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Research Article

Insights into Coital Frequency: Whether Coital Frequency has any Impact on Male Sub-Fertility/Infertility

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Abstract

Objective: Frequency and timing of intercourse is one the strongest and most persistent factors affecting fertility in non-contracepting populations. Relatively few studies on coital pattern and its association in contemporary India have been published. This study used a small window data to investigate the impact of coital frequency whether it definitely matters on male infertility in Indian context.

Materials and Methods: A total of 352 infertile individuals and 100 control male subjects aged between 20-50 years were recruited and 250 cases and 100 control subjects were used for the analysis after the implementation of exclusion criteria. Sexual activities were analyzed with the help of questionnaire. Semen analysis, sperm function tests and hormonal analysis being conducted for both control subjects and cases according to WHO criteria. The obtained data was expressed in mean and standard error. Independent- samples'*t*'-test was done through SPSS statistical program (version 14.0). *P* value less than 0.05 were considered as significant.

Results: Coital frequency of infertile individuals in the age group of 31-40 years is quite high, but coitus showed no significant difference between infertile and control subjects. Macroscopic and microscopic analysis of the spermatozoa between control and infertile subjects showed significant variation except liquefaction time, agglutination and viscosity. Functionality of spermatozoa also highly compromised in infertile group. Hormone profile of infertile and control subject was significant only for FSH and LH, whereas Prolactin, Testosterone and Estradiol were not altered.

Conclusion: Hence the infertility in the present study could be due to other etiologies except coital frequency as such infertility is multifactorial in nature. Thus, the problem of infertility can be managed to some extent by avoiding junk food, healthy life style, stress free life, regular exercise.

Keywords: Coital frequency; Spermiogram; Hormone analysis; Male infertility

Introduction

Infertility is defined by an unsuccessful waiting time to pregnancy of 12 months, despite frequent unprotected intercourse [1]. Challenges to human fertility arise from many conditions caused by genetic abnormalities, infectious or environmental agents and behavior. One in six couple is sub-fertile [2], 30% of subfertile couples have no identifiable medical cause [3] and over 70% of these conceive within a further 24 months of trying without medical help [4]. Thus Infertility is mainly classified in two types; Primary Infertility is the term used to describe a couple that has never been able to conceive a pregnancy, after a minimum of one year of attempting to do so through unprotected intercourse. Secondary Infertility is the term used to describe couples who have previously been pregnant at least once, but had not been able to achieve another pregnancy. Infertility affects men and women equally.

Aging also places limits to fertility. Recent trends toward postponing age at first pregnancy have highlighted the natural limits of fertility and accelerated the development and use of medical technology to overcome such limits. Half of the couple trying for pregnancy succeeds within 3 months, increasing to over 85% by the end of first year [5]. Prolonged infertility can be a psychosocial stress for the infertile couple leading to poor marital adjustment and decreased quality of life [6]. Although some infertile couples report unsatisfactory sex [7], to our knowledge, association of coital frequency and infertility is sparse, only a very few authors have focused on this [8]. Coital frequency has been reported to be a function of marital status, relationship, duration, number and sex of children, religious affiliation, income, education, fertility intentions, age, race, and self-assessed health, time spent in etc [9-13]. To explore the questions whether coital frequency definitely matters? Are there any association exists between couple infertility with coital frequency? How frequently infertile men were engaging in sex? To answer these questions the present study was undertaken.

Materials and Methods

A total of 352 infertile individuals and 100 control male subjects aged between 20-50 years were recruited irrespective of caste and

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religion from different infertility centers and clinics in and around Mysore, India. After excluding infertility associated metabolic disorders such as T2DM, obesity, thyroid, hypertension etc along with smoking, alcohol and drug abuse, long term medication etc. 250 cases and 100 control subjects were used for all the analysis. The study was approved by the institutional ethical clearance committee of University of Mysore and concerned hospitals (IHEC-UoM No. 54/Ph.D/2011-12). Informed written consent letter was taken from the participants and subjects were interviewed to collect information about family, medical, reproductive histories which includes the duration of active married life, premature ejaculation and psychological status of the subjects and life style factors. Self-reported monthly coital frequency was reviewed among a population of men presenting for evaluation of male factor infertility and hypothesized that men presenting to an infertility clinic will be engaging in less frequent coitus than the general population. In this study frequency of sexual intercourse was recorded as (1-2), (3-4), (5-7) per week. In the present study pre-ovulation sexual intercourse was considered to study coitus and infertile cases were thoroughly educated about the chance of conception in ovulatory cycle and probability of conception etc. The factors that might predict which men are having less frequent coitus were also studied.

Semen collection and preservation

Semen samples were collected after 3-5 days of ejaculatory abstinence in a sterile plastic container by the process of masturbation [14]. The collected samples were allowed to liquefy at 37°C for 30 minutes and analyzed within one hour of collection.

Examination of semen by physical characteristics

Physical examination was conducted with respect to liquefaction time, color, pH, viscosity of semen and count, density and motility of the sperm by following WHO guidelines [15]. The absence of spermatozoans was confirmed by the centrifuged pellets in Azoospermia cases.

Examination of semen by microscopy

A simple method for grading motility was recommended by WHO [14], being used to distinguishes spermatozoa as progressive or non-progressive based on its motility rate. The motility of each spermatozoan was graded as rapid linear and progressive (grade a), sluggish, linear and progressive (grade b), non progressive (grade c) and immotile (grade d). Within a given microscopic field, all spermatozoa with grade a and b were counted first. Subsequently spermatozoa with non-progressive motility and immotile spermatozoa were counted in the same field. Motility of at least 200 different spermatozoa was observed and expressed in percentage.

Sperm vitality

Sperm vitality was estimated by using eosin and nigrosin stains to assess the membrane integrity of the cells. The percentage of viable cells normally exceeds that of motile cells. This one-step staining technique uses nigrosin to increase the contrast between the background and the sperm heads, which makes them easier to discern. It also permits slides to be stored for re-evaluation and quality-control purposes [16].

Agglutination

Spermatozoa may show head to head, tail to tailor mixed types of agglutination. Agglutination does not refer to a mere aggregation of spermatozoa around cellular debris. If agglutination is observed, the number of both agglutinated and non agglutinated spermatozoa should be counted in at least 20 randomly selected optical fields and the incidence of agglutinated spermatozoa was expressed. Samples showing sperm agglutination were subjected to further immunological tests.

Sperm and germ cell morphology by papanicolaou staining

Papanicolaou staining is the widely used procedure for examination of germ cell morphology since it distinguishes clearly between basophilic and acidophilic cell components and allows a detailed examination of the nuclear chromatin pattern. This method gives an optimal result for analysis of sperm morphology and immature male germ cell. Single blinded semen analysis was carried out for both control and infertile individuals.

Sperm Function Tests

Nuclear chromatin decondensation test (NCD)

This test was carried out to check the ability of decondensation of nuclear chromatin in vitro in spermatozoa. Semen sample was centrifuged to separate plasma. Modified method of Gopalkrishnan [17], was used to study the decondensed spermatozoa. The number of condensed and decondensed heads was counted and if more than70% of spermatozoa shows decondensed nuclear chromatin then it was considered as normal.

Hypo-osmotic swelling test (HOS)

Integrity of plasma membrane was performed using this test .Percentage of coiled (curled) tail was recorded by Jeyenderan, et al. [18] methodology. If more than 60% of spermatozoa, shows coiled tail then it was considered as normal.

Acrosomal intactness test (AIT)

Quality of the acrosomal enzymes was analyzed using this test by modified method of Gopalkrishnan [17]. The percentage of spermatozoa with halos surrounding the head was recorded. Values more than 50% was considered as normal.

Hormone assay

The blood samples were collected from the above mentioned subjects and serum was separated by centrifuging at 3000 rpm for 5 minutes at room temperature. The obtained serum was used to estimate the levels of FSH, LH, testosterone and prolactin using CALBIOTECH ELISA kit. The readings were taken under Thermo-fisher multimode micro titer plate reader.

Statistical analysis

Obtained data was analyzed using statistical program SPSS (version 20). Quantitative data were analyzed using Independent-samples't'-test was used to find out the significant mean difference between case and control subjects. *P* value less than 0.05 were considered as significant.

Results

The distribution of infertile subjects based on the age and coital frequency was shown in the Figure 1. Maximum number of

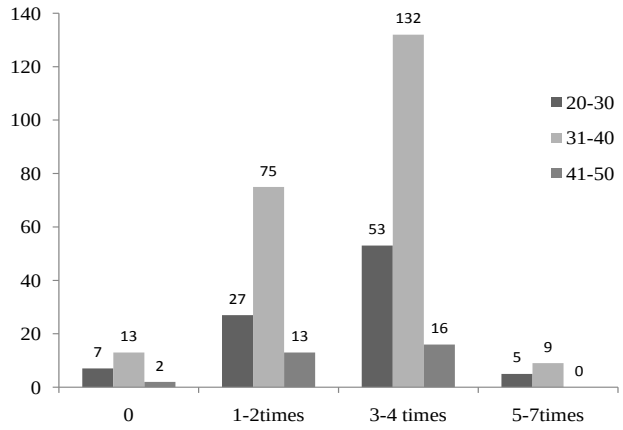

Figure 1: Age wise Distribution of subjects based on coital frequency among the infertile cases.

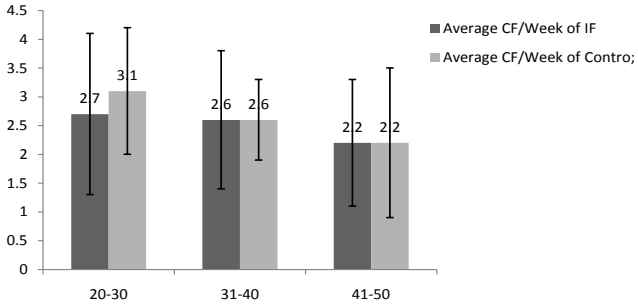

Figure 2: Comparison of Coital frequency per week between infertile and control subjects based on the age (Mean±SD).

individuals showed coital frequency of 3-4 days per week at the age range of 31-40 years followed by 20-30 years. Even nil coitus was showed by a small group of infertile individuals in all the age group per week. Comparison of coital frequency between control and infertile subjects done based on the age group was shown in the Figure 2. There is a difference in the coitus exist between control and infertile subjects at the age range of 20-30 years but statistically not significant. But no significant differences showed between control and infertile individuals in the age groups of 31-40 and 41-50 years. Table 1A shows the distribution of infertile and fertile individuals based on their occupation. It was categorizes into 3 groups. Group 1 represented by academicians, advocates, accountants, bank workers etc, Group II represents farmers exposed to pesticides, herbicides and insecticide along with occupation exposure to mutagens. Group III includes executives, medical reps, etc people who are travelling more. The distribution of duration of infertile condition and coital frequency among infertile group was shown in the Table 1B.Wherein couple with infertile condition were more between 1-5 years followed by 6 to 10 years. Probable reason could be they were receptive for diagnosis and treatment.

Table 2 represents different macroscopic semen parameters, wherein coagulation, colour and odour showed significant variations but not all. Microscopic examinations such as count, motility, morphology and functional status of the spermatozoa were significantly low compared to normozoospermic individuals

Table 1A: Distribution infertile and fertile individuals based on their occupation.

Groups	Control		Infertile	
	No.	%	No.	%
Group 1	33	33.0	125	35.5
Group 2	64	64.0	220	62.5
Group 3	3	3.0	7	1.98
Total	**100**		**352**	

Table 1B: Distribution of the duration of infertile condition and coital frequency among infertile group.

Duration of infertile condition	No. of subjects	Average Coital Frequency
1-5 years	180	2.8
6-10 years	135	2.5
11-15 years	29	2.5
16-20 years	8	1.75

Table 2: Comparison of physical semen parameters between infertile and control subjects. (Aspermia and azoospermia are excluded from the semen analysis n=25).

Semen parameters	Control (n=100)		IF (n=225)		χ^2 test
	Normal	Abnormal	Normal	Abnormal	
Coagulation	98	2	188	37	0.002*
Liquefaction time	78	22	174	51	0.080
Color	89	11	174	51	0.031*
Agglutination	85	15	180	45	0.376
Viscosity	88	12	180	45	0.145
Odour	91	9	154	71	0.001*

*p is significant at the 0.05 level

Table 3: Comparison of semen parameters between infertile and control subjects (aspermia and azoospermia are excluded for the semen analysis, n=number of subjects, IF=Infertile, HOS=Hypo-osmotic swelling test, NCD=Nuclear chromatin decondensation test, AIT=Acrosome intactness test, CI=Confidence interval).

Semen parameters	Control (n=100)	IF (n=225)	T value	95% CI		*p*< 0.05
				Lower	Upper	
Sperm count	70.1±4.25	28.4±2	5.3	32.4	14.9	0.01*
Viability	66±1.2	53.7±1.4	4.0	14.2	4.8	0.01*
Motility	54.4±1.8	37.6±1.8	5.4	22.8	10.6	0.01*
Morphology	41±1.4	26.8±1.2	6.6	18.3	9.9	0.01*
HOS	63.6±1.9	50.3±1.5	4.5	18.6	8.0	0.01*
NCD	71.4±1.2	61.06±1	1.9	10.1	0.15	0.05*
AIT	66.4±2.5	51.0±1.6	3.1	15.2	3.6	0.02*

*p is significant at the 0.05 level

(Table 3). HOS test indicative of plasma membrane permeability, de-condensation of nucleus through NCD test and enzymatic activity of acrosome through AIT were significantly less not up to the reference values of WHO guide lines. Independent t-test for hormones in both groups was performed and the data is depicted in and Table 4. In the present study significant difference found for LH and FSH in both the groups but not for prolactin, testosterone and estradiol.

Discussion

Infertility is a global concern [19], approximately 167 million ever married woman aged 15-49 years in developing countries were

Table 4: Independent t-test between different hormones in both infertile and control groups (LH=Luteinizing hormone, FSH= Follicle stimulating hormone, PROL= Prolactin, TESTO=Testosterone, ESTRAD=Estradiol).

	t-value	Sig. (2-tailed)
LH	1.91	0.05*
FSH	5.05	0.01*
PROL	0.57	0.56
TESTO	1.29	0.19
ESTRAD	1.87	0.06

*p is significant at the 0.05 level

infertile [20]. Infertility rates exceed 30% in sub Saharan Africa [20]. According to UN ranking, India is on 77th rank and fertility rate from 2000-2005 is 3.11 and from 2005-2010 is 2.81. Infertility has multiple dimensions, ranging from biomedical to the social. The interactions between these factors are very complex and difficult to understand. It is this reason even today in majority of cases the reasons for infertility remains unexplained.

It was theorized that the duration of infertility might have a possible effect on coital frequency because couples who are infertile for a long time may lose hope and stop having frequent intercourse. Semen volume was used as a predictor in our exploratory analysis because, on occasion, low semen volume is a presenting complaint by men and it may be an indication of testosterone deficiency (the major organs producing semen are testosterone dependent) or potentially decrease their sexual drive by limiting self-confidence. Sperm production is supported by testosterone and sperm count was therefore included as an independent variable. Azoospermia and aspermia were excluded in the study due to their association with sexual dysfunction by other mechanisms (i.e., Klinefelter syndrome) [21].

In order to check and confirm social and environmental factors responsible for decrease in fertility the people of the same kind of occupation are grouped together in our study. It is clear from the data that the group I which comprises of academicians, advocates, accountants, bank workers showed highest level of infertility. Use of contraceptive for delaying child birth is more common among the professionals and other higher income groups, making this group more vulnerable to the cumulative effect of the cause of infertility, including ageing. Stress also is an important factor prevalent in professionals associated with changes in life style and dietary pattern could be responsible for infertility. Group II comprise of farmers which stood second in our study probably due to their high exposure of pesticides and other harmful chemicals. Although not indicated in the study but alcohol consumption and use of tobacco in any form, particularly smoking, has significant effect on decreasing fertility [22,23].

There are a myriad of causes of infertility, and many couples attempt to conceive for many months or years before seeking medical attention [24]. Infertile couples report having unsatisfactory sex lives due to scheduling intercourse, sex becoming a mean to an end, invasion of privacy by clinical inquiry and intercourse reminding patients of their infertility [7]. We hypothesize that perhaps this leads to less frequent coitus. To explore this further, we examined coital frequency in infertile couples and explored which variables predicted less frequent coitus. Most infertile couples seeking evaluation are engaging in coitus at least five times per month. This is similar to that of the general population. In both the National Survey of Sexual Health and Behavior in 2010 [25] and an earlier US survey [26], men and women aged 30–39 years were engaging in sexual intercourse on average seven times per month. Thus, it appears that even couples who have been trying to conceive for 2 years are still engaging in sexual intercourse at a similar rate to their age-matched peers. However, not all infertile couples are having frequent coitus. Approximately 25% of infertile couples are having coitus less than five times per month. When assessing the influence of various clinical parameters independently, increasing age, erectile dysfunction, decreased libido, lower semen volume and increased duration of infertility were all associated with less frequent coitus. Serum testosterone, overall sperm count, motility, morphology and other criteria along with sperm function tests and azoospermia not have statistically significant associations with coital frequency. We expected that for couples with infertility the frequency of coitus would be reduced and in particular the frequency would be reduced in those with extended infertility duration. In the present study probably the stress of the infertile couple would increase over time and would reduce the sexual interest, functioning and frequency. However, the frequency of sex in men with infertility was unchanged compared with the general population and the frequency of sex was unrelated to the duration of infertility. Testosterone was also a poor predictor of coital frequency in the multivariable model. Although it is a known predictor of sexual function in older men, most men in our study were eugonadal, therefore perhaps changes in Testosterone within a normal range were less likely to affect sexual function. But variation in FSH and LH was evident indicating the impact of hormones in spermatogenesis would be a common cause of infertility.

There are several limitations in this study. These data were self-reported, sometimes without a partner present to verify the accuracy. To our knowledge this is the first study of its kind to explore coital frequency and predictors of coital frequency among a cohort of men seeking treatment for infertility.

Conclusion

Coital frequency in the present study showed negative association with couple infertility. Hence the etiologies for infertility in the present study could be other than coitus. As such the management of infertility is one of the most important tasks. Thus, the problem of infertility could be tacked by appropriate diagnosis and treatment and to some extent by good and healthy food, medication, regular exercise etc.

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