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Research Paper

Role of the proper nutrition for indian women with recurrent pregnancy loss (RPL)

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ABSTRACT

Two or more miscarriages or biochemical pregnancy losses are treated as recurrent pregnancy loss (RPL). Conditions like immune deficiency, thrombophilia, endocrine dysfunction, and obesity have all been linked to an increased likelihood of miscarriage. There is currently no documented treatment for repeated miscarriages; hence, diet and drug aspects must be implemented nationally or internationally. Databases like Google Scholar, the Directory of Open Access Journals (DOAJ), Semantic Scholar, etc., were used to find publications relevant to this study's objectives. From the Indian perspective, a pregnant woman's daily calorie intake should increase by 350, with an additional 9.5 g of protein in the second and 22.0 g in the third trimester. Prenatal folic acid supplementation has been linked to managing proper birth weight and reduced rates of congenital disabilities. During pregnancy, a woman's ideal weight gain is around 10 kilograms, which is the case for women who eat healthily. Limiting salt intake is necessary to prevent hypertension or preeclampsia during pregnancy. Coffee, tea, and other caffeinated drinks should be used in moderation. Vegetables like papaya, cabbage, pumpkin, milk derivatives, sugar cane, and fruits like bananas, mangoes, pineapple, avocados, etc., are the most taboo foods in developing countries like India and Africa. The widespread avoidance of these foods during pregnancy can be attributed to myths that they contribute to foetal obesity, evil eye, abortion, and other delivery difficulties. In rural India, pregnant women are primarily not adequately informed about the significance of eating a healthy, well-rounded diet. To ensure maternal dietary diversity, even modest; well-targeted awareness-raising programs should go a long way. Hence expected mothers should get compulsory nutritional guidance on what to eat and how much from experts like dietitians, physicians, or other experienced mothers through personal meetings or social media platforms to minimize recurrent pregnancy loss.

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1. INTRODUCTION

The women of reproductive age (1%-3%) experience recurrent pregnancy loss, characterized as at least 2 or 3 miscarriages or biochemical losses. The affected women experience significant psychological effects. Immune dysfunction, thrombophilia, endocrine dysfunction, and obesity are risk factors for repeated pregnancy loss. The best-documented treatments for recurrent pregnancy loss are heparin and low-dose aspirin for people with antiphospholipid syndrome and vaginal micronized progesterone for those who have had three or more miscarriages. However, there is no well-established treatment for recurrent pregnancy loss. It should be put into practice to track the outcomes of specific clinics on a national or international scale [1].

2. METHODOLOGY

This is a review article to analyze the various perceptions of the authors about the nutrition of women already having a history of loss of pregnancy one or more times. Despite the lack of specific data on this topic, some keywords or phrases were used to search relevant articles from 2000 onwards. The keywords are “recurrent pregnancy loss,” “safe pregnancy,” “pregnancy nutrition,” “Indian diet,” and similar types. The major open-access databases, such as Google scholar, DOAJ, Semantic scholar, etc., were considered for searching intended articles.

3. RESULTS AND DISCUSSION

Recurrent pregnancy loss (RPL) affects many expected mothers. Studies are beginning to zero in on immunological risk factors, which account for roughly 50% of idiopathic cases. Women with a history of RPL in their family or who have had placental issues may be at a greater risk of developing the illness themselves. The best way to ensure you get enough minerals and vitamins daily is to eat a varied diet that includes enough seasonal vegetables, especially green leafy ones, milk, and fresh fruits. Milk's calcium is the most digestible form of the mineral. Women who are expecting or are currently nursing should take iron, folic acid, vitamin B, and calcium supplements. Reducing the risk of food poisoning during pregnancy is an essential pan important goal.

Ticconi et al. 2020 conducted a prospective cohort study to examine the possibility that women who have experienced repeated miscarriages have a higher risk of developing other pregnancy-related problems. The study showed 431 women with RPL, and 661 occurred in otherwise healthy women. Preterm premature rupture of the membranes, foetal malformations, chromosomal or genetic abnormalities, threatening miscarriage, and other types of miscarriage were the most common problems [2].

3.1 Antiphospholipid (APL) Antibodies

Thrombosis of the veins or arteries, as well as miscarriage, are symptoms of antiphospholipid syndrome, a systemic inflammatory illness. Lupus anticoagulant (LA) and anticardiolipin antibodies are the most common forms of APL (ACL). Discussed that there might be less overlap between non-

traditional and traditional aPL antibodies, resulting in a stronger relationship to RPL. The study's findings indicate the need for additional research to define the significance of the non-conventional APL antibody for RPL patients [3].

3.2 Immunological Risk Factors

Vomstein et al. 2021 described in their paper that between one and five percent of all couples usually suffer from recurrent pregnancy loss (RPL). Changes in anatomy, heredity, hormone levels, and blood clotting ability are all known to increase the danger. Research is beginning to focus on immunological risk factors, which account for around half of idiopathic cases. The focus was placed on the guidelines' suggestions for diagnosing RPL and treating it, including corticosteroids, intralipids, intravenous immunoglobulins, aspirin, and heparin. Finally, a summary of the present state of the art in terms of diagnosis and treatment was provided [4].

3.3 Defective Placentation

Conditions that cause placental malfunction are associated with severe risks during pregnancy for both mother and child. For this reason, investigating links between possible risk factors and placental abnormalities is crucial. The risk of RPL in women with a family history of the disorder or who have experienced placental difficulties is thought to be higher. A study showed that faulty placentation is likely to blame for the higher risk of adverse late pregnancy outcomes in women with Reproductive Placenta Dysfunction (RPL). RPL women might benefit from additional antenatal observation to lower the likelihood of congenital disabilities. Decreased placental dysfunction can be achieved through improved obstetrical history screening and increased antenatal care quality [5].

3.4 Nutrition Recommendation for Indian Women with Pregnancy

This article mainly emphasizes the best possible nutrition and regular diet for Indian mothers having a record of recurrent pregnancy loss. Hence, as per guidelines of the National Institute of Nutrition, it is recommended that a pregnant woman consume an extra 350 calories per day, along with an additional 9.5 g of protein in the second and 22.0 g in the third trimester. Pregnancy weight gain (10-12 Kg) and childbirth weight can be increased with the help of supplemental meals (about 3 Kg). During these times of increased physiological demand, some micronutrients become more critical. Consumption of folic acid during pregnancy has been shown to right birth weight and decrease the likelihood of a baby being born with a congenital disability. Iron is required for the high demands of erythropoiesis in the pregnant woman and her developing child (RBC formation). For healthy foetal bone and tooth development, the production of calcium-rich breast milk, and the prevention of osteoporosis in the mother, calcium is crucial during pregnancy and lactation. A healthy iodine level is essential for the developing brain of both mother and child, and getting enough vitamin, A is necessary. Altogether 60% of her daily energy needs can be met by grains, including rice, wheat, and millet. Polyunsaturated fatty acids and some extra calories can be found in high concentrations in cooking oil. Protein-rich foods include dairy products, fresh seafood, meat, poultry, and eggs. Protein can be obtained from first-class animal food alone, but it is possible to get enough protein from a combination of cereals, pulses, and nuts. Consuming a wide variety of seasonal vegetables, especially green leafy ones, milk, and fresh fruits, is the best way to meet your daily mineral and vitamin needs. Grams of flour that have been fermented or sprouted, together with vitamin C-rich foods like citrus fruits, might increase the body's iron absorption. The calcium in milk is the most absorbable form of the mineral. Supplements of iron, folic acid, B vitamins, and calcium are recommended for pregnant and breastfeeding women, even though they can achieve their dietary needs with a healthy diet [6].

Pregnant women who consume a healthy diet gain an ideal weight (10-12 kg) during their pregnancy. To prevent constipation, she should eat more high-fiber meals, such as whole grain cereals, legumes, and vegetables (about 25 g/1000 kcal). She ought to drink 8-12 glasses of water daily. Caffeinated drinks, such as coffee and tea, should be limited or avoided altogether during pregnancy due to their adverse effects on foetal development. In addition to meeting these nutritional needs, a pregnant

woman should get regular check-ups for weight gain, blood pressure, and anemia and be immunized against tetanus toxoid. She needs two to three hours a day of activity and rest. Because of the potential risks to the developing fetus or infant, pregnant and nursing mothers should not take any medication without consulting a doctor. Misguided food taboos and beliefs must be challenged. Pregnancy-related prevention of microbiological food-borne illnesses is a significant public health policy because it addresses the most pressing issue in food safety. One of the best ways to prevent foodborne illness is to avoid eating items that may have been tampered with [6].

Table 1. Summary of Estimated Average Requirement and Recommended Dietary Allowance (EAR and RDA) of an Indian woman with pregnancy in a day

EAR	**Body weight (kg)**	**Energy (kcal/day)**	**Protein (g)**	**Calcium (mg)**	**Magnesium (mg)**	**Zinc (mg)**	**Iron (mg)**	**Folate (mcg)**	**Iodine (mcg)**	**Vit-B_6 (mg)**	**Vit-B_{12} (mcg)**	**Vit-A (mcg)**	**Vit-C (mg)**	**Vit- D (IU)**
	55 (+10)	1660 -2720 (+350)	36.0 + (7.6 - 17.6)	800	370	12	21	480	160	1.9	2 + (0.2)	406	55 + (10)	400
RDA	**Body weight (kg)**	**Energy (kcal/day)**	**Protein (g)**	**Calcium (mg)**	**Magnesium (mg)**	**Zinc (mg)**	**Iron (mg)**	**Folate (mcg)**	**Iodine (mcg)**	**Vit-B_6 (mg)**	**Vit-B_{12} (mcg)**	**Vit-A (mcg)**	**Vit-C (mg)**	**Vit- D (IU)**
	55 (+10)	-Do-	36.0 + (9.5 - 22.0)	1000	440	14.5	27	570	220	2.3	2 + (0.25)	900	15	600

As shown in Table 1. Complete data has been shown irrespective of EAR cum RDA values published by the National Institute of Nutrition (ICMR). This table indicates the recommendation for the indian pregnant woman who needs that much energy and all nutrients categorially. There are three types of activities: sedentary, moderate, and heavy, which usually gain 10 kilograms of additional weight during pregnancy. The need for extra energy (350 kcal/day) and other nutrients, including protein, during 2nd and 3rd trimester is also mentioned in that table [7].

3.5 Food Contraindications

Most mothers make blunders while balancing their body's nutritional needs with the medications they should take daily. If an expected mother takes a pill or drug as directed by her doctor but eats a particular meal, the combination could be fatal due to a food-drug interaction. Many foods have adverse

effects on the human body and can interact or react with certain medications, as was evaluated and analyzed by the study's author. Both food and medicine are required, but the careful patient must choose the former with the help of a dietician and the latter with the aid of a doctor's prescription, according to Banerjee 2020. Knowing how foods and medications interact is required to avoid potential health problems [8].

Many authors, including Dathe and Schaefer 2019 discussed in their paper that pregnancy is a crucial period when the medicine is to be wisely selected by the physician, precisely by the obstetricians/gynecologists. Pregnancy-safe drugs should be used first and foremost when treating women of reproductive age. Medications with limited or no research behind them are only used if the standard treatments are ineffective or intolerable. Substances known to be harmful to development should never be used. Having been exposed to such a substance is not, in and of itself, cause to terminate the pregnancy [9].

In a study, Banerjee 2022 mentioned that adequate assessment, diagnosis, interventions, and monitoring and evaluation (ADIME) form the basis of the subjective, objective, review, and plan (SOAP) paradigm. The first step is assessing the woman's health condition and making a diagnosis. The best results from the recommended diet can be obtained, and she can be motivated to maintain their health through monitoring and evaluation as key management [10].

3.6 Risk of Excess Weight

Gaskins, 2018 found that weight gain was substantially associated with an increased risk of pregnancy loss, and more women gained than lost more than 5% of their body weight. The only other study on the topic found that weight gain was also more common and had negative consequences on pregnancy loss [11].

3.7 Myths and Misconceptions (Food Taboos)

There are many myths and misconceptions about safe pregnancy and avoiding much good food in developing countries like India and Africa. Many people, including expecting mothers, their husbands, and in-laws, believe eating certain things is dangerous for the baby. In most areas in Ethiopia and South Africa, vegetables like cabbage and pumpkin, milk and milk derivatives, sugar cane, fruits like bananas and avocados, and eggs are the most avoided foods during pregnancy. Beliefs that these foods can cause foetal obesity, evil eye, fear of abortion, and subsequent birth complications led to their widespread avoidance during pregnancy. Pregnant women's ideas and attitudes, nestled under the impact of their social milieu and society's traditional beliefs and values, were shown to be at the root of their adherence to dietary taboos [12], [13].

In India, the expected mother and her family believe some fruits may affect her. These are papaya, jack fruit, ripe mango, banana, pineapple, and grape because some perceptions are expressed in the form of words (in the local language) are 'cold food,' 'hot food,' overweight, rigors, seizures, and labor difficulty. According to the study by Rajkumar Patil et al. 2010 in a village near Pondicherry, some people even refer to papaya as a "hot" fruit. Pregnant women are advised to avoid traditionally "hot" foods for fear of having an abortion. Similarly, 'cold' meals are often avoided during breastfeeding since they have the potential to affect both the quality and amount of milk negatively. Papain and chymopapain, two proteolytic enzymes, are the primary ingredients in papaya latex and are solid uterine stimulants. Fully mature papayas, which can be safely consumed, contain either no latex or only trace amounts that are enough to prevent cramping in the uterus but not enough to cause pregnancy loss. However, unripe or semi-ripe papaya (a high concentration of latex that generates noticeable uterine contractions) may have a negative effect during pregnancy and should be avoided [14].

A review study by the authors from the University of Rome discussed that plant and processed food items, as opposed to animals or nonspecific physiological issues, are the most common sources of worry about pregnancy weight gain and labor complications. Clinical evidence shows that obstructed labor poses a significant risk to maternal life in non-Western nations, and this concern about large

newborns coincides with this trend. The foetal growth potential of the staple food, namely the agricultural subsistence mode, may account for taboos to reducing newborn birth weight [15].
According to the study, Asian countries are more prone to obesity and other lifestyle disorders. The elderly population in southeast Asia is plagued by obesity, CVD, hypothyroidism, kidney illness, poor bone health, pregnancy complications, and infertility. Many researchers compare the effects of vegan and non-vegan diets, two of the most popular dietary patterns today. It signifies that improper vegan or non-vegan dietary patterns can modulate TSH, creatinine, and bone mass among older adults, particularly among women [16].

3.8 Avoidance of Some Food

There is a tentative food list that may affect the pregnancy of women already having a history of RPL. All types of grapes, dry dates, bananas, and the extra melon should not eat in case of excess weight (existing obesity). Raw papaya, tomatoes, fenugreek seeds cum leaves, and all ground-level leaves should be avoided due to pesticides [rooftop leaves are allowed, like pumpkin, bottle gourd, and similar leafy vegetables duly cooked/appropriately boiled]. Arum, brinjal, and all seeds, like pumpkin seeds, sesame seeds, etc., should be less than average.

Further, mothers must avoid all unwashed, uncooked raw vegetables and avoid too much carrot cum beet to eat salad or natural content. They should abstain from all local green vegetables that are backdated and long kept in a refrigerator. Improper vegetables may be the shelter of bacteria and fungi. Here is the other significant advice that may be the risk factors during pregnancy [17], [18].

Hence to Avoid all these Below-Mentioned:

1. Alcohol, tobacco, or similar products.
2. Coffee/similar food rich in caffeine.
3. Licorice (mulethi), also the local name Jasthi Madhu, is a type of honey.
4. All fast foods/junk foods/ outside street foods
5. Marine/ sea fishes that are mainly frozen (refrigerator-kept) or dead fishes which are rich in mercury.
6. Undercooked fish and chicken should be deep-fried in olive oil/ white oil.
7. Half boil eggs and duck/local hen eggs. Only poultry egg full boil, preferably white part.
8. Mutton, crab, prawn, or high-fat red meats.
9. Unpasteurized milk like cow's/buffalos' milk, canned fruit juices, etc.
10. Open roadsides fruits, juices, or similar foods.
11. Excess cheese and mayonnaise are open from shops to eat or prepared from cow's raw milk. Use double-toned milk to prepare cheese, Chena, and paneer; that is all better to eat during pregnancy.
12. Cod liver/shark liver oil.
13. Improper mustard oil or other refined or seed oil.
14. Other foods to avoid if you have allergies or hypersensitivity.

3.9 Pregnancy Nutrition Awareness

A study revealed that pregnant women did not utilize online or offline modes to track their health or increase their fitness level. The study's importance lies in its ability to evaluate how much time and effort were expended after the consultation. The study's final findings revealed that several participants were unmotivated to complete the task due to various personal, environmental, and temporal reasons. [19] Therefore, pregnant women lack education regarding the importance of a varied and balanced diet and essential micronutrients like iron and vitamin A in many countries. Nevertheless, the respective government has noted encouraging views on dietary variety and nutritional care. Small but well-targeted awareness-raising initiatives and women's economic empowerment can go a long way toward ensuring maternal dietary diversity. Pregnant women can get advice on how to eat healthily and adequately during their pregnancy and reduce their risk of miscarriage from NGOs or using specific groups of social media

platforms like WhatsApp and Facebook and other initiatives by state or central governments focussing the rural areas [19], [20].

4. CONCLUSION

There are pregnancy myths cum misconceptions that certain foods, including papayas, pineapples, and other vegetables and fruits, cause foetal obesity, the evil eye, abortion, and other delivery complications that have led many people to avoid eating them while pregnant. Pregnant women in rural India lack information on the importance of a balanced diet, a burning issue in almost all developing countries. Modest, well-targeted awareness-raising activities should go a long way toward ensuring maternal dietary diversity. Thus, to reduce the occurrence of miscarriage, expectant moms must have access to dietary advice from professionals such as dietitians, physicians, or other educated and experienced mothers via personal counseling or online communities.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Swapan Banerjee	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	

C: **C**onceptualization
M: **M**ethodology
So: **So**ftware
Va: **Va**lidation
Fo: **Fo**rmal analysis
I: **I**nvestigation
R: Resources
D: Data Curation
O: Writing- **O**riginal Draft
E: Writing- Review& **E**diting
Vi: **Vi**sualization
Su: **Su**pervision
P: **P**roject administration
Fu: Funding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study, and their voluntary consent was obtained prior to data collection.

Ethical Approval

The study was conducted in compliance with the ethical principles outlined in the Declaration of Helsinki and approved by the relevant institutional authorities.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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