POVERTY AS A PREDISPOSING FACTOR OF ILLNESS TENDENCIES IN SUGAR CANE WORKERS[1]

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This exploratory research based on the Social Ecological Theory aimed to study the health promotion of 39 people working in the harvest of the sugarcane in São Paulo, Brazil. The objectives were to identify the individual, social and environmental factors predisposing the workers to illnesses. The data were collected through direct observation of the labor activity and a questionnaire. The main individual determinant factors were physical effort and hectic work rhythm, and among the environmental factors, intense solar radiation, dust, soot and the presence of venomous animals were highlighted. The conditions of life and work reflect the poverty of these individuals and are the main social determinants of illness. The interaction of these factors can cause respiratory, cutaneous, musculoskeletal problems, occupational accidents. Thus, eradicating poverty and improving work conditions are fundamental for the health promotion of these workers.

DESCRIPTORS: working conditions; occupational health; poverty; rural workers

LA POBREZA COMO FACTOR DETERMINANTE DEL ADOLECER DE TRABAJADORES DEL CORTE DE LA CAÑA DE AZÚCAR

Investigación exploratoria, estructurada en la Teoría Social Ecológica, para el estudio de la promoción de la salud en 39 trabajadores del corte de la caña de azúcar de una cultura del Estado de São Paulo-Brasil. El objetivo fue identificar los factores individuales, sociales y ambientales del adolecer de los trabajadores. La recolecta de datos fue realizada mediante observación directa de la actividad y del trabajo y un cuestionario. Los principales determinantes individuales del adolecer de los trabajadores fueron el ritmo físico acelerado y esfuerzo en el trabajo; entre determinantes del ambiente fue el calor intenso, la polvareda y la presencia de animales ponzoñosos; las condiciones de vida y de trabajo reflejan la pobreza de estos individuos, el principal determinativo del adolecer de los trabajadores. La interacción entre estos factores puede causar enfermedades respiratorias, cutáneas, osteomusculares y accidentes laborales. Así, suprimir la pobreza y mejorar las condiciones del trabajo son básicos para la promoción de la salud de estos trabajadores.

DESCRIPTORES: condiciones de trabajo; salud laboral; pobreza; trabajadores rurales

A POBREZA COMO FATOR PREDISPONENTE AO ADOECIMENTO DE TRABALHADORES DO CORTE DA CANA-DE-AÇÚCAR

Pesquisa exploratória, estruturada na Teoria Social Ecológica para o estudo da promoção da saúde de 39 trabalhadores, atuantes no corte da cana-de-açúcar de usina do interior do Estado de São Paulo-Brasil. Objetivou identificar fatores individuais, sociais e ambientais predisponentes ao adoecimento desses trabalhadores. Os dados foram coletados por meio de observação direta da atividade laboral e de questionário. Os principais determinantes individuais do adoecimento dos trabalhadores foram esforços físicos e acelerado ritmo de trabalho; entre os determinantes ambientais, destacaram-se calor intenso, poeira, fuligem e presença de animais peçonhentos; as condições de vida e trabalho refletem a pobreza desses indivíduos, principal determinante social do seu adoecimento. A interação desses fatores pode ocasionar o aparecimento de doenças respiratórias, cutâneas, osteomusculares e acidentes de trabalho. Assim, erradicar a pobreza e melhorar as condições de trabalho são fundamentais para a promoção da saúde desses trabalhadores.

DESCRITORES: condições de trabalho; saúde ocupacional; pobreza; trabalhadores rurais

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INTRODUCTION

Mainly after the 1970's, sugar cane became one of Brazil's main agricultural products. Today, it is responsible for about 3.5% of the country's Gross Domestic Product (GDP) and US$ 8 billion in exports[1]. Nowadays, the sugar-alcohol sector employs more than one million people. Brazil is the largest sugar cane producer in the world and the State of São Paulo is responsible for 60% of Brazilian production, with 55% of the product being transformed into alcohol and 45% into sugar[1].

In recent years, the world has looked at ethanol extracted from sugar cane, due to the need to seek alternative fuel sources, considering the uncertainty of future oil availability and issues involved in environmental warming. Thus, Brazil has worked to improve the production techniques of ethanol, used as fuel for vehicles and machines and mainly exported to the United States [1]. These facts turn Brazil into a potential supplier of these products and put the country into an economically favorable position for multinational investments, which would result in economic development.

What alcohol production is concerned, although it offers economic development to Brazil, the world needs to be informed about the nature of sugar cane harvesters' work: poor people who are exposed to different health risk situations, which have made them victims of occupational diseases.

Sugar cane harvesting occurs in high temperatures, due to the hot climate during the harvesting period, with temperatures ranging from 23 to 36°C; there is dust and soot from the soil, from cane burns and from poisonous animals; cutting instruments are used, which can cause occupational accidents; workdays are long, breaks are insufficient, the work rhythm and physical effort are intense and wages are low[2] - about R$0.30 (US$0.15) per meter of harvested cane, equivalent to a monthly salary of R$750 (US$375), that is, two minimum wages.

Most workers are poor, live in houses that often lack basic sanitation and tap water, with a total lack of hygiene. Their nutritional standard does not attend to individual organic needs. They receive merely curative medical care through the public health system. The harvesters do not have any leisure possibility whatsoever and their education level is low[2].

Poverty is considered as one of the factors determining a population's health, which is why it is an important focus of attention for the World Health Organization. Due to the intrinsic relation between poverty and health conditions, the WHO organized a global meeting in New York in the year 2000, during which the Millennium Declaration was elaborated. This document contains the main goals to reduce the global population's poverty levels and improve quality of life in this millennium: to eradicate extreme poverty and hunger, achieve universal basic education, promote gender equality and women's autonomy, reduce child mortality, improve maternal health, combat AIDS and other contagious diseases, guarantee environmental sustainability and establish a global partnership for development [3-4].

Poverty has five main dimensions, which reflect the privation of human abilities: human (privation of health, education); economic (income, means of life, decent work); political (rights, participation); sociocultural (dignity, social status) and protection (vulnerability, risks, lack of safety)[5].

Based on the premise that health and disease are processes determined by the interaction among different factors and intending to analyze sugar cane harvesters' health conditions, this research was carried out to find support in order to answer the following guiding questions:

- What individual, social and environmental factors can determine illnesses among workers involved in manual sugar cane harvesting?
- How have poverty and work conditions influenced these persons' illnesses?

OBJECTIVES

General

- To identify individual, social and environmental factors predisposing towards illnesses in manual sugar cane harvesters.

Specific

- To identify demographic data of workers involved in manual sugar cane harvesting;
- To identify environmental factors that can entail risks for the workers' health;
- To identify the social conditions of sugar cane harvesters;

CONCEPTUAL FRAMEWORK: THE SOCIAL ECOLOGICAL THEORY

According to the Social Ecological Theory[6-7], an individual's state of health and well-being are determined by the interaction among individual, social and environmental factors. Social Ecology is considered as a model or set of theoretical principles to understand the interrelations among different individual and environmental factors in a person's health and disease[7]. The ecological perspective in behavioral sciences and in Public Health focuses on the nature of individuals' action with their physical and sociocultural means [6-7].

The main premises of the Social Ecological Theory are[6]: people's well-being is influenced by multiple factors from the physical and social environment; health and health promotion analysis should focus on the multidimensional and complex nature of human environments; Just like environments can be described in terms of their complexity, the individuals inserted in these environments need to be studied in different spheres; the relations between individuals and environments are characterized by cycles of mutual influence and interdependence.

The most expressive applications of multidimensional interventions can be found in the documents *Healthy People 2000* and *Healthy People 2010*, elaborated by the North American government to determine objectives and action priorities in order to promote the health and improve the quality of life of North American citizens [8-9].

METHOD

This is an exploratory research, based on the hypothesis that the health-disease process is determined by the interaction among individual, social and environmental factors, the central premise of Social Ecological Theory[6-7] is used as one of the reference frameworks in the study of Health Promotion in different countries.

The study was developed at a sugar cane mill in the interior of the State of São Paulo-Brazil, which employs more than a thousand harvesters during the harvesting period, when the sugar cane is cut.

The study population consisted of 39 male and female manual sugar cane workers, who were randomly selected and agreed to voluntarily participate in the research, giving their written consent.

Procedures: data were collected in July and August 2006, using a questionnaire that was guided by open questions about demographic data and the workers' health and work conditions. Moreover, direct observation of the work environment and the workers' housing was carried out in three work shifts, using a preestablished script and a field diary for notes. After each work shift, the workers were followed to their houses, where their living conditions were observed.

Data were analyzed by identifying the main individual, social and environmental factors associated with these workers' illnesses. Data analysis aimed to understand what the main risks were for sugar cane workers' health. For the sake of this analysis, the Social Ecological Theory in Health Promotion[6-7] was used as the theoretical reference framework.

Ethical considerations: the study was approved by the Institutional Review Board at the University of São Paulo at Ribeirão Preto College of Nursing, a WHO Collaborating Centre for Nursing Research Development, and the directors of the sugar cane mill under analysis gave their consent. The standards determined in Resolution 196 about ethical standards for research involving human beings were complied with [10].

RESULTS

Individual Factors

Thirty-five of the 39 workers were men (89.7%) and four women (10.3%), between 18 and 60 years old, with 69.2% of the workers up to 30 years old and only 7.7% older than 45. What their civil status is concerned, 56.4% was married, 35.9% single, 5.1% lived with a partner and 2.6% separated. All workers denied performing any other professional activity. Most subjects (84.6%) were migrants from the Northeast of Brazil, while 15.4% came from the State of São Paulo. As to education level, 56.4% of the harvesters had up to four years of education, 38.5% between five and eight years and 5.1% up to 11 years.

The data showed that 71.8% had been working in sugar cane harvesting for less than six years, 12.8% between six and ten years, 7.7% between 11 and 15 years and 7.7% did not provide this information.

Information about work and health conditions

Most workers (89.7%) believed that manual harvesting could entail risks for their health. Moreover, 43.6% identified accident risks due to handling the knives used for cutting the cane and to exposure to poisonous animals. They also informed about the risk of developing respiratory problems because of contact with dust and soot from the burned sugar cane.

Other risks 23.1% of the workers appointed included physical overload and exhaustion related to the great physical effort made during the harvest, due to the intense work rhythm. Furthermore, 17.9% of the workers identified risks of bone-muscle problems.

What accident occurrence is concerned, 33.3% of the workers mentioned they had already been victims of accidents while harvesting sugar cane by handling the knives, causing cuts in the higher and lower limbs (mainly hands, legs and feet).

When asked about the quantity of cane harvested per day, 28.2% of the workers indicated cutting up to eight ton; 46.1% up to fourteen ton and 10.2% up to twenty ton per day; 15.4% said that they did not know how much cane they harvested during each work shift. The quantity ranged from six to twenty ton per day among male and from seven to ten ton per day among female workers.

As to the presence of health problems, most workers (94.8%) denied having any health problem; only one worker (2.6%) mentioned depression and another (2.6%) chronic pain in a right upper limb.

About their physical and psychological fatigue, 74.4% of the workers indicated that their body felt tired and painful at the end of the shift, while 17.9% informed about concern or mental fatigue.

All harvesters mentioned three meals per day: breakfast, lunch and dinner. It was observed that the mill serves breakfast (one 200-ml cup of milk and coffee and one 50-g bun with margarine) during transport to the fields, around 6 a.m. While observing the work day, it was found that lunch, served between 10:30 and 11:30 a.m., included beans, rice, pasta and cassava flour. For dinner, all workers indicated that they routinely consumed the same items as they had for lunch.

Environmental Factors

Environmental factors were identified by observing the work place and from information the workers provided.

During the regional harvesting period (from April to November), the workers involved in sugar cane harvesting face different climatic conditions, being exposed to high temperatures (up to 36°C), intense sunrays, humidity, rain, wind, dust caused by the harvest and soot from the burns carried out before the manual harvest.

Other environmental risks include residues of pesticides used in sugar cane planting and the presence of poisonous animals on the fields, mainly snakes.

Social Factors

The harvesters start work at 7 a.m. and finish at 3:20 p.m., with one day off for every five work days. When they arrive on the field, each worker receives a piece of land called "eito"; the size of each "eito" is between 100 and 150 meters, with five "streets", representing the lines on which the sugar cane is planted, in order to facilitate the harvest.

While observing harvest, it was found that the workers bend their spine, at an angle of less than 90 degrees towards their lower limbs; with one hand, they hold a piece of cane and, with the other, they use the knife and cut the plant. Next, the harvesters pick up the piece and carry it to a pile. These piles are transported by trucks to the mill, where alcohol or sugar is produced.

To protect themselves from the sun, dust and soot, all harvesters used a hat; scarves on their face; two long-sleeve shirts, one on top of the other; and long trousers, besides individual protection equipment (IPE): glasses, gloves, leg protection and leather boots.

With respect to their remuneration, sugar cane harvesters receive as they produce, that is, according to how many meters they cut per day. The mean amount paid per meter of harvested sugar cane was R$ 0.30, equivalent to US$0.15.

What their housing conditions and access to health services is concerned, it was observed that the workers live in small cities near the fields and that all houses were in asphalted neighborhoods in the city center. The houses were simple brick constructions with tap water and treated sewage. Some houses had washable floors, rooms with individual beds, a bathroom with a toilet and shower, a kitchen with a fridge and stove and a living room. In total, between eight and tem single male workers lived in each house.

It was evidenced that, when the workers build a family, they are obliged to leave these houses and move to smaller ones in less appropriate conditions for survival, as they were located in places without asphalt, where different houses are built very close to one another, without walls to separate the family spaces. These constructions do not offer any privacy and constitute population agglomerates without the slightest conditions of hygiene; a large amount of accumulated garbage was found in these areas, open garbage cans at the doors of many houses, countless insects and dirty clothes thrown around, mixed with dirt and soil.

The mill does not offer any program to prevent occupational diseases or follow the employees' families and a private medical insurance is only offered to administrative workers; the harvesters used public health services and all of them mentioned they sought medical care in case of a health problem only, without any kind of health promotion care.

DISCUSSION

These results demonstrate the existence of different individual, social and environmental factors predisposing towards illness among manual sugar cane harvesting workers in Brazil. Poverty is a relevant factor in this context.

It was found that the workers are exposed to various health risk situations, which represent a work burdens manifested in biomental exhaustion patterns [11], categorized as: physical burdens (sunrays, rain, extreme temperatures); chemical burdens (dust, soot, pesticide residues); biological burdens (inoculation of infectious microorganisms through stings and bites from poisonous animals); mechanical burdens (accidents mainly caused by handling work instruments); physiological burdens (extreme physical effort, incorrect postures, sudden and repetitive body movements); mental burdens (frenetic work rhythm, constant attention and concentration, monotony, repetitiveness, threat of unemployment)[2,12].

The physical, chemical, biological and mechanical burdens represent environmental factors, related with the emergence of different health problems affecting sugar cane harvesters, such as respiratory and cutaneous diseases, upper and lower limb injuries and the occurrence of countless symptoms, such as fatigue, feeling bad, increased blood pressure and heart frequency [2,12].

The physiological and mental burdens, in turn, represent individual factors associated with the occurrence of occupational accidents, leading to various kinds of injuries and disabilities. Moreover, the set of sudden and repetitive body movements, the constant physical effort and intense work rhythm required in the sugar cane harvest determine these workers' physical exhaustion and the appearance o bone-muscle problems, such as pain, acute and chronic lesions in the upper limbs and back region and extreme physical and mental tiredness [2,12].

Based on the demographic data, it was identified that the workers' education level is low. Most of them are migrants from the Northeast and young. They may cut up to 20 ton per day and their diet is inappropriate, rich in carbohydrates and poor in proteins and fibers, insufficient for the large amount of energy they spend due to their work.

The harvesters do not respect the limits of their own body in their work, intensifying their work rhythm in the attempt to gain more money and as a way of guaranteeing their job for subsequent harvests, leading to the degradation of their health and even to death caused by excessive work. This was the case for ten workers from mills in the State of São Paulo in 2005[13].

The inappropriate housing conditions, lack of hygiene, inadequate diet, different risk factors during work and low wages, health service access difficulties and absence of leisure represent social determinants of these workers' illnesses [14], factors that picture and characterize the poverty situation the workers from the sugar cane mill live in.

Poverty can determine the appearance of disease due to lack of basic sanitation and environmental hygiene in the places this population lives in, as well as alterations in the individuals' nutritional state, affecting their immunological state and facilitating infections and disease transmission[14-15]. Moreover, poverty reflects the existence of vulnerability, risks, lack of safety and privation of health, education, income, means of life, decent work, rights, participation, social status and mainly human dignity[5].

FINAL CONSIDERATIONS

The sugar cane harvesters' living and work conditions can lead to illnesses, due to individual, environmental and social factors. Thus, in order to

improve their living, health and work conditions, multidimensional interventions are needed, which represent proposals to modify the different determinants of their illnesses, with a view to actually promoting this population's health; isolated interventions, only focusing on individual factors or only looking at the improvement of environmental conditions or exclusively proposing social actions, cannot revert the situation these workers experience.

Hence, to promote the health of sugar cane workers, it is fundamental to elaborate and implement interventions that aim to minimize and eliminate the different factors that have determined illnesses in this population, mainly by adopting programs to improve these persons' work conditions and eradicate their poverty, which not only depends on local actions, but also on organizational, political, social, environmental and individual changes.

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