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Assessing prevalence of heat stress among the farm workers in Indo Gangetic Plain

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Abstract

Heat stress has become endemic in agricultural work. Farm workers who are potentially exposed to heat can face heat stress symptoms if they are not adequately protected. The workers especially complain about its impact while performing agricultural activities during March to June because intensity of heat during these months is high. Concerns about heat stress have become especially relevant with deteriorating climatic conditions. Worsening of health is more prominent because most of farm activities are carried out manually under direct heat exposure and even the lack of awareness among the farm workers regarding the health hazards and the un-availability of the protective methods. The combination of manual farm activities and heat exposure is a health, environmental and occupational issue, which need serious concern globally. The study was undertaken to find out the demographic profile of the farm workers and assessment of Heat stress via a checklist.

Keywords: Heat stress, farm workers, farm activities

Introduction

India is primarily an agrarian economy as farming is one of the most important occupations in the country. It is generally perceived as a healthy outdoor occupation. However numbers of studies have classified farming as a risky and hazardous job because of the nature of farm work, farm workers are at particular higher risk of developing health problems. The drastic change in the world wide climate has created too much problems for the outdoor farm workers. Most of farm operations in India are still accomplished manually under direct heat of the sun. These factors, makes the farm operation quite dangerous for the farmers. Since the farm practices are time bound, farmers are compelled to perform the farm activities under the prevailing weather conditions. The exposure of farm workers to hot occupational environment remains a persistent impediment to improve productivity and problems affecting the health of the workers. As human body naturally maintain temperatures between 36 °C and 38 °C. When the body temperature rises above this range, the body will react to get rid of the excess heat. However, if the body continues to gain heat faster than it can get rid of it, the body temperature increases and the person experiences heat stress. Health problems that result from heat stress are known as heat disorders.

Heat disorders occur most often when heavy physical work is done in hot, humid environments and when the body consequently loses too much fluid and salt. The combination of heat stress, dehydration and physical activity impose challenge for physical adjustment, with potential risk of ensuring heat related injuries and disorders, e.g., heat cramp, heat exhaustion, heat syncope. A substantial amount of body water lost as sweat, including loss of fluid through respiration, gastrointestinal tract as well as kidney causes a matter of concern. Even the pre-existing medical conditions can significantly increase an individual's vulnerability to heat. Other important factors, such as the overall vulnerability of the population, the extent to which people have adapted and acclimated to higher temperatures, local climate and topography, can affect trends in "heat-related" deaths. Prevalence of the above factors is more common among the farm workers is due to the low level of awareness and lack of knowledge about heat exposure associated risks, often do not pay enough attention regarding hazards which obstructs them to take preventive and protective measure.

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Thus, in order to assess the demographic profile and heat stress among the farm workers, this investigation entitled "Assessing prevalence of heat stress among the farm workers in Indo Gangetic Plain" was planned keeping in mind the following objectives to be fulfilled:

- To assess the demographic profile of the respondents.
- Assessment of heat stress among farm workers via Heat Stress Assessment Checklist

Methodology

The present study was conducted in six villages of Jasra Block of Allahabad district of Uttar Pradesh which lies in Indo-Gangetic Plain. The geographical diversity of the state causes varied climatic conditions. The district has a tropical climate and average maximum temperature ranges between 43 °C – 45 °C which may go as high as 46 °C during peak summers. Being an agriculture-oriented district the major workforce depends upon agriculture and agricultural allied

activities with the total gross irrigated area of 392.142 hectares of land. A sample of 180 farm workers was selected via simple random sampling technique. Further, the sample was segregated into three age groups viz., 31-40 years, 41-50 years and above 50 years with 60 sample in each age category. The farm workers who were aged above 30 years were only included in the study having minimum five years of farm experience. Interview Schedule and Heat Stress Assessment Checklist was used to explore the data.

Result and Discussion

Demographic Profile of the Respondents

Assessment of demographic profile of respondents provides a platform for in depth study of specific objective. In present study, the socio economic status of respondents was studied with respect to various parameters namely- age, sex, occupation, income, educational qualification, type of family and number of members in the family.

Table 3.1: Demographic profile of the farm workers

Demographic Characteristics		31-40 Years (n=60)	41-50 Years (n=60)	51 and Above (n=60)	Total (N=180)
Sex	Male	27 (45)	25 (41.7)	26 (43.3)	78 (43.3)
	Female	33 (55)	35 (58.3)	34 (56.7)	102 (56.7)
Education	Illiterate	25 (41.7)	47 (78.3)	52 (86.7)	124 (68.9)
	Primary school	33 (55)	9 (15)	6 (10)	48 (26.6)
	Secondary School	2 (3.3)	4 (6.7)	2 (3.3)	8 (4.4)
Occupation	Farmers	28 (46.7)	34 (56.7)	42 (70)	104 (57.8)
	Contractual Farmers	32 (53.3)	26 (43.3)	18 (30)	76 (42.2)
Marital Status	Unmarried	5 (8.3)	3 (5)	-	8 (4.4)
	Married	51 (85)	50 (83.3)	47 (78.3)	147 (81.7)
	Widow/widower	4 (6.7)	7 (11.7)	13 (21.7)	25 (13.9)
Family Type	Nuclear	14 (23.3)	17 (28.3)	23 (38.3)	54 (30)
	Joint	42 (70)	28 (46.7)	27 (45)	97 (53.9)
	Extended	4 (6.7)	15 (25)	10 (16.7)	29 (16.1)
Family Composition	Up to 6 members	14 (23.3)	17 (28.3)	23 (38.3)	54 (30)
	7 to 10 members	42 (70)	28 (46.7)	27 (45)	97 (53.9)
	11 and above members	4 (6.7)	15 (25)	10 (16.7)	29 (16.1)
Monthly Family Income	Up to Rs. 5000/-	15 (25)	26 (43.3)	15 (25)	56 (31)
	Rs. 5,001/- to Rs. 10,000/-	14 (23.3)	23 (38.3)	12 (20)	49 (27.3)
	Rs. 10,001/- to Rs. 20,000/-	21 (35)	8 (13.3)	19 (31.7)	48 (26.7)
	Rs. 20,001/- and above	10 (16.7)	3 (5)	14 (23.3)	27 (15)
	Rented House	12 (20)	8 (13.3)	6 (10)	26 (14.4)
Type of House	Pakka	9 (15)	8 (13.3)	6 (10)	23 (12.7)
	Semi kachha	19 (31.7)	34 (56.7)	48 (80)	101 (56.1)
	Kachha	32 (53.3)	18 (30)	6 (10)	56 (31.1)
Total land holding	Up to 1.99 acre	38 (63.3)	45 (75)	48 (80)	131 (72.8)
	2 acre to 4 acre	17 (28.3)	15 (25)	8 (13.3)	40 (22.2)
	Above 4 acre	5 (8.3)	-	4 (6.7)	9 (5)
Total number of livestock	1 to 2	-	14 (23.3)	30 (50)	44 (24.4)
	2 to 4	37 (61.7)	27 (45)	12 (20)	76 (42.2)
	Above 4	23 (38.3)	19 (31.7)	18 (30)	60 (33.3)
Livestock Type	Cattels& buffalo	36 (60)	38 (63.3)	35 (58.3)	109 (60.6)
	Goats	18 (30)	20 (33.3)	6 (10)	44 (24.4)
	Poultry	6 (10)	2 (3.3)	19 (31.7)	27 (15)

The present study explored the demographic profile of the farm workers that out of total 180 farm workers 43.3 per cent of them were male and rest 56.7 per cent of farm workers were females. Mass of them were revealed as illiterate. In different age groups female farm workers were maximum (58.3 per cent in the age group of 41-50 years, followed by 56.7 per cent in the age category i.e. 51 years and above years whereas, male farm workers were maximum (45 per cent in the age group of 31-40 years. Out of total 180 farm workers only 4.4 per cent of the farm workers were in the category of secondary school, 26.6 per

cent of the farm workers were educated till primary school, while maximum that is 68.9 per cent of the farm workers were illiterate. More than half of the farm workers were having joint family. Further data related to their economic status, it was reported not very good because about 57.8 per cent of them were farmers and the rest 42.2 were contractual labourer.

Further majority of them were married with very few widow or unmarried. More than 80 per cent of the farm workers were married and very few numbers of them were found widow/ widower. Among farm workers in different age

groups i.e. 31-40 years, 41-50 years and 51 years and above majority were married (85%, 83.3% and 78.3 per cent respectively). About 35 per cent of the farm workers were having monthly income in between 10,000-20000 in the age group of 31-40 years. Further, in the age group of 41-50 years 43.3 per cent of them were having family income up to 5000, whereas in age group of above 50 years, majority (23.3 per cent) were having monthly family income more than 20001Rs. In the age group of 41-50 years 85.6 per cent of them were having own house and in age group of farm workers 90 per cent were having their own house. More than half (56.1 per cent) of the respondents were having semi kachha house, followed by 31.1 per cent with kachha house and the rest 12.8 per cent were having pucca house. The majority of the farm workers were having land holding up to 1.99 acres. More than 60 per cent of the farm workers in the age group of 31-40 years were having up to 1.99 acres of land. About 45 per cent were having 2-4 livestock's in the age group of 41-50 years. Further, 38.3 per cent of the farm workers in the age group of 31-40 years were having livestock's more than 4. Three fifth of the farm workers were having cattle's and buffalo while only 15 per cent were having hens (poultry).

Work profile of the farm workers

It was observed that 90 per cent of the whole population was performing the farm activities for more than 7 hours in a day. On comparing the data among different age groups it can be envisaged that only 30 per cent of the farm workers were performing farm activities for 4-6 hours in a day among age group (51 years and above). Working on farm for 4-6 hours was practiced specially among the farm workers people as they were unable to cope with the heat and amount of labor required, so they use to leave either early or generally use to skip in the evening time. The data regarding the rotation of farm activities was found common among all the three age groups while few of the farm workers use to skip the evening hours, because of being exhausted while working throughout the day. Bending and squatting posture were the two most commonly adopted postures among the farm workers.

Heat Stress Assessment Checklist

Farm workers engaged in manual works are at risk of suffering from heat stress while working on the farm fields especially in the summer days when the temperature and humidity are high. The heat stress assessment checklist comprises of risk factors such as temperature, humidity, air movement, workload, clothing and acclimatization.

Temperature

When the farm workers were inquired about their workplace location, it was revealed that cent per cent of the farm workers were accomplishing most of the farm activities outdoor. Further, on asking about their perception regarding the temperature of their workplace, 98.9 per cent reported that the temperature of their workplace exceed above tolerance level mostly. On comparing the data among different age groups it was found that only 3.3 per cent of the farm workers found that the temperature of their workplace is bearable in the age group 31-40 years, while in the remaining two age groups cent per cent of the farm workers found that the temperature of their workplace generally exceeds the tolerance level. Further, on enquiring about the

blowing air in their workplace it was found that 96.7 per cent in the age group above 50 years, 95 per cent in the age group 41-50 years and 83.3 per cent among the farm workers aged 31-40 years found that the air blowing in the surrounding are hot.

Relative Humidity

On inquiring the farm workers about the various risks associated with the relative humidity, it was found that 81.7 per cent found it a factor responsible for hindering their comfort level while working. On comparing the data among the age groups it was found that 85 per cent in the age group of above 50 years and 76.7 per cent in the age group of 41-50 years discovered that the relative humidity is cause of trouble for them while working outdoors. During the day when the humidity is high, cooling mechanism of the body becomes inefficient resulting in lack of evaporation from the skin surface resulting in moist skin. When the farm workers were asked about the above stated problem it was found that more than 85 per cent in all the three age groups reported for hindrance in normal sweating during high relative humidity.

Heat Radiation

On analysing the data regarding the heat radiation it was found that cent per cent in the age group worked under direct heat. When the farm workers were asked that, whether the farm field's radiate heat or not. It was found that 30 per cent in age group 31-40 years reported for it, and 86.7 per cent in the age group of above 50 years. The heat radiation was common while harvesting of wheat.

Air Movement

The air movement plays a significant role in lowering the elevated temperature of the body. Thus, in order to asses heat stress it is important to analyse the air movement in the workplace. The data regarding the wind movement reported that the 95 per cent of the farm workers found it a problem when blowing with high pace during the day time. When the farm workers were compared on the basis of age group it was found that more than 90 per cent in all the age group revealed that the natural wind blowing from 10 a.m. onwards throughout the day was very hot. On the whole it can be concluded that for majority of the questions the farm workers reported "Yes".

Conclusion

Thus, with the pace with which global average temperature is rising, there is a need for training and education for creating awareness among the farm workers in order to safeguard them so that they can have a quality life. Knowledge regarding use of improved agriculture equipment, safe work methods such as adoption of protective methods which could help in combating the problem of direct sunshine among the farm workers

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