ORIGINAL ARTICLE

Genetic association of infertility in *vataj prakriti* female patients with reproductive age group

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Abstract

Background: According to the ancient system of medicine *Vataj Prakriti* females are more prone for infertility. Many studies have been carried out to determine the association between *Dehaj Prakriti* and specific diseases, whereas to understand the direct relationship between *Vataj Prakriti* and infertility still need more studies. **Objective:** The objective of the study was to investigate the association between infertility and *Prakriti* using modern diagnostic tool, i.e., Karyotyping. **Materials and Methods:** This study was conducted as a randomized controlled study on 50 infertile females by evaluating their *Prakriti* and Karyotyping and to find out the relationship between both of them. Study was conducted at Sir Sunderlal Hospital, IMS, BHU, and Cytogenetic Lab, Department of Anatomy, IMS, BHU. *Prakriti* was assessed by Performa (questionnaire-based) and Karyotyping was done by G-banding Technique. Correlation between *Prakriti* and Karyogram and other factors such as age, chief complaints, menstrual history, and endocrine profile were assessed. **Results:** The overall *Vataj Prakriti* females were 72% out of these 01% are Turner's, and 18% are Turner Mosaic. The study identified a statistically significant relationship between *Vataj Prakriti* and infertility. **Conclusion:** Results of the present study suggested that the *Vataj Prakriti* females were more prone for infertility than *pittaj* and *kaphaj Prakriti* and all abnormal karyogram is also associated with *Vataj Prakriti*.

Key words: Infertility, karyotyping, *Prakriti*

INTRODUCTION

Turner's syndrome is characterized by short stature, gonadal dysgenesis, and anatomic malformations, including pterygium colli, congenital heart disease, renal anomalies, and cubitus valgus (Turner *et al*., 1938). Turner's syndrome phenotype is attributed to hemizygosity for genes that are normally expressed in both the active and inactive X-chromosomes in females (Park *et al*., 1999). According to recent reports, only about half of all Turner's syndrome patients are really monosomic for the whole X-chromosome, while the other half is represented by a heterogeneous group with different structural abnormalities of the sex chromosome (Kuznetzova *et al*., 1995). Most of them are confined to structural abnormalities of the X-chromosome. The other group of these patients has a mosaic karyotype with the second cell lines carrying numerical or structural sex chromosome anomalies (Gicquel *et al*., 1992). Detailed clinical and cytogenetic analysis of these patients can provide new information on the developmental effects of different chromosomal segments and their participation in normal and abnormal development. In genetics, a mosaic, or mosaicism, involves the presence of two or more populations of cells with different genotypes in one individual, who has developed from a single fertilized egg.[1] Around 30% of Turner's syndrome cases demonstrate mosaicism, while complete monosomy (45, X) occurs in about 50–60% of cases.[2] Infertility is usually defined as no pregnancy after 1 year of unprotected intercourse. This is a relative measurement. Over time, many couples may

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achieve pregnancy. In 5 years, nearly one-half of "infertile" couples will conceive. Infertility also called sterility means not being able to become pregnant after a year of trying. If a woman keeps having miscarriages, it is called infertility. Lots of couples have infertility problems. About a third of the time, infertility can be traced to the woman. In another third of cases, it is because of the man. The rest of the time, it is because of both partners or no cause is found. Infertility is not always a woman's problem. In only about one-third of cases is infertility due to the woman (female factors). In another one-third of cases, infertility is due to the man (male factors). The remaining cases are caused by a mixture of male and female factors or by unknown factors.[3]

Primary Infertility

Primary infertility is defined as the absence of a live birth for women who desire a child and have been in a union for at least 12 months, during which they have not used any contraceptives.[4] The World Health Organization also adds that "women whose pregnancy spontaneously miscarries, or whose pregnancy results in a stillborn child, without ever having had a live birth would present with primarily infertility."[5] *Prakriti* or the constitutional specificity of a person is a perpetual concept in *Ayurveda*. Conceptually, it brings about a phenotypical classification of human population based on the predominance of certain bio humors (*Dosa*) in every individual leading to a constitutional specificity and on which the physical, physiological, and mental traits of a person depends. *Prakriti* identification is proposed to be of explicit value in individualized health-care system as the world is running behind the patient-centered care. This is also proposed to be of value in predictive medicine by presenting due to diseases susceptibility and incidence pattern in a given constitutional type. Considering the pragmatic importance of *Prakriti* in patient care, it would be important to understand the concept of *Prakriti* as is prescribed in *Ayurveda* and to see as to how this is being proposed for its utilization in patient care. It would be of further importance to see if a *Prakriti* analysis could be used as a dependable tool for evidence-based decision-making in *Ayurvedic* clinical practice.[6]

MATERIALS AND METHODS

Randomized clinical trials and observational study of 50 infertile females suitable for Karyotyping were recruited to this study.The study was conducted according to the guidelines and ethics after the official permission. All patients were informed about the study, and the de Performa was developed for personal history, all couples subjected to full history taking, complete general examination, complete gynecologic examination, and infertility workup including husband's semen analysis, endocrinal analysis, and ultrasonography (USG). This study evaluated 50 female patients with infertility who underwent *Prakriti* analysis and karyotyping in the Laboratory of Cytogenetics, Department of Anatomy, IMS, BHU. The approval from the local ethics committee had been obtained before the initiation of the study. Informed consent from all individual participants included was obtained. *Prakriti* analysis was done by questionnaire based Performa, and chromosomal analysis was performed by G-banding technique at high resolution. A hundred metaphases were counted for each patient, and International System for Human Cytogenetic Nomenclature (ISCN, 2009) guidelines were used when performing karyotype analysis.[7] Mosaicism ratios of the cases were calculated by proportioning total number of abnormal cell lines. In karyotype analysis, mosaic cell line ratio of ≤10% was defined as low-grade mosaicism, and >%10 as high-grade mosaicism.[8] Medical history regarding prior hormone therapy, prior assisted reproductive techniques attempts in infertility cases and perinatal outcomes were obtained by face-to-face interview or assessment of hospital medical records. All patients were assessed with physical examination and underwent a set of diagnostic tests including thyroid function tests, abdominal, and pelvic USG.

Statistical Analysis

For the purpose of summarization, presentation and analysis of data, two software programs were used; these were (IBM® SPSS® V. 20) and Microsoft Office Excel 2010. Continuous variables were expressed as frequencies, percentages. Chi-square test was used to evaluate the variable.

RESULTS

The age range of infertile women enrolled in the present study was from 18 to 44 years. According to age, women were classified into three categories, the first one included women with an age of 18–24 years and they represented the 26% of the infertile women sample, whereas the second category included women with an age range of 25–34 years; this group accounted for 58% of infertile women of total sample. Women with an age of 35–44 years constituted the third group, and they accounted for a minor fraction of women sample by forming only 16% of the entire sample. These categories are outlined in Table 1.

According to chief complaints in infertile women, women were classified into three categories, the first one included women with complaint of menstrual disturbances, and they represented the 66% of the infertile women sample, whereas the second category included women with complaint of vaginal discharge;

Table 1: The distribution of cases according to age

Age (years)	Number of cases (%)
18–24	13 (26.00)
25–34	29 (58.00)
35–44	8 (16.00)
Total	50 (100.0)

this group accounted for 16% infertile women sample. Women with a complaint of dyspareunia constituted the third group, and they accounted for forming 18% of the entire sample. These categories are outlined in Table 2.

According to menstrual history in infertile women, women were classified into four categories; the first one included women with normal menstrual history they represented the 18% of the infertile women sample, whereas the second category included women with polymenorrhagia this group accounted for 20% infertile women sample. Women with complaint of hypomenorrhea constituted the third group, and they accounted for forming 40% of the entire sample. Women with complaint of menorrhagia constituted the fourth group, and they account for forming 22% of the entire sample. These categories are outlined in Table 3.

According to the duration of infertility, women were classified into four categories, the first one included women with duration of 1–3 years and they represented the 10% of the infertile women sample, whereas the second category included women with duration of 4–6 years this group accounted for 56% of infertile women sample. Women with duration of 7–10 years constituted the third group, and they accounted for 30% of the entire sample. Women with duration of 11–15 years constituted the fourth group, and they accounted for only 4%. These categories are outlined in Table 4.

According to karyotype, women were classified into three categories, the first one included women with normal karyotype, and they represented the 80% of the infertile women sample, whereas the second category included women with XO this group accounted for only 2% infertile women sample. Women with Turner mosaic constituted the third group and they accounted for 18% of the entire sample. These categories are outlined in Table 5.

Table 2: The distribution of cases according to manifestations related to reproductive system in cases of infertility

Other complaints	Number of cases (%)
Menstrual disturbances	33 (66.0)
Vaginal discharge	8 (16.0)
Dyspareunia	9 (18.0)
Total	50 (100.0)

Table 3: The distribution of cases according to menstrual history

Menstrual history	Number of cases (%)
Normal menstrual	9 (18.0)
Polymenorrhagia	10 (20.0)
Hypomenorrhea	20 (40.0)
Menorrhagia	11 (22.0)
Total	50 (100.0)

According to *Prakriti*, women were classified into three categories, the first one included women with *Vataj Prakriti,* and they represented the 72% of the infertile women sample, whereas the second category included women with *Pittaj Prakriti* this group accounted for 16% infertile women sample. Women with *Kaphaj Prakriti* constituted the third group, and they accounted for 12% of the entire sample. These categories are outlined in Table 6.

On the comparison of *Prakriti* and *Karyogram*, of 50 patients (52%) *VÁtaja*, (16%) *Pittaja*, (12%) *Kaphaja* represent normal karyotype (80.0%), 20 *VÁtaja*, represent turner, and turner mosaic (20.0%) [Table 7].

DISCUSSION

Prakriti has its association with metabolism, chronic diseases, and genotypes: Possibilities of newborn screening and a lifetime of personalized prevention (Subhojit *et al*., 2013). In our study, we investigated the karyotypes of patients with infertility only from peripheral blood lymphocytes (for technical reasons), and compared our findings with *Prakriti* assessed by questionnaire based Performa. Turner patients have typical morphological features such as short stature, low hairline, poor breast

Table 4: The distribution of cases according to duration of infertility

Duration of infertility (years)	Number of cases (%)
1–3	5 (10.0)
4–6	28 (56.0)
7–10	15 (30.0)
11–15	2 (4.0)
Total	50 (100.0)

Table 5: The distribution of cases according to karyotype

Karyotype	Number of cases (%)
Normal (XX)	40 (80.0)
Turner (XO)	1 (2.0)
Turner mosaic	9 (18.0)
Total	50 (100.0)

Table 6: The distribution of cases according to *Prakriti* of patient

Prakéti	Number of cases (%)
VÁtaja	36 (72.0)
Pittaja	8 (16.0)
Kaphaja	6 (12.0)
Total	50 (100.0)

Table 7: The comparison of cases as per *Prakriti* and karyotype report

Karyotype	*Prakéti*			Total (%)
	VÁtaja (%)	*Pittaja* (%)	*Kaphaja* (%)	
Normal	26 (52.0)	8 (16.0)	6 (12.0)	40 (80.0)
Turner and turner mosaic	10 (20.0)	0 (0.0)	0 (0.0)	10 (20.0)
Total	36 (72.0)	8 (16.0)	6 (12.0)	50 (100.0)

χ^2=4.861, *P*=0.08

development, small fingernails, shortened metacarpal IV, elbow deformity, and presence skin folds, and no menstruation all these features are also present in Turner mosaic patients but are less severe as these patients had normal cells (XX) also, severity of disease depends on number of abnormal cells present in patients (XO), these type of morphological features are also described in *Ayurveda* by *Acarya's* in *Vataja Prakrti* such as rough body, undeveloped body, unstable joints, eyebrows, jaw, lips, tongue, head, shoulder, hands, and feet, also have less hair, beard-moustaches (maybe indicate underdeveloped secondary sexual characters) small hairs, nails, teeth, face and also small hands and feet, more prone for diseases (low immunity), low degree of lifespan, and low degree of progeny. All these morphological features can be corelated with Turner an Turner mosaic patients. Moreovere, we also assess *Prakriti* of 50 infertile female patients. On comparison all turner and turner mosaic karyogram belongs to *Vataj Prakriti* so, on the basis of these observation we can assume that *Vataja Prakriti* females are more prone to infertility. Turner and Turner mosaic syndrome was also related to *Vataj Prakriti.* As *Vandhyatva* is also considered under *Vataja vyadhi.*

CONCLUSION

Results of the present study suggested that the *Vataj Prakriti* females were more prone for infertility than *Pittaj* and *Kaphaj Prakriti* and all abnormal karyogram is also associated with *Vataj Prakriti*. The present study may initiate plethora to sketch various layout strategies for developing scientifically validated approaches for preventive measures in *Vataja Prakriti* cases, as *Vataja Prakriti* cases are more prone to infertility. Such type of study can provide the scientific logical bases for preventing *Prakriti* related disorders in developing progeny. It can pave a path for the future researcher to research in this field.

LIMITATIONS

This study was done on limited number of patients due to time limitation for our research work to make it more clear this study requires comparison of large numberof patients *prakriti* with Karyogram.

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