

Comparing mental and neuropsychological health outcomes between two pesticide exposure groups in rural Bangladesh

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Background: Agricultural workers are at risk of pesticide exposures in agriculture-dependent South Asian countries due to lack of monitoring and education on proper use of personal protective equipment (PPE). Limited information is available in the literature if pesticide exposure is associated with mental and neuropsychological health outcomes in this region. The major goal of the present study was to examine the associations of pesticide exposure with several mental and neuropsychological health outcomes.

Methods: A pilot study was conducted in a rural community in Matlab, Bangladesh on 57 healthy adults who were 30–55 years old and were also free from any chronic illness. Among the subjects, 38 were occupationally exposed (regularly using pesticides in the field) and 19 were environmentally exposed (living in the agricultural community but were not using pesticides). Participants responded to a number of demographic, pesticide exposure, 16 depression and 20 stress questions through a face-to-face interview conducted by a research team that included a physician. At the same time, the team completed two parts of Trail Making Test (TMT), a neuropsychological pencil-paper test. To compare two exposure groups for the demographic characteristics and outcomes we used independent sample t-test and chi-square test for continuous and categorical variables respectively.

Findings: After the preliminary analysis, it was observed that occupationally exposed group had non-significantly higher depression score on the Center for Epidemiologic Study Depression (CESD) scale as compared to environmentally exposed group. Furthermore, occupationally exposed group had significantly higher depression score on the CESD interpersonal subscale ($p < 0.05$). Occupationally exposed group took longer time (Mean times in sec \pm sd were 73.1 ± 40.3 vs 123.8 ± 48.7 for part A; 56.8 ± 25.1 vs 112.0 ± 28.7 for part B) to complete both parts of the TMT even though the differences were not statistically significant perhaps due to the small sample size.

Interpretation: The findings of this study are preliminary, and larger studies need to be conducted in this population to obtain further evidence on the mental and neuropsychological health outcomes of pesticides.

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Beyond operationalizing: The need for evaluation in One Health

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Background: Motivating and sustaining the operationalization of One Health depends on measured outcomes to secure future investment. We conducted a systematic review of One Health literature to analyze how interventions were evaluated and the nature of the outcomes reported.

Methods: We searched Scopus, PubMed and Web of Science using the term ('One Health'), restricting publication date from year 2003 (based on the formal introduction of the term) until May 26, 2015, when the literature review was first initiated. Articles were categorized based on title, as 'Topical'—whether One Health was referred to as a concept: the interdisciplinary integration of animal health, human health and ecosystem well-being, 'Non-Topical', or in a language other than English. We reviewed abstracts of 'Topical' references; those that cited a One Health approach were included in the full-text review upon which articles were screened for topic, and if any, metrics reported. Articles were excluded if they did not specifically provide a case study of an approach or if the full-text could not be located.

Findings: A total of 3858 articles were found resulting in 1839 unique papers; of these we categorized 808 as 'Topical'. Out of the 103 articles included for full-text review, 47 articles referenced specific a One Health intervention. 21 of these articles evaluated the approach, of which 8 used quantitative metrics (such as DALYs, cost savings, livestock productivity) to report outcomes. The majority of articles referenced the effectiveness of One Health approaches without citing measured outcomes.

Interpretation: Our search terms may have limited the inclusion of interventions termed as 'Ecohealth' or programs that fit the One Health concept, but our findings suggest evaluation of One Health programs is not yet widely employed. Building on attention from stakeholders across the One Health interface, evaluation can shift the paradigm beyond ad hoc operationalization to more a sustained and systematic execution of One Health. Demonstrating outcomes and allowing for comparison across interventions can inform stakeholder investment, shape how priorities are set, and resources allocated.

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Implementing climate change and health into pre-service nursing education

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Program Purpose: In April 2015, 30 leaders of U.S. medical, nursing and public health schools met at the White House and pledged to train the next generation of healthcare professionals to address the health effects of climate change. The University of Michigan School of Nursing was one of the signers this pledge. Our aim is to insert innovative and impactful education about climate change and health into the existing nursing curriculum.

Structure: The desired outcome is that all nursing students at the University of Michigan will receive education about the health effects of climate change in each year of their education.

Outcome and Evaluation: We reviewed the current curriculum to determine which courses would be the best fit for climate change and health education, where we noted that a freshman and a senior course had the most relevant course content. We incorporated short but relevant teaching points about climate change into these selected didactic and clinical courses. Within the first semester of implementation, all freshman nursing students and half of the senior class received one or more lectures on climate change and health.

Additionally, we piloted climate change and health as the focus for a senior-level community health course. Topics addressed in this course included climate science, effects of climate change on food systems, environmental health issues and climate change within the social determinants of health. Students worked with a non-profit that addresses climate change in Detroit, collaborating on the development of fact sheets targeted towards community members about health issues related to climate change, specifically on mold due to flooding and on heat emergencies.

Faculty development activities were also conducted. All faculty received information about climate science and health, curriculum insertion points, and resources for teaching climate change.

Going Forward: Our goals are to collect pre and post education data, as well as to develop metrics that measure climate change and health knowledge. As frontline providers for illnesses and injuries stemming from climate change, nurses must be prepared to address these increasingly common health concerns. Climate health education is relevant for nursing education globally.

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Contributions of relationships to retroviral spillover risk and transmission potential in human networks in western Uganda

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Background: Although simplified representations of reality, network models in social, ecological, engineering, and medical fields have led to a number of important discoveries about the processes that underlie relational structures. In infectious disease research, networks have increasingly been applied to investigate the structure and dynamics of the relationships underlying these complex phenomena. This study uses multiple tools from social network analysis to explore the roles that social relationships play in contact events between humans and non-human primates, contact events within human populations, human retroviral infection status, and the potential transmission of infections across communities in western Uganda.

Methods: We collected survey and retroviral infection data from 720 individuals living in small agrarian communities near the forests of Kibale National Park in western Uganda from 2013 to 2014. From this data, we analyze: 1) the types of social characteristics and network properties that are predictive of human contact with non-human primates, 2) the types of social characteristics and network properties that predict human infection with retroviruses

from non-human primates, and 3) the types of social characteristics and network structures that lead to human infection with HIV.

Findings: As forest cover has diminished, human and non-human primate communities have greater resource overlap and experience frequent inter-species contact events. Additionally, individuals in these communities are at a high risk for HIV infection. Both HIV infection and social network data provide an appropriate template for how a novel zoonotic infection with similar human-to-human transmission patterns as HIV would spread throughout these communities. In addition to baseline data on HIV infection status for each individual in this study, each individual was re-surveyed and re-tested 1-2 years following the baseline study to understand the rate of sero-conversion as well as the temporal nature of networks in these communities.

Interpretation: Analyzing the networks that link individuals is not only important for assessing the risk of infection with human and simian retroviruses, but is also necessary for understanding and preparing for future potential transmission scenarios of emerging retroviral infections in communities like the ones studied in rural western Uganda.

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Evaluation of short-term education programs in rural southern Ethiopia

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Program/Project Purpose: Many global health trips attempt various methods of population education in an effort to eliminate health disparities with uncertain knowledge of overall efficacy. Our team set out to create an educational project focused on one specific issue that would be evaluated for long term effectiveness in order to have a better understanding of the success of our project. Our purpose was as follows: The high incidence of preventable illnesses in rural Ethiopia can be effected by student-run, short term, focused education programs. The educational team worked with community leaders and used local resources to create a sustainable education program for the community.

Structure/Method/Design: A one-week education program was enacted by UTHSCSA students in June 2015 focusing on the prevention and transmission of Trachoma. The populations included in the program were 30 members of an established "Women's Group" in the community, as well as 98 students in the 2nd, 3rd, and 4th grade at Common River (our community site). Before the program, a pre-test was administered to participants to evaluate the baseline knowledge of this preventable illness. Once the program was completed, a post-test was administered to evaluate changes in knowledge, and thereby the effectiveness of the program. All patients seen in the concurrent clinic were screened for Trachoma to help to track data on the disease in that community in future years.