

Research Brief on Assessing Climate Change Induced Water Salinity Impacts on Sexual and Reproductive Health and Rights in Coastal Bangladesh

Mahin Al Nahian, Priyanka Barman, Tanvir Ahmad, Mithun Dutta, Md. Moinuddin Haider, Dr. Peter Kim Streatfield

- Bangladesh is experiencing climate change and sea level rise faster than global average.
- Salinity intrusion in land and water has been identified as the most devastating impact of sea level rise by coastal communities in Bangladesh.
- Salinity intrusion has severe consequences on agriculture, livelihoods, and public health outcomes.
- There is a lack of scientific evidence on how women and adolescents suffer in managing their sexual and reproductive health and rights in a coastal saline environment.
- This study aims to investigate how vulnerable populations- adolescents and women - in the coastal districts have been impacted by a variety of saline water-based climate change driven threats, how they have responded, and what coping options they might have in future in Bangladesh.

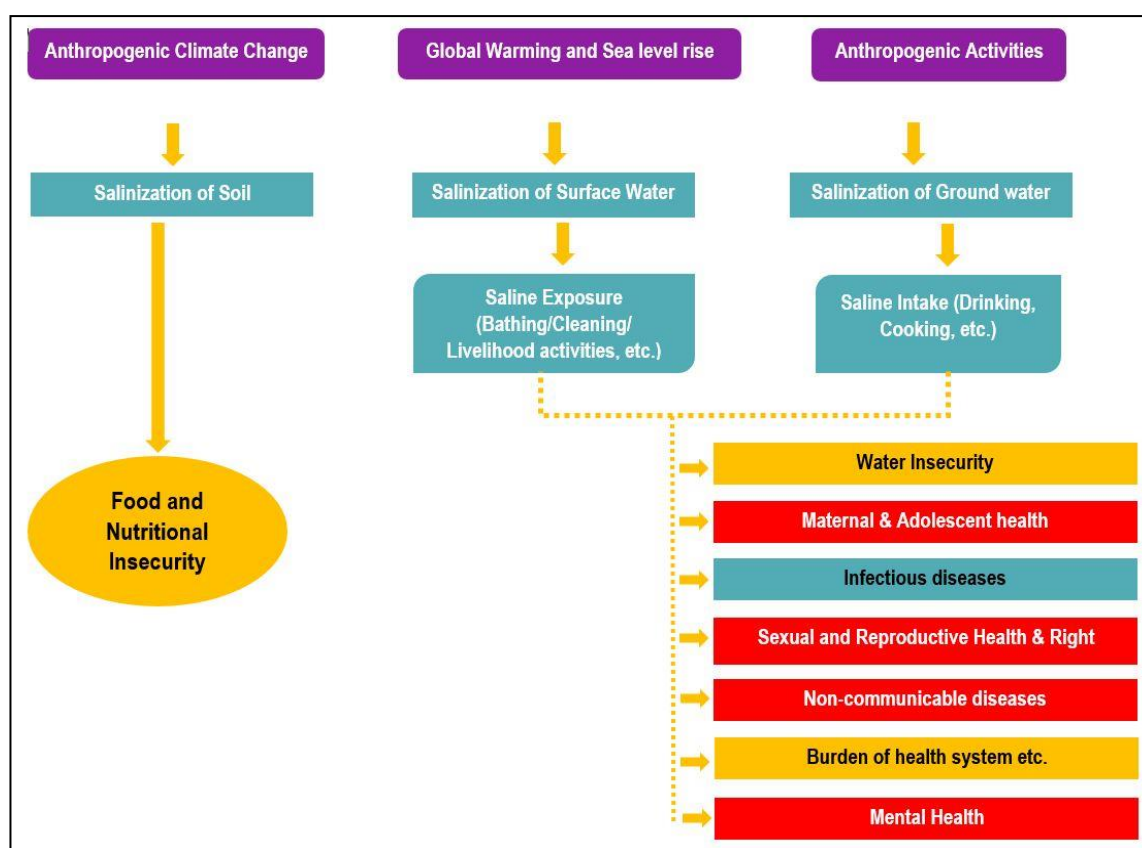


Figure: Conceptual framework of the study. Anthropogenic climate change, global warming and sea level rise, and man-made activities are the major reason for salinity intrusion in coastal soil and water bodies. Increase in soil salinity has a severe impact on agricultural production and thus poses a threat to food and nutritional security. Salinity into surface water (rivers, ponds, lakes, etc.) and ground water (shallow aquifers and deep aquifers) has also severe health consequences- infectious diseases (diarrhoea and cholera, etc.), water insecurity (increase salinity made water impossible to drink), burden on health system (increased patient load from communicable and non-communicable diseases, maternal and adolescent health, sexual and reproductive health and rights, non-communicable diseases and mental health). In this study, the primary focus was given to the red boxes- on how water salinity impacts on such health issues. The orange boxes have a secondary focus and the blue box was not addressed under the scope of this study.

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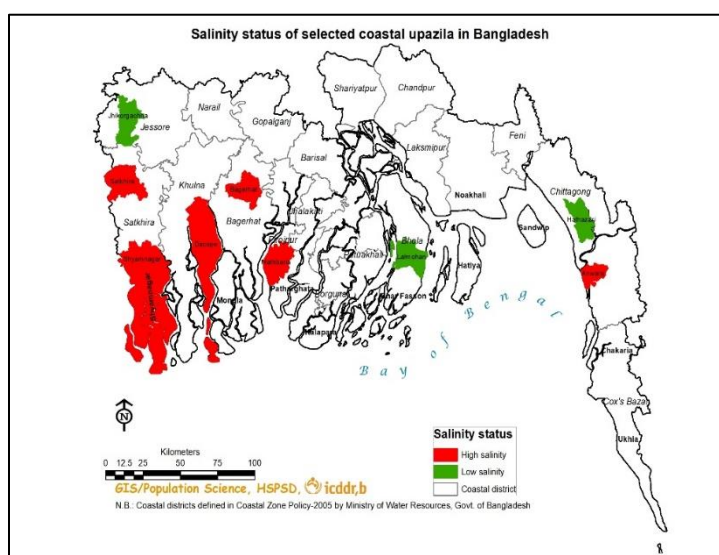
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The study

The study is primarily a cross-sectional survey in coastal districts of Bangladesh. Primary data was collected from the coastal households on health, particularly on sexual and reproductive health and rights, linked to climate change, and sea level rise associated salinization of surface and ground water. The study required representation from the various coastal regions in the south west, south central, and south east to cover the natural variation and different exposure to cyclone tracks, sea level rise, salinity in soil and water, as well as some social issues like women's mobility, empowerment and decision making, etc. Thus, three coastal divisions were chosen with both high salinity districts and low salinity districts, and the sample was calculated using a "case to control" match ratio of 2 to 1. The study was implemented through a collaborative effort of the National Institute of Population Research and Training (NIPORT), and the Initiative for Climate Change and Health (ICCH) of icddr,b. Primary data was collected through a household questionnaire survey, carried out by a third-party research firm, Associates for Community and Population Research (ACPR).

Study areas

The study is centered around water and salinization problems in coastal Bangladesh. Thus, the study areas have been selected based on the 2019 ground water (GW) salinity data from Bangladesh Water Development Board (BWDB) monitoring stations (<http://www.hydrology.bwdb.gov.bd/>), established in coastal districts. The study selected six high saline areas as 'exposed districts' to salinization problem and three low saline areas as 'comparison districts.' In total, the study was carried out in 9 Upazillas from 7 coastal districts in 3 divisions ranging from south-east to south-central to south-west.



Sample Size

In each Upazila, 15 mouza/ clusters were selected, and 40 households (HH) were selected randomly in each cluster. Thus, the sample was:

- High saline areas = $6 \times 15 \times 40 = 3,600$ HHs
- Low saline areas = $3 \times 15 \times 40 = 1,800$ HHs

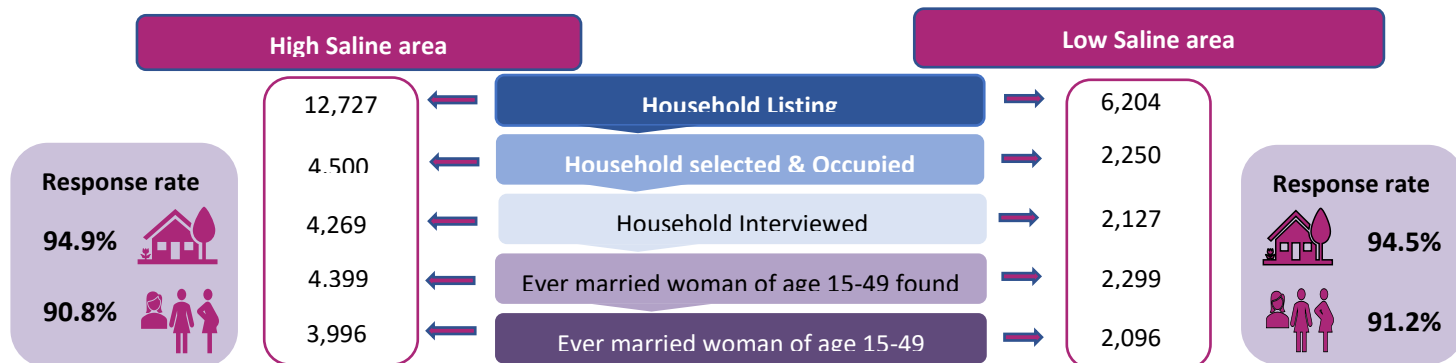
In total 5,400 HHs were selected in the study using a "case to control" match ratio of 2:1. In case of non-response and withdrawal, an additional 20% HHs were kept in the sampling framework. So, total sample size was $5,400 / 0.8 = 6,750$ HHs.

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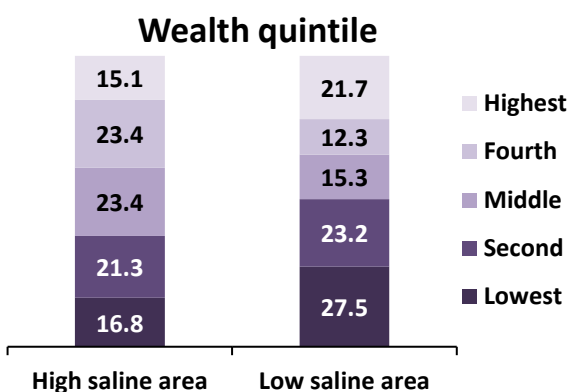
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Findings

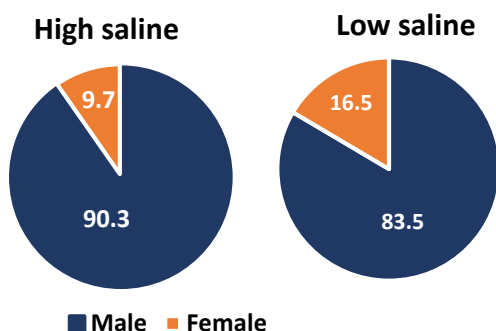
The first part of the survey was on households. The household section captured essential data to measure the wealth quintiles, headship of household, major drinking water sources, status of sanitation facilities, perceptions on climate change, and disasters experienced by the households.



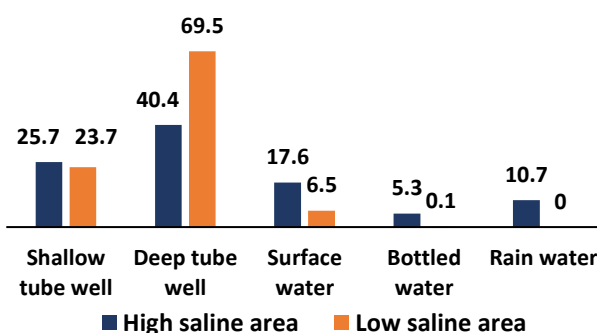
- There is a marginal differences among ‘within-areas’ wealth quintiles; and ‘between areas’- there is some difference, specifically in highest and lowest quintiles.
- Female headed households are more common in low saline areas.



Household headship



Source of drinking water

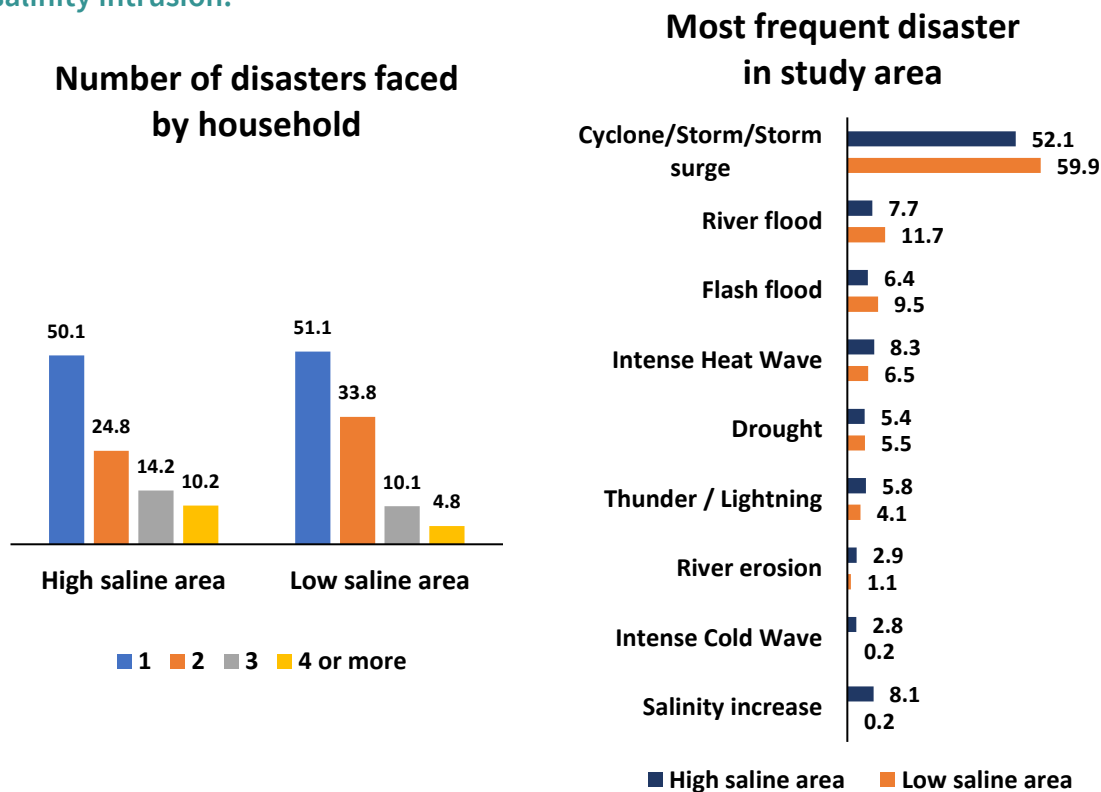


- Both areas have almost 100% improved sanitation coverage.
- More than 70% HHs depend on ground water sources (primarily deep tubewells) for drinking water. Bottle and rain water is only used in high saline areas.

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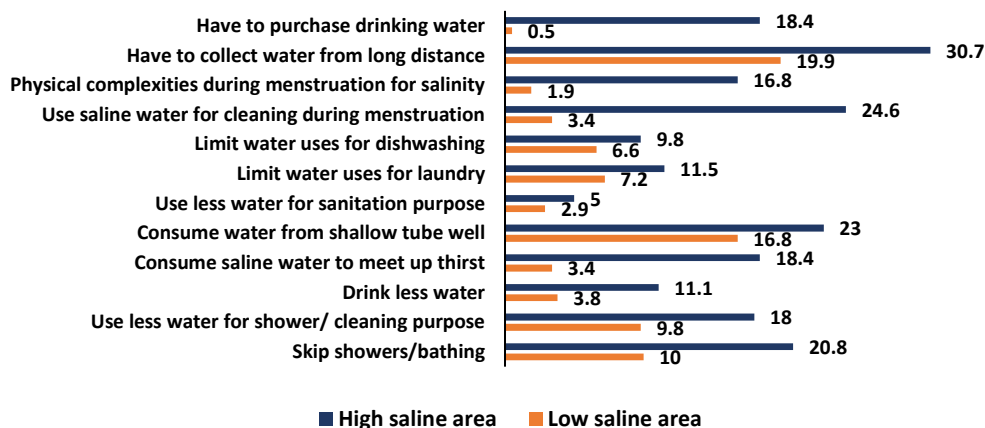
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- Almost 100% of HHs faced at least one disaster in their lifetime.
- Cyclone is the predominant disaster in the coastal areas; followed by monsoon/ river flood, heat stress, tidal flood (coastal communities take tidal flood as flash flood) and salinity intrusion.



- Cyclone, river flood and tidal flood, all result into saline water intrusion, stagnation and waterlogging- which means increased salinity in water and soil in the areas.
- Considering increased salinity in water, in all aspects of day-to-day life, along with drinking, drinking water collection, bathing, cleaning, and menstrual hygiene management- there are clear distinctions in women’s suffering in high and low saline areas.

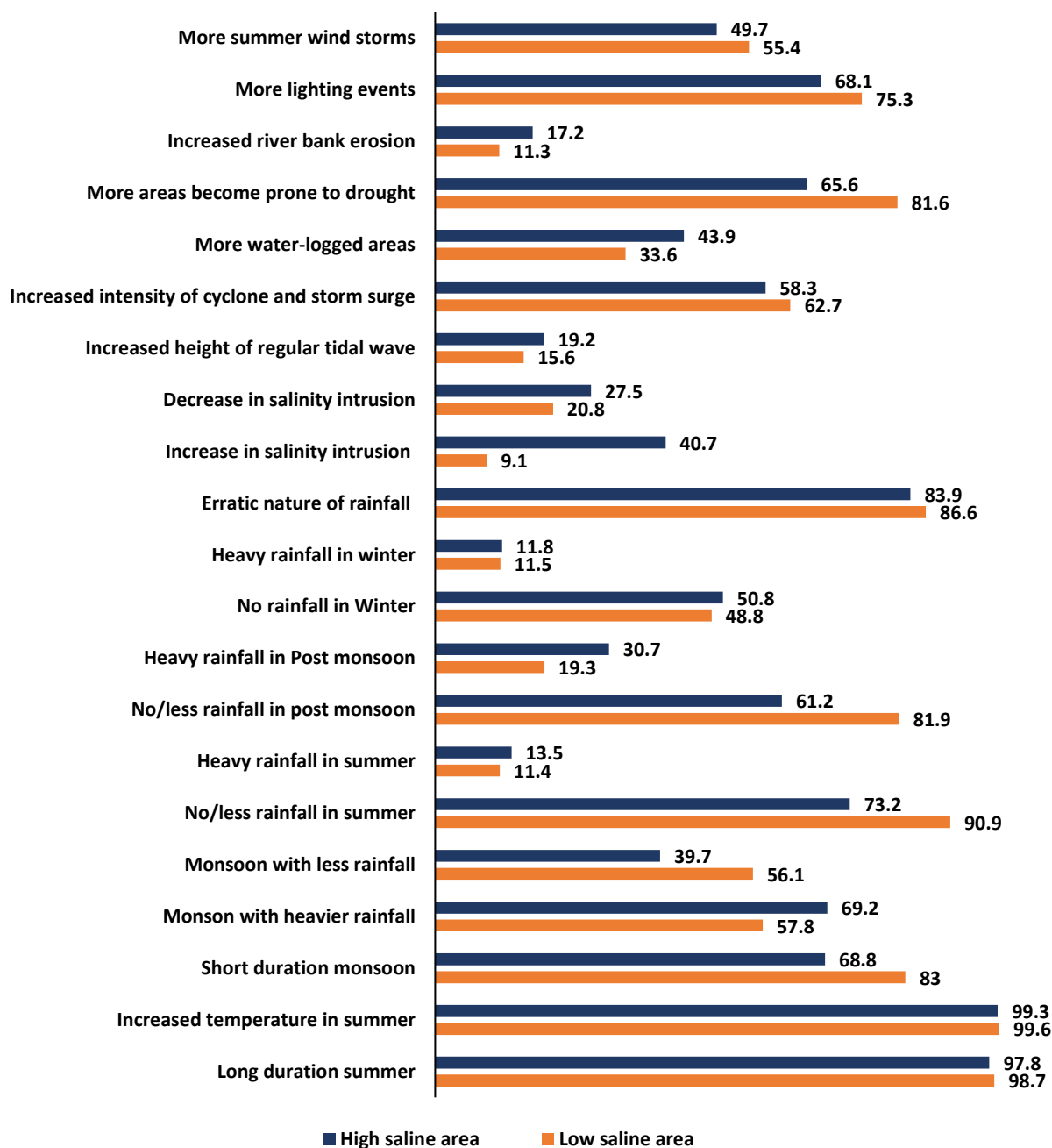
Impact of safe water scarcity on daily life



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Household's perception on climate change



- There is general consensus among respondents that summer has become longer with increased heat, rainfall has become erratic, shorter in duration with more intense rainfall.
- Nor'wester storms with lightning events have become a major concern.
- Perception on events that enforce salinization are predominant in high saline areas.

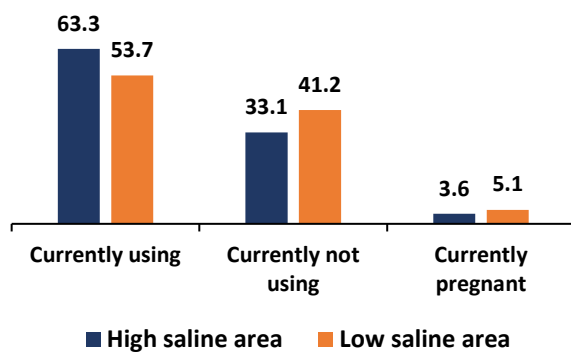
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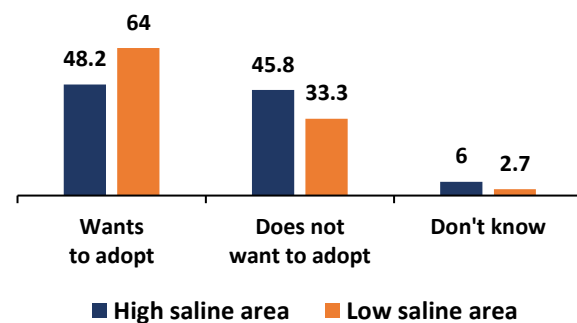
The second part of the survey was carried out with women respondents from the selected households. The women section collected data from eligible women, who were ever-married women of 15-49 years age. Both high saline and low saline areas exhibited similar age distributions among eligible respondents.

- Majority (94%) of women are currently married during the time of the survey. About 80% of the respondents are Muslim.
- The distribution of educational attainment is relatively similar between high saline and low saline areas for lower levels of education (1-5 years and 6-10 years), there are slight differences in the distribution of higher education levels (11 or more years).
- About 85% of these respondents are housewives, followed by business related job (5.1%) and blue collar jobs (3.3%).

Currently married woman's contraceptive use



Currently married woman's attitude towards future contraceptive adoption

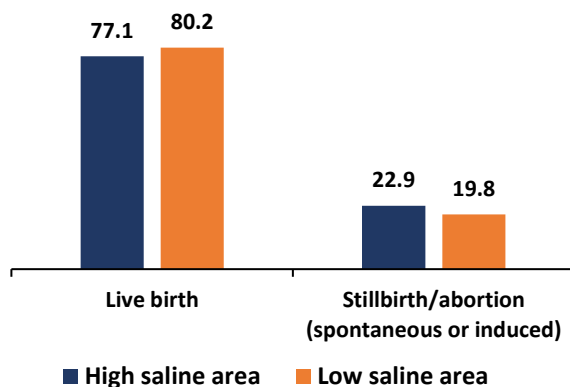


- The rate of contraceptive use is more common in high saline area; surprisingly, unwillingness to use contraception in future is also higher in high saline areas comparing to low saline areas.
- Though present use of contraception is less in low saline areas, however, willingness for contraception adaptation in future is high among the low saline areas' women.
- Percentage of live births and normal delivery is also high in low saline areas.
- Percentages of stillbirth/ abortion is slightly more common, and C-section delivery is very much more common, in high saline areas.

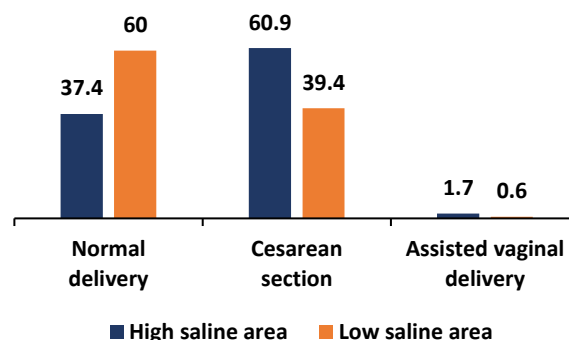
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Outcome of last pregnancy in last 3 years

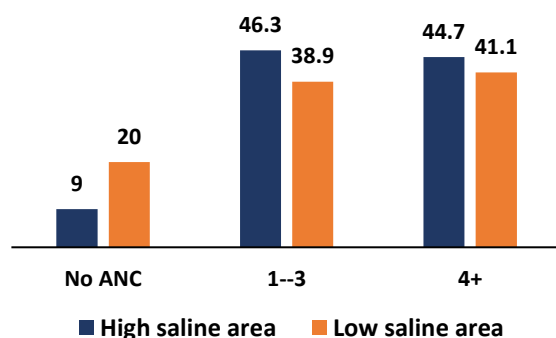


Mode of delivery for last live birth

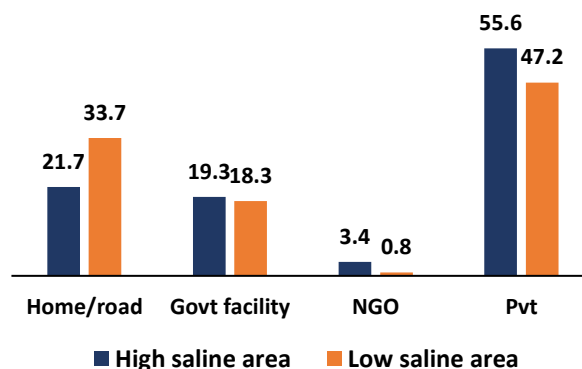


- Following the trend in delivery, the place of delivery for last live birth is also high in privately owned health facilities. Both normal delivery and delivery at home is higher in low saline areas- pointing out that, pregnant women may face higher complexity in high saline areas during their delivery.
- Interestingly, rate of ANC recipience is better in high saline areas. In case of 1-3 ANC and 4+ ANC, high saline areas performed relatively well comparing to low saline areas. This finding may be seen from a different perspective, new born babies have higher complexities in high saline areas and as such mothers are more attentive towards ANC visits.

Number of ANC for last live birth



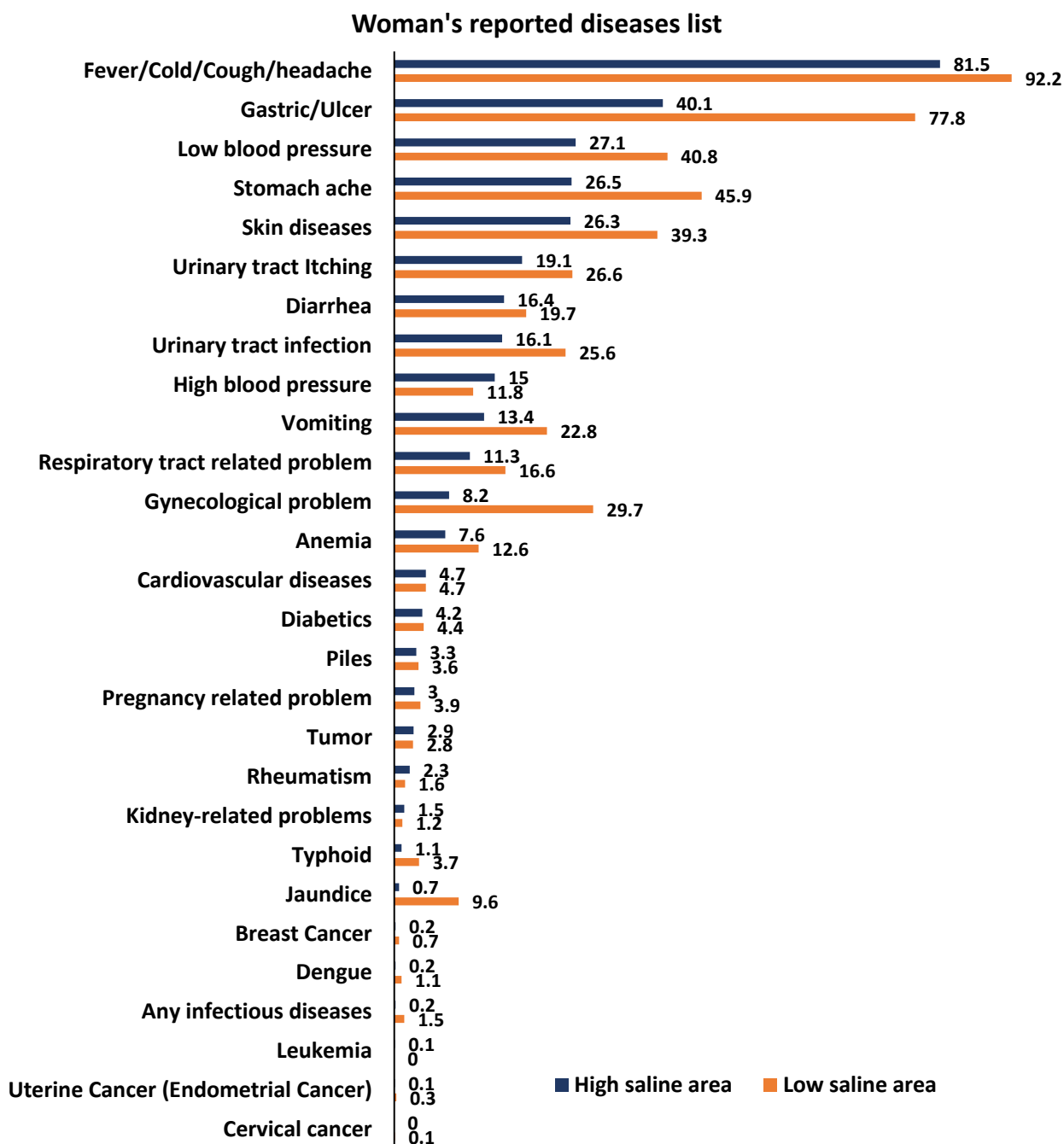
Place of delivery for last live birth



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- About 93% and 99% women have reported that they had suffered from any diseases in the past 6 months, in high saline and low saline areas, respectively.



Acknowledgements:

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