

devices may cause harm by reducing inspectors' investment in visual inspection. The latest developments of portable and handheld devices will also be presented.

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# UNDERWEIGHT AND STUNTING AMONG BANGLADESHI FEMALE ADOLESCENTS: FINDINGS OF A NATIONALLY REPRESENTATIVE SURVEY

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Optimum nutritional status of an adolescent girl is not only vital for herself but also for the future generation. Nutritional status of the adolescents are often under-reported in resource-poor countries like Bangladesh. Bangladesh Integrated Household Survey (BIHS) contains data on nutrition status of every household member, individual food consumption and other potential determinants of nutrition. We analyzed the BIHS 2015 round data to explore the nutritional status of the rural adolescent girls aged 10-19 years and to investigate associated factors. We collected data on households those are nationally representative (rural only). We extracted data for girls aged 10-19 years, their anthropometric measurements, 24-hour dietary recall data and additional information. We had information of 1,835 adolescent girls with an average age of  $14.1 \pm 2.8$  years. Majority of the girls (89.9%) were never married and attending school during the survey period (82.2%). Among the menstruating girls, only 10.4% used disposable sanitary pad. The average height was  $146.4 \pm 9.4$  cm and weight was  $38.4 \pm 9.7$  kg. Among the girls, 14.8% had BMI-for-age Z score  $< -2SD$  (thinness) and 5.4% were overweight or obese. About 26.5% adolescent girls were stunted (height-for-age Z score  $< -2SD$ ). The major sources of animal protein for these girls were fish (71.7%), dairy products (32.1%) and egg (22.5%). In multivariable regression, only age and education level of these adolescents were significantly associated with both underweight and stunting. Age was a protective factor in underweight (AOR=0.91, 95% CI 0.85-0.98) and girls having only primary or less education had 64% higher odds (AOR=1.64, 95% CI 1.16-2.34) of being underweight compared to those with secondary education. Age (AOR=1.23, 95% CI 1.17-1.30), primary or less education (AOR=1.94, 95% CI 1.48-2.55) and unhygienic toilet (AOR=1.29, 95% CI 1.03-1.63) were the factors associated with stunting in these girls. The prevalence of underweight and stunting was high among adolescent Bangladeshi girls. Policymakers must focus on this group, as they are the key to break the intergenerational cycle of undernutrition.

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# MENTAL ILLNESS AND HOMELESSNESS FROM THE FEMALE PERSPECTIVE: INSIGHTS FROM LOS ANGELES COUNTY

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Abstract Research has consistently shown that individuals with mental illness are at increased risk of life events that may lead to homelessness, such as low income, poor coping skills, and incarceration. But little is known about how previous life events and mental illness may affect individuals once homeless. What is known about homelessness in urban environments is largely based on samples that are predominantly male. However, housing inadequacy in the United States is increasingly affecting women and female-headed families. This study analyses a large sample ( $n = 1351$ ) of women experiencing homelessness in Los Angeles County. The cross-sectional data provides insights into the demographic makeup of unsheltered women in the county, including indicators of mental health. The mean age of the sample was 46 years of, with most the women identifying as either white (41%) or black (34%). Nearly half (48.7%) of the sample reported a history of depression, post-traumatic stress disorder, and/or another serious and persistent mental illness. More than half (55.9%) of these women reported a history of depression. The prevalence

of post-traumatic stress disorder in this sample was 37.8% and rates of drug and alcohol abuse were 28% and 21% respectively. Chi-squared analyses showed that adults who were both mentally ill and homeless were more likely than homeless adults without mental illness to report prior domestic violence, human trafficking, and incarceration ( $p < 0.01$ ). A t-test for independent samples revealed that mental illness was also statistically significantly associated with longer periods of homelessness ( $p < 0.01$ ). This study provides support for the notion that traditional methods of alleviating homelessness, like job training programs, will do little to treat a one of the major drivers of chronic homelessness. The data presented here alludes to the fact that supportive housing with integrated mental health services and trauma informed services will be necessary to deal with the growing number of homeless women in Los Angeles.

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# COMPARATIVE BEHAVIORAL RESPONSES OF AEDES AEGYPTI, AEDES ALBOPICTUS AND CULEX QUEQUINFASCIATUS (DIPTERA: CULICIDAE) TO PLANTS BASE REPELLENT OF VETIVER COMPOUNDS

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There are many reports revealed that some plant-derived are considered non-toxic, alternative insect repellents for humans. Vetiver compounds were assessed as repellent mosquito vectors. *Aedes aegypti*, *Aedes albopictus* and *Culex quequinfasciatus* were tested behavior responses with vetiver compounds through the High Throughput Screening System (HITSS). As a result, the behavioral responses of mosquitoes to plant base of vetiver compounds indicated that some compounds had spatial repellent, contact irritant and/or toxic properties. The study provides informative data on the mosquito-repellent property of vetiver plant against *Ae. aegypti*, *Ae. albopictus* and *Cx. quinquefasciatus*. We conclude that the pure compounds from vetiver could potentially be developed as promising plant-based repellents fight against the bite of mosquitoes.

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# ASSESSING THE IMPACT OF CLIMATE CHANGE ON SLEEPING SICKNESS IN ZIMBABWE USING A GEOSPATIAL MODEL OF TSETSE POPULATION DYNAMICS

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Climate change influences the entomological and epidemiological components of vector-borne disease transmission. Rhodesian human African trypanosomiasis (rHAT), a zoonosis caused by trypanosomes transmitted by tsetse flies, occurs at localised foci across East and Southern Africa. At one focus in northern Zimbabwe, a long-term decline in the abundance of tsetse appeared to be correlated with recent increases in temperature. A mechanistic model of tsetse population dynamics suggests that this decline is due to the impact of temperature on tsetse mortality and development rates. We aimed to produce a geospatial model of tsetse population dynamics to explore the effect of climate change on the abundance of the rHAT vector *Glossina pallidipes* across all sites in Zimbabwe where rHAT has been reported. We compared remotely sensed MODIS temperature data to local weather station data previously used to fit a mechanistic model to longitudinal *G. pallidipes* abundance. We applied an adjustment to convert from land surface temperature to air temperature, and then used the adjusted data to estimate mortality and development rates in the existing ordinary differential equation (ODE) model, running simulations for each  $1 \text{ km} \times 1 \text{ km}$  cell in Northern Zimbabwe. The projection of this model throughout Northern Zimbabwe produced estimates of changes in tsetse abundance for locations currently lacking longitudinal data. Our model predicts decreasing abundance of tsetse within several low elevation areas in relation to increasing

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Comparative behavioral responses of *Aedes aegypti*,  
*Aedes albopictus* and *Culex quequinfasciatus* (Diptera :  
Culicidae) to plants base repellent of vetiver  
compounds.

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