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Medical students need to be sensitized on Infertility: assessment from an observational study in Puducherry, India

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ABSTRACT

Introduction: *Infertility affects an estimated 60 to 80 million couples worldwide. Apart from anatomical, genetic, endocrine and immunological factors several epidemiological factors also contribute to the problem of infertility. In this study, we assessed the level of knowledge on infertility among medical undergraduate students, because they represent the next generation of doctors from whom couples will be seeking treatment for infertility.*

Methods: *A cross-sectional study was conducted by the Department of Obstetrics and Gynaecology of Pondicherry Institute of Medical Sciences, among VIIth semester MBBS students. Data was collected in the form of pre- and post-test. Average values for responses were calculated; Chi square test and McNemer test were applied.*

Results: *Overall, the knowledge was moderate regarding risk factors and causes of female infertility. Only half of the students (56.3%) knew about the correct definition of infertility, but majority of them (94.3%) knew that both partners contribute equally to infertility. There was a notable lack of basic knowledge among students about the possible treatment options. But, there was a significant change in the knowledge as proportion of students who gave correct answers was more during the post-test (p value <0.05).*

Conclusion: *Though the knowledge of infertility in medical students is promising, more education programs are recommended regularly to update their knowledge.*

INTRODUCTION

Infertility is a global reproductive health concern and it affects an estimated 60 to 80 million couples worldwide.[1]Primary infertility is defined as failure of a couple to conceive after 12 months of regular intercourse without use of contraception in women less than 35 years of age; and after 6 months of regular intercourse without use of contraception in women 35 years and older.[2]But WHO defines infertility in the context of a two-year timeframe. The operational definition, put forth by the WHO, defines primary infertility as the *"Inability to conceive within two years of exposure to pregnancy (i.e. sexually active, non-contracepting, and non-lactating) among women 15 to 49 year old"*.Secondary infertility is defined as a condition when a couple previously conceived, but was unable to conceive subsequently despite cohabitation and coitus for a period of two or more years.[3]. The WHO estimates the overall prevalence of primary infertility in India to be between 3.9% and 16.8%.[4] Estimates of infertility shows considerable variations across the states of India. Infertility is highest in the Southern region and lowest in the Northern region. The overall trends in infertility show that the prevalence of infertility is increasing in India.[5]

Several epidemiological factors contribute to the problem of infertility. Nearly 5% of infertile couples suffer from anatomical, genetic, endocrine and immunological factors. Of them approximately one-third of the cases are attributable to the woman, one-third to the male partner and the rest are unexplained.[6]In any society where child bearing and motherhood defines a woman's identity the social stigma of infertility impacts heavily on women.[7] Identifiable factors affecting female infertility include: hormone imbalance, tubal factors, acquired non-tubal factors, sexual dysfunction and congenital abnormalities.[8] Lifestyle factors like the increasing age at marriage of either spouse, delay in child bearing on account of education and career, stress, obesity, diet, smoking and alcohol use, along with environmental chemical exposures have been increasingly associated with reduced fertility.[9] Among males, common causes of infertility are oligozoospermia, genetic abnormalities, hormonal imbalances, immunological factors and varicocele, or idiopathic.[10]Depending on the causes, infertility may be treated by surgery, administration of hormones, intra-uterine insemination of sperms and/or assisted reproductive technologies (ART). The latter includes plethora of procedures wherein male and female gametes are used for the purpose of reproduction, namely in vitro fertilization (IVF), intra-cytoplasmic sperm injection, pre-implantation genetic diagnosis, embryo cryopreservation and gestational surrogacy.[11]

Knowledge about infertility is important among medical students. Many students have little awareness of the period of the month in which a woman is most fertile. Population studies confirm that couples receives information most frequently from doctors and since infertility and ART is associated with many ethical, legal and regulatory issues it is

Volume : 5 | Issue : 10 | October 2015 | ISSN - 2249-555X

necessary that health promotion strategies begin early in the medical carrier.

The objective of the present study was to assess awareness and knowledge regarding basic facts about infertility, various risk factors and treatment, among medical undergraduate students.

METHODS

A cross-sectional study was conducted by the Department of Obstetrics and Gynaecology of Pondicherry Institute of Medical Sciences, in Puducherry, India. All undergraduate students of VIIth semester MBBS participated in the study. The purpose of the study was explained to the participants and informed verbal consent was obtained. After the pretest a brief introduction was given on basic facts regarding infertility. The introduction was followed by a skit in which various techniques, ethical and legal issues related to ART were covered. After the skit there was a group discussion on the various issues related to the topic. All the students actively participated in the discussion, asked questions and also shared their thoughts on the topic. The post test and feedback were taken from the students after the group discussion.

The pre- and post-test contained multiple choice questions. The students were asked to answer the questions individually and anonymously. Data were entered in Microsoft Excel 2007 and were analyzed by using Statistical Package of Social Sciences (SPSS) software. Averages were calculated and chi square test was applied to find the significant difference in the knowledge among different groups. P value of < 0.01 was taken as statistically significant. The proportion of correct responses for each question in pre- and post-test were calculated and compared by using McNemer test.

RESULTS

Among a total of 87 participants, 43 (49.4%) were male and 44 (50.6%) were female students. Only half of the students knew the definition of infertility correctly, (52.3% female; 60.5% males). The majority of students, however, knew that both males and females could be responsible for infertility (female students: 95.4%; male students: 93.1%). Similarly, majority of the female students, (77.3%) and 60.0% male students correctly knew that the most fertile time in a woman's menstrual cycle occurs in the middle of her menstrual cycle. The knowledge was poor among male students, as 39.5% did not know or answered incorrectly. (Table 1)

Table1. Basic knowledge about Infertility

Q1. Definition of Infertility			
Response	**Female n (%)**	**Male n (%)**	**Total n (%)**
< 12 months	12 (27.3)	11 (25.6)	23 (26.4)
12-24 months	23 (52.3)	26 (60.5)	49 (56.3)
> 24 months	8 (18.2)	5 (11.6)	13 (14.9)
Don't know	1 (2.3)	1 (2.3)	2 (2.3)
Total	44 (100.0)	43 (100.0)	87 (100.0)
Q2. Who contributes to Infertility?			
Response	**Female n (%)**	**Male n (%)**	**Total n (%)**
Female	1 (2.3)	1 (2.3)	2 (2.3)
Male	0 (0.0)	1 (2.3)	1 (1.1)
Both	42 (95.4)	40 (93.1)	82 (94.3)
Don't know	1 (2.3)	1 (2.3)	2 (2.3)
Total	44 (100.0)	43 (100.0)	87 (100.0)
Q3. Fertile period in a woman's menstrual cycle			
Response	Female n (%)	Male n (%)	Total n (%)
Beginning	1 (2.3)	1 (2.3)	2 (2.3)
Mid-cycle	34 (77.3)	26 (60.5)	60 (69.0)
End of cycle	7 (15.9)	6 (14.0)	13 (14.9)
Don't know	2 (4.5)	10 (23.2)	12 (13.8)
Total	44 (100.0)	43 (100.0)	87 (100.0)

Majority of the students were aware that smoking and alcohol consumption can cause infertility (78.2%; 71.3% respectively).Only 40.2% knew that previous long term use of contraceptive pill by women could cause problems with conception. On the other hand, notable proportions of both female (38.6%), and male students (16.3%) thought that previous use of Cooper-T could cause infertility. In regards to biological causes of female infertility only 41.4% of the students know that genital tract infections could cause infertility. (Table 2)

Table2. Knowledge about risk factors for Infertility and causes of female Infertility

Risk factors for Infertility	**Female (n=44)***	**Male (n=43)***	**Total (n=87)**
	n (%)	**n (%)**	**n (%)**
Excess caffeine intake	24 (54.5)	21 (48.8)	45 (51.7)
Smoking	37 (84.1)	31 (72.1)	68 (78.2)
Alcohol	37 (84.1)	25 (58.1)	62 (71.3)
Obesity	26 (59.1)	25 (58.1)	51 (58.6)
Intense exercise	18 (40.9)	16 (37.2)	34 (39.1)
Previous long term use of OCP's	16 (36.4)	19 (44.2)	35(40.2)
Previous use of Copper-T	17 (38.6)	7 (16.3)	24 (27.6)
Don't know	1 (2.3)	1 (2.3)	2 (2.3)
Biological Causes of Female Infertility	**n (%)**	**n (%)**	**n (%)**
Abnormal menses	28 (63.6)	18 (41.9)	46 (52.9%)
Blocked tubes	30 (68.2)	24 (55.8)	54 (62.1%)
PID	24 (54.5)	12 (27.9)	36 (41.4%)

*More than one option possible

Both male and female students identified multiple infertility treatment options. Almost half of the students (63.2%) were familiar with IVF. However the gap in the knowledge was evident as, less than half of the students identified ovulation induction and Intrauterine insemination as other treatment option for infertility (34.5% & 49.%). But when asked to correctly identify what constituted Assisted Reproductive Techniques (ART), 72.4% correctly responded. (Table 3)

Table 3. Knowledge of Infertility treatment & Assisted Reproductive Techniques (ART)

Response	**Female (n=44)***	**Male (n=43)***	**Total (n=87)***
	n (%)	**n (%)**	**n (%)**
Ovulation Induction	19 (43.2)	11 (25.6)	30 (34.5)
Intrauterine insemination	25 (56.8)	18 (41.9)	43 (49.4)
In Vitro Fertilization	29 (65.9)	26 (60.5)	55 (63.2%)
Oocyte &embryo donation	13 (29.5)	10 (23.3)	23 (26.4%)
Gestational Surrogacy	11 (2.5)	6 (14.0)	17 (19.5%)
Don't know	0 (0.0)	2 (4.7)	2 (2.3)

*More than one option possible

The number of correct responses for majority of questions, was less in the pre-test which increased significantly during the post-test. Regarding legal issues, more than half (59.8%). of the students knew that Gestational surrogacy is legal in India. (Table 4)

Table 4. Comparison of the correct responses during the pre- and post-test

Question	**Correct Response n=87**		**P value**
	Pre-test n(%)	**Post-test n(%)**	

Volume : 5 | Issue : 10 | October 2015 | ISSN - 2249-555X

Infertility is defined as	49 (56.3)	68 (78.2)	0.004
Who contributes to Infertility	82 (94.3)	86 (98.9)	0.219
Fertile period	48 (55.2)	68 (78.2)	0.004
Risk factors	65 (74.7)	87 (100)	0.009
Causes of female infertility	55 (63.2)	78 (89.7)	<0.001
ART includes	63 (72.4)	85 (97.7)	<0.001
Is surrogacy legalized in India	52 (59.8)	86 (98.9)	<0.001
Surrogacy should be offered to	44 (50.6)	57 (65.5)	0.041

DISCUSSION

In India, where lot is being done to promote safe motherhood, there is inadequate focus on infertility in reproductive health programmes. Infertility is a social taboo and mainly the women bear the brunt of the stigma associated with it.[12] Review of literature shows that, there are very few studies done, that have assessed the knowledge, attitudes, and beliefs of Indian medical students with regards to infertility.

The results from our study showed that 56.3% of the students correctly responded that infertility is diagnosed usually after one to two years of regular unprotected sex. Majority of students, however, knew that both males and females could be equally responsible for infertility. Our findings were consistent with other similar study done by Brittany and Martin among college students in Grenada, where only 38.8% male and 44.7% female students correctly knew about the most fertile time in a woman's menstrual cycle. The majority of students, however, knew that both males and females could be responsible for infertility (male students: 84.9%; female students: 90.2%).[13] Similarly in a study conducted by Kelley-Anne in Ottawa University , 78.3% female and 87.5% male students were able to define infertility correctly.[14]

In the present study, students had limited knowledge of lifestyle risk factors. Only 51.7% students were aware that excess of caffeine intake can cause infertility while 58.6 % of them knew that obesity can lead to infertility. On the other hand, 27.6% of the students incorrectly believed that previous use of Copper-T could cause infertility. In a country like India, where Copper-T is offered free of cost by the government to control the rising population, such misconception may lead to underutilization of contraceptive services. The findings are supported by similar study done by Sumera Ali et al.[15] Another study done by Nouri et al reported better awareness in which 71.8% of the female and 60.0% of male medical students were aware that excess of caffeine intake could cause infertility and 71.8% female and 66.7% male students knew that obesity could impair conception.[16]

Similarly the knowledge of various biological causes of female infertility was also poor among the students. The results were quite surprising as only 41.4% of the students know that genital tract infections could cause infertility among women. Our findings are consistent with similar study done among Grenadian students in which notable proportions of both female and male students did not know that a genital tract infection (GTI) or sexually transmitted infection (STI) could cause infertility.[13]

Students were further asked about the various treatment options available for infertile couples. Almost half of the students (63.2%) were familiar with IVF. But they were ignorant about other options such as ovulation induction, oocyte and embryo donation. But in Grenada, where IVF procedure is not currently available, many (male students: 75.3%, female students: 68.8%) did not identify it as a successful infertility treatment technique. [13]

The findings in the present study correlate with similar studies done elsewhere. The correct knowledge regarding causes of female infertility and possible treatment available was poor among medical undergraduate students. It may be because of insufficient exposure and training. But when proportion of students who gave correct answers for each question during the pre and post-test was compared, the number of correct responses for all the questions increased significantly during the post-test. Thus, these results indicate a need for medical students to receive better understanding and training, to provide sexual and reproductive health services in future.

CONCLUSION

This study is the first of its kind to be conducted in India. While it is encouraging to note that the majority of medical students knew about the risk factors for infertility, there are still gaps in the knowledge of these students as to the causes and treatments of infertility. There are a lot of misconceptions that IUCD can cause infertility. Additional research needs to be conducted among Indian medical students using more detail questionnaire to assess the awareness and the level of knowledge on infertility and reproductive health.

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