Research Proposal

Risk Factors for the Reproductive Health of Women in Coastal Bangladesh

Submitted by
Lamisa Manha Aditee
Brac University
lamisamanha22@gmail.com
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1. Introduction:

High levels of salinity in soil and water, increased pollution, and vulnerability to natural disasters are some common scenarios of coastal areas in Bangladesh. Women and girls suffer the most since they use the salty water the most for household tasks and maintaining menstrual hygiene (Sagar, 2023) . A study on Climate Change Impact in Bangladesh shows that women are the most vulnerable group who are the worst victims of climate change followed by children and the elderly population which is 63% (Kabir et al., 2016) . In coastal Bangladesh, drinking water from natural sources has become salty. This happens because seawater is mixing in, due to rising sea levels, cyclones, and the reduction of freshwater flowing from upstream.

Although there has been much research conducted to know about the causes of this severe problem in Bangladesh ,there is limited focus on the solution of these conditions on women's reproductive health, and how biotechnology can be applied to mitigate these effects. This study aims to improve women's reproductive health in these regions by using biotechnological approaches such as identifying biomarkers for health risks and creating a sustainable healthcare system.

2. Research Objectives

2.1 Primary Objective: To identify the biomarkers for health risk of coastal environmental conditions on women's reproductive health and develop biotechnological solutions to address identified health challenges.

2.2 Specific Objectives:

1. Identify biomarkers which are related to reproductive health issues of women in coastal areas in Bangladesh.
2. Explore biotechnological methods such as water purification and pathogen detection to reduce reproductive health risks

3. Research Questions

1. How climate change is affecting womens' reproductive systems in Bangladesh?
2. Which factors of environmental change particularly have a specific effect on this condition ?
3. Which biomarkers have already been explored which indicates reproductive health risks due to environmental stressors such as high salinity and coastal areas' water pollution?

4. Literature Review

In the southwestern coast of Bangladesh, over 4 million people have a serious freshwater shortage, and women suffer the most from this problem (Karim, 2024).A 2008 survey found that pregnant women living along the southwestern coast of Bangladesh had higher rates of

(pre)eclampsia and gestational hypertension compared to those in non-coastal areas. This was believed to be linked to salt contamination in drinking water (Khan et al., 2008). In the research of Drinking Water Salinity and Maternal Health in Coastal Bangladesh ;the findings indicate that sodium intake among pregnant women in coastal Bangladesh far exceeds the recommended level of 2 g/day (85 mmol/day), as set by WHO and FAO. With an average intake of 3.4 g/day and some reaching as high as 7.7 g/day, sodium levels are significantly increased and can cause severe health issues (Khan et al., 2011). Technologies such as prenatal genetic testing and advanced imaging can detect and address risks like (pre)eclampsia, gestational diabetes, and other conditions early on.

5. **Methodology**

This research will be combined with quantitative data collection (biomarker identification) with qualitative interviews and surveys for community feedback. Firstly , Laboratory analysis on biological samples (urine, blood of women in that area) to identify the biomarker. Then PCR-based pathogen detection to identify the contaminants and pathogens affecting reproductive health. By focusing on PCR-based detection it can identify the waterborne or environmental pathogens that might affect women's reproductive health. On the other hand, FGD works with community people, health and service providers to engage the community to raise awareness and health education, promoting preventive health care practices. Lastly, statistical analysis of biomarker prevalence and thematic analysis for qualitative responses from FGDs .

6. Expected Outcomes

The research's probable outcome is the identification of reproductive health risk biomarkers and promoting community health education to reduce risks for coastal women.

8. Significance of the Research

By focusing on reproductive health in coastal areas and identifying factors for this condition , it creates a scope to use biotechnology in the public health sector to identify problems.
Furthermore this research can significantly have a good chance t o have scalable solutions for these health problems .

10. Timeline

The research will be conducted for 10 months.Approximate timeline for the data collection is first 4 months , second 4 months for developing analysis and last 2 months for community engagement .

9.References :

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