educational Background		
		Male n (%)	Female n (%)	p value ^b	Medical / Para medical n (%)	Others n (%)	p value ^b
Do you think infertility is 100% curable?	Yes	107 (46.12%)	145 (41.31%)	0.333	125 (44.17%)	127 (42.33%)	0.002*
	No	57 (24.57%)	105 (29.91%)		93 (32.86%)	69 (23.00%)	
	Don't Know	68 (29.31%)	101 (28.77%)		65 (22.97%)	104 (34.67%)	
Do you think keeping laptop on lap can affect fertility especially in male?	Yes	150 (64.66%)	195 (55.56%)	0.007*	173 (61.13%)	172 (57.33%)	0.044*
	No	33 (14.22%)	40 (11.40%)		42 (14.84%)	31 (10.33%)	
	Don't Know	49 (21.12%)	116 (33.05%)		68 (24.03%)	97 (32.33%)	
Do you think wearing tight under wears have effect on fertility? (Especially in men)	Yes	136 (58.62%)	183 (52.14%)	0.003*	169 (59.72%)	150 (50.00%)	0.031
	No	50 (21.55%)	55 (15.67%)		50 (17.67%)	55 (18.33%)	
	Don't Know	46 (19.83%)	113 (32.19%)		64 (22.61%)	95 (31.67%)	
Do you think it is socially acceptable to have a test-tube baby?	Yes	143 (62.07%)	255 (72.65%)	0.020*	203 (71.73%)	195 (65.00%)	0.215
	No	39 (16.38%)	43 (12.25%)		36 (12.72%)	46 (15.33%)	
	Don't Know	50 (21.55%)	53 (15.10%)		44 (15.55%)	59 (19.67%)	
If a female cannot have a baby, do you think this is grounds for divorce?	Yes	34 (14.66%)	62 (17.66%)	0.338	53 (18.73%)	43 (14.33%)	0.153
	No	198 (85.34%)	289 (82.34%)		230 (81.27%)	257 (85.67%)	

^b Chi square test performed at 95% CI * Significance

Nilliny Y et al., conducted a cross sectional study on Depression, Anxiety and psychotropic medication use and fecundability. They found evidence for an

association between high levels of depressive symptoms and reduced fecundability.^[21] Silvestris E et al., conducted a review on obesity and female fertility and

concluded that overweight and obese women need longer time to conceive and undoubtedly are at higher risk of infertility.^[22] Magnúsdóttir EV et al., conducted a study on obesity, sedentary occupation and male subfertile and stated that in males, obesity adversely affects fertility by altering semen parameters, endocrine changes and oxidative stress. Obese males are three times more likely than normal weight men to have reduced semen quality.^[23] Hassan M et al., conducted a study on effect of female age on fertility stated that there is marked decrease in fecundity over 35 years.^[24] In a study conducted by Nouri K et al., it was reported that there is a decline in the semen parameters above the age of 35 years, which may lead to reduced conception rates or even infertility.^[25] Wilcox AJ et al., conducted a study on timing of sexual intercourse in relation to ovulation and concluded that all conceptions resulted from intercourse that occurred during a six-day interval ending on the day of ovulation, which is halfway between two menstrual cycles.^[26] According to WHO, Infertility is defined as the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse. However, consulting a fertility specialist is a couple's wish and it's also appreciable to consult a fertility specialist at any time to get the essential information about fertility and pregnancy.^[27] Mortazavi SA et al., conducted a study on the fundamental reasons why laptop should not be used on your lap and stated that, when laptop is placed on the lap, not only the heat from a laptop computer can warm men's scrotums, the electromagnetic fields generated by laptop's internal electronic circuits as well as the Wi-Fi Radiofrequency radiation hazards (in a Wi-Fi connected laptop) may decrease sperm quality.^[28] Minguez-Alarcon L et al., conducted a cross-sectional study on type of underwear worn and testicular function in males attending fertility clinic and concluded that men who frequently wore boxers had significantly higher sperm concentration and total sperm counts, and lower serum FSH levels, compared to other men.^[29] Ali S et al., conducted a similar KAP study among a selected adult population, where they mentioned the same question and 92% responded that infertility is not a reason for divorce and only 8% responded that it grounds for divorce. This is contrary to the findings in which it was reported that having test-tube baby is not socially acceptable.^[30] Unisa S conducted a study about childlessness in Andhra Pradesh, India and stated that this is very common in Asian countries, especially India, where women are forced to experience very harsh treatment, both physically and psychologically, from family and society.^[31]

LIMITATION:

Although less likely due to the web-based survey, social desirability bias in public response is still possible. Lack of direct observation while participation, an unavoidable limitation in web-based surveys, is present in our study also. Majority of the responses received

were from the age ranging from 18-28 years, the young generation. So, the data on knowledge attitude and perception about infertility, among the people above the age of 28 years was comparatively low.

CONCLUSION:

A significant difference, in knowledge, attitude and perception, among males and females and also among participants with medical/paramedical educational background and other educational backgrounds. We took the initiative to spread awareness about infertility and certain ways to improve reproductive health, through video and pamphlet. However, further measures should be taken by the government to give everyone, regardless of gender, a proper education regarding sex and reproductive health, from adolescence, so as to encourage the young generation to be conscious about their reproductive health and hygiene, thus preventing infertility and seeking early treatment for unforeseen cases of infertility.

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CONFLICT OF INTEREST:

The authors whose names are listed that they have NO affiliations with or involvement in any organization or entity with any financial interest.

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