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Communicable Diseases as Occupational Hazards for Agricultural Workers: Using Experience Sampling Methods for Promoting Public Health

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Vector-borne communicable diseases cause more than 700,000 deaths annually (World Health Organization, 2019). Despite various efforts, there has been no change in mortality rates due to communicable diseases worldwide (World Health Organization, 2019). Most communicable diseases have no cure and can attain epidemic status quickly. Therefore, prevention is critical in reducing disease transmission. Communicable disease transmission as an occupational health hazard is often ignored in work psychology research and public health policy. Using experience sampling methods, Saxena (2015) found that work and nonwork behaviors associated with rice farming in South Asia increase exposure to Japanese encephalitis. Owing to the extreme urgency in reducing the spread of communicable disease, this policy brief uses Saxena's (2015) findings to provide intervention recommendations for communicable disease control in line with the United Nations' Sustainable Development Goals 3, 8, and 17. Overall, the brief creates a call to action for health organizations to consider work-related occupational hazards in policies for disease control, and for labor and work and organizational bodies to expand research and practice to incorporate public health phenomenon in psychological research.

Impact and Implications

Saxena (2015) found that agricultural work may pose an occupational health hazard for workers in poverty by exposing individuals to communicable diseases. This article provides recommendations for reducing the risk for contracting Japanese encephalitis in poor agricultural workers aligned with United Nations' Sustainable Development Goals 3 (Good Health and Well-Being), 8 (Decent Work and Economic Growth), and 17 (Partnerships; Government, Work Psychology, and Health).

Keywords:

public health, workers in poverty, experience sampling methods, United Nations' Sustainable Development Goals, industrial–organizational psychology

Work-related occupational hazards such as in mining, construction, and chemical laboratories have received much attention from occupational health psychologists and policymakers. However, the role of work behavior in disease transmission is not well understood. This is problematic, given communicable diseases rank in the top 10 causes of death worldwide (World Health Organization [WHO], 2018). Vector-borne diseases account for 20% of all communicable diseases, with the highest burden in the poorest populations (WHO, 2019). Vectors are living hosts (e.g., mosquitoes) that transmit disease through virus and bacteria between humans and animals through biting activity (Centers for Disease Control and Prevention, 2018). Vector-borne communicable diseases, such as malaria, dengue, and chikungunya, account for serious loss of life and functionality for individuals and communities that are affected, often assuming large-scale epidemic status, as witnessed in the recent Ebola epidemic in Africa and the global spread of COVID-19. Unfortunately, the worst hit of such epidemics is borne by those who live and work in poverty.

There is no cure for the majority of communicable diseases; therefore, *prevention via reducing disease transmission is critical*. There is an immediate and urgent global need to provide holistic evidence-based solutions for reducing communicable disease transmission.

Using psychological research methods adapted to suit unique research settings, Saxena (2015) uncovered occupationally driven work behaviors and culturally driven non-work activities that predispose agricultural workers to a deadly vector-borne communicable disease and increase the risk of Japanese encephalitis (JE), highly endemic to rice-farming regions of South Asia and spread through mosquito bites. One in four cases of JE are fatal, and permanent neurologic or psychiatric sequelae can occur in up to 50% of those infected. These statistics are especially concerning owing to the absence of curative treatment for this disease.

As a follow-up to the study, this policy brief provides direct-action recommendations aligned with the United Nations' Sustainable Development Goals (SDGs) of health and well-being, decent work, and partnerships for the goals. By encouraging collaboration between health and labor organizations (SDG 17), we commend active interventions for using work psychology in policy development for disease control (SDG 3) and expanding research in work psychology to consider public health hazards as deterrents to decent work (SDG 8).

Method

Saxena (2015) integrated industrial–organizational psychology research methods to better understand disease epidemiology. To capture the field workers' lived experiences, the experience sampling method¹ was adapted to the local eco-cultural

¹ The reader is referred to Saxena (2015) for a detailed explanation of the experience sampling method and its use in rural settings.

milieu so as to examine behaviors that increase transmission of JE in rural, agricultural districts in India. This allowed for capturing real-time data that are of a transient and dynamic nature, as it unfolded in situ, in ecologically valid settings. Data were collected in the summer months when the risk of disease transmission is highest.

The dominant occupation of the region is rice farming, employing large numbers of agricultural workers and farmers who work in irrigated rice and paddy fields in nonorganizational settings, often, often in poverty. The guiding research objective was to identify behaviors that exposed rural farmers to JE transmission. Multiple dense daily assessments that overlapped with the disease life cycle gauged participant behaviors that increased disease exposure along with accompanying thought processes. Data were collected in the local language over the course of five 24-hr cycles. This research design was advantageous in providing flexibility to uncover subjective experiences and thought processes. The data were then translated according to protocols of cross-cultural research and analyzed to reveal insights.

Results

Findings suggest that work-related behaviors and aspects of daily life were putting the population at an increased risk of becoming infected with JE. Critical findings are presented in the following text.

Working Time and Shift-Work

Working hours in the rice fields (early morning and dusk) correspond with feeding activity of the disease-carrying mosquito, thereby exposing farmers and agricultural workers to peak mosquito feeding activity.

Proximity to Rice Fields

Workers reside close to rice fields that allow the perpetuation of the disease life cycle owing to the presence of other animal and bird species that act as host. The large mosquito population and exposure during working hours increase disease threat to workers and their families.

Insufficient and Ineffective Use of Protective Equipment

Insufficient numbers of mosquito bed nets per household and inconsistent use of protection by rotating bed nets among family members on different nights of the week expose everyone in the family unit to infectious mosquito bites.

Nonwork Activities

The following activities were conducted during peak biting times of the JE vector.

Baithaks. *Baithaks* are a traditional cultural activity where village members meet with community elders. These serve important social functions including psychological

detachment from work and are held outdoors every night. While adults have meaningful social interactions in the *baithaks*, children play outdoors.

Toilets. It was found that individuals use outdoor toilets at dawn.

Conclusion

Most disease control programs rely on vector control program surveys that focus on conformity to the rule of bed net use at night to prevent mosquito bites. Saxena (2015) found that bed net implementation may not be enough to solve this epidemic. Daily work and nonwork activities for agricultural workers and their families coincide with mosquito feeding cycles. This was revealed through experience sampling that allowed capturing and tracking behavioral episodes as they occurred in real time.

Recommendations

A key first step entails identification of communicable diseases as occupational hazards associated with work. This will lead to a dual synergistic outcome in policy making. For health organizations, there is an urgent need to consider work and life activities before implementing standardized policies. Labor and work psychology organizations should broaden the horizon of occupational safety hazards to include communicable diseases. This will lead to a dual synergistic outcome in policy making as called upon by SDG 17. Following is the call to action.

Prepolicy Work

Disease control task forces should consider on-the-ground grassroots reality before policy toolkit creation and implementation.

- Policymakers should work in interdisciplinary teams to collect ground-level data. An amalgamation of multiple disciplines can ensure important information is not lost in translation. Based on the findings, fruitful collaborations with psychological scientists can yield meaningful, broad-ranging information.
- Agencies should include the voice of the worker and embed intervention plans within the local cultural milieu. Failure to do this may lead to lack of acceptance by the local population and failed intervention programs.
- Solutions should not aim to change local culture and associated norms. Instead, the focus should be on aligning policymakers' schemas to the target populations' worldview.

Education Programs

These programs should be participatory, allowing community members to voice their concerns and questions. These should encourage individuals to evaluate ongoing behaviors that put them at risk of being bitten by disease agents and self-develop alternatives to avoid peak biting times and/or take extra precautions.

- Education programs for vulnerable working populations, especially in occupations/regions that carry the burden of communicable diseases should be designed to increase awareness and provide preventative methods to reduce disease transmission.
- Education programs for children and families may be mandatory and/or voluntary. Mandatory programs would integrate disease awareness education into the academic curriculum of affected regions. Voluntary programs could be held after school hours to encourage families to attend. These programs should focus on the disease ecology and preventative measures. Both programs should raise awareness of the severity of the disease. Particular emphasis must be placed on the use of protective equipment and mosquito repellent creams before and after sunset.

Preventative Measures

- Village elders and community leaders should be made a key part of intervention programs by actively distributing and encouraging liberal bodily application of repellent creams to all members of baithaks and to children before the beginning of the evening activities.
- Preventive strategies should be aligned with peak vector activity based on an understanding of communicable disease epidemiology. For instance, as illustrated by Saxena (2015), JE attains epidemic status during the summer; therefore, extra precaution must be especially implemented in the summer and rainy preharvest periods.
- Governments and health care bodies must provide free and abundant access to protective equipment such as long-sleeved clothing, boots, and ample mosquito repellent creams, to farmers and agricultural workers in the informal economy. Adequate numbers of bed nets must be provided in line with the number of members in each household. When delivering preventative tools, health care professionals should guide local villagers on proper usage and the importance of daily, frequent use.

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