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Case Series

Effectiveness of Femm Approach in Managing Women with Subfertility in Mwanza, Tanzania

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Abstract: ***Introduction:*** Infertility is a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse. Approximately one in six people have experienced infertility at some stage in their lives. In Tanzania, the prevalence of infertility is 16%. Most couples suffer from this condition silently without knowing what to do. FEMM (Fertility Education and Medical Management) has come to bring back hope and happiness in these patients. ***Case series:*** Here we present four cases of women with subfertility who have suffered for more than five years without being able to conceive. Very interesting they all conceived within two to four months after using the FEMM approach. Currently, they are all pregnant at different gestation ages. ***Conclusion:*** Women who are not ovulating cannot conceive. Many times the answers to infertility are hiding in plain sight within the patterns of a woman's menstrual cycle. Failure to ovulate is the first sign of an underlying health condition in a woman followed by irregular cycles. Observing characteristics of cervical mucus is a simple and non-expensive biomarker any woman can tell you about. Fertility awareness together with medical management helped these women to conceive.

Keywords: Hormonal subfertility, hyperprolactinemia, hypothyroidism, menstrual cycle pattern, ovulation.

INTRODUCTION

Fertility Education and Medical Management (FEMM) is a knowledge-based health program for women. It teaches women how to understand and monitor hormonal and other health indicators that impact on their reproductive health. These indicators are associated with hormone-related processes in their bodies, therefore responding to them allows women to manage their reproductive health even better [1]. Fertility awareness is useful in helping women to identify the different stages of their reproductive life cycle and is a valuable tool in helping women to identify the gynecological disorders [2]. Women have to understand that the persistence of irregularities within the mucus patterns and the menstrual cycle should be of concern more so to those with subfertility issues [2].

Infertility is a disease of the male or female reproductive system defined by the failure to achieve pregnancy after 12 months or more of regular unprotected sexual intercourse [3]. In 2010, an estimated 48.5 million couples worldwide were infertile [4]. Approximately one in six people have experienced infertility at some stage in their lives. Globally, 17.5% is the estimated lifetime prevalence of infertility [5]. In the African region, the lifetime infertility prevalence is 13.1 % while in Tanzania the prevalence is 16% [6].

Monitoring menstrual cycle irregularities can be a very good tool in determining underlying health problems. These may be due to ovulatory dysfunction, in particular endocrine disorders, gynecological issues, and iatrogenic causes such as contraceptive use [1].

CASE SERIES

We had four cases of women with subfertility as shown below:

These women were received, clerked and followed up for three months. Physical examination and laboratory work ups were done and the following were the results.

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PATIENT	PROLACTIN	TSH	ESTRADIOL	OGTT-I	BMI	CYCLES
1	47 ng/ml	3.45 mIU/ml	5 pg/ml	NORMAL	31	Anovulatory
2	54 ng/ml	2.89 mIU/ML	21 pg/ml	IR	34	Anovulatory
3	37 ng/ml	4.17 mIU/ML	38 pg/ml	IR	34	Anovulatory
4	200 ng/ml	1.34 mIU/ML	13 pg/ml	IR	30	Anovulatory

IR (Insulin resistance), BMI (Body mass index), OGTT-I (Oral glucose tolerance test and insulin levels)

HORMONES	**RECOMMENDED HORMONE LEVELS**
PROLACTIN (ng/mL)	5-19
TSH (mIU/L)	0.35-2.5
HbA1C (%)	4-5.6
ESTRADIOL (pg/mL)	50-200
FSH (mIU/mL)	<7

FIRST PATIENT

She had subfertility for seven years, presented with galactorrhea, acanthosis nigricans, central obesity and dry cycles with abnormal bleeding. We diagnosed her with hyperprolactinemia, hypothyroidism, hypoestrogenic, first class obesity, with anovulatory cycles. With the help of the FEMM medical management guidelines, she conceived within three months.

SECOND PATIENT

She had a history of subfertility for eight years, presented with acanthosis nigricans, central obesity, acne and heavy bleeding patterns. We diagnosed her with hyperprolactinemia, hypothyroidism, hypoestrogenic, insulin insensitivity, and first-class obesity, with anovulatory cycles. After using the FEMM approach she conceived within two months.

THIRD PATIENT

She had a history of subfertility for seven years, she presented with acne, central obesity, inflammatory erythema, hair loss, scaling of the skin and dry cycles with abnormal bleeding patterns. We diagnosed her with hyperprolactinemia, hypothyroidism, hypoestrogenic, insulin insensitivity, and first-class obesity with anovulatory cycles. With the FEMM approach, she was able to conceive within two months.

FOURTH PATIENT

She had a history of subfertility for six years, she presented with acne, hirsutism, generalized fatigue with dry cycles and abnormal bleeding. We diagnosed her with hyperprolactinemia, hypoestrogenic, insulin insensitivity, first-class obesity, with anovulatory cycles. With the FEMM approach, she conceived within one month.

These women were managed with medications to include: Bromocriptine, Levothyroxine, Metformin, and Estrogen gel; as well as diet control, stress management, and physical exercise. Fertility education was provided to enable them to understand the reason behind the history of subfertility in their life and help with timing of intercourse. The FEMM method was used to teach patients how to chart their menstrual cycle and how to identify their fertility window by using the biomarkers. The four women were able to conceive.

DISCUSSION

FEMM is a knowledge-based health program, which educates women on how to monitor hormonal changes in their bodies hence allowing them to manage their health [1]. Ovulation is a sign of health [7]. The first sign of an underlying health problem a woman experiences is an abnormality in the ovulation. Therefore monitoring her ovulation allows a woman to understand, maintain, and improve her health. She can identify anovulatory cycles, varied cycle lengths, short luteal phases, duration and flow of menstruation, and quality of cervical mucus. Cycle irregularities and anovulation are associated with poor reproductive health outcomes.

The principal indication of fertile days in a menstrual cycle is the appearance and the sensation of a wet substance [mucus] emanating from the epithelial membrane of the cervix. This mucus sign precedes ovulation and depends upon the growth in the ovary of a follicle which produces estrogens and which is usually succeeded by the rupture and the release of an ovum (ovulation) [8]. The last day on which this substance with fertile characteristics is observed is called the peak day. This day is also the day of ovulation in 80% of cycles. Ovulation occurs on the preceding day in about 10% of cycles and in about 10% of cycles on the day following the peak day [8].

Studies have suggested a complex role of prolactin hormone regarding reproduction. Hyperprolactinemia leads to anovulatory or short cycles. This happens when the prolactin acts through prolactin receptors on metastasis suppressor kisspeptin-1 neurons, with downstream disruption of the gonadotropic releasing hormone secretion, followed by decreased production of gonadotropins [9]. The complications of hyperprolactinemia in fertility include: disruption of gonadotropic releasing hormone, granulosa cell dysfunction, inhibition of corpus luteum function, and dysfunction of endometrium hence decreased implantation [9].

Thyroid hormones influence ovulation by acting upon folliculogenesis and steroidogenesis at the ovarian level. They also have an influence on sex hormone binding hormone and the gonadotrophin-releasing hormone secretion [10]. Both hypothyroidism and hyperthyroidism can result in menstrual irregularities anovulatory cycles and miscarriage [11].

There is an increased prevalence of infertility in obese women and the risk of infertility is threefold higher in obese women than in non obese women. The probability of pregnancy is reduced by 5% per unit of body mass index exceeding 29kg/m^2 [12]. Obesity impairs ovarian follicular development, qualitative and quantitative development of the oocyte fertilization, embryo development, and implantation [13]. Obesity plays a significant role in reproductive disorders. It is associated with anovulation, menstrual disorders, infertility, miscarriages, difficulty in assisted reproduction, and adverse pregnancy outcomes. The gonadotrophin secretion is affected because of increased peripheral aromatization of androgens to estrogens. Both insulin resistance and hyperinsulinemia lead to hyperandrogenemia. The sex hormone binding globulin and growth hormone are decreased and leptin levels are increased. This leads to deterioration of neuro-regulation of hypothalamic-pituitary-gonadal axis [12].

The root cause of subfertility can be found only if we dig deep enough to understand the problem and associated process. Charting the menstrual cycle is a vital tool to all reproductive women seeking conception and, therefore, it is the duty of all medical practitioners to help these women understand the biomarkers in their menstrual cycle.

Most women suffer subfertility because of high BMI which leads to insulin insensitivity. Women should be encouraged to cut down their weight by modifying their diet (restrict carbohydrates, sugary drinks and excess fatty/oily food) and life style change (doing exercises and avoiding stress).

CONCLUSION

Every woman should be able to understand her menstrual cycle. She should be able to recognize her bleeding and cervical mucus patterns, the length of her cycle, as well as, the frequency, volume, and duration of her menstrual bleeding. A woman's accurate perception of when she ovulates is critical for recognizing whether she has any abnormalities that indicate a potential underlying health problem warranting medical consultation. Fertility awareness and medical management made these women and many more smile again, hence, FEMM is a tool to be incorporated in our health facilities to help us manage women with subfertility.

Author's Contribution: JM, DM, CC, GK, HM and AK worked to evaluate and treat the patients. JM, AK and DK compiled the cases and reviewed the drafts of the manuscript. All authors contributed in the writing, review and preparing the manuscript.

Conflict of Interest: All authors declare that they have no conflict of interest with FEMM or any pharmaceutical company.

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