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Impact of solar lighting gadgets on the task performance and quality of life of the hill families of Uttarakhand

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■ **ABSTRACT :** In Uttarakhand, there are dirt paths, stone steps and goat trails wind through the hills for several kilometers before reaching some villages from the road but no proper lighting system and safety system are available and if available with little number to manage activities related to household farm, livestock and income generating productive tasks. In such situation women have to work for cutting and carrying firewood from the forest and fetching of fodder and water during the night time also. In such harsh situation, they are really sufferer. This poor lighting and insufficient/ non-availability of light would lead to many accidents and injuries and reduce the working potential of people and consume more time and efforts. The present paper focus on the impact of introduced solar light lighting gadgets on the task performance and quality of life of the hill families of Uttarakhand. Solar lighting gadgets were introduced among fill families for 30 days and impact of solar lighting gadgets on performance of task and livelihood of the families was recorded. Paired t-test revealed that solar lighting gadgets had positive impact on the task performance and livelihood and health of the families.

■ **KEY WORDS:** Solar lighting gadgets, Hill families, Fetching of fodder, Fuel

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Light is the integral part of life. Rural people in hill areas are so poor that they cannot afford electricity which is provided by government. If they afford, it is not in sufficient amount because of high charges of electricity bill. People have to work whole day for their livelihood and manage their household, farm and livestock. But there is no proper lighting facility to manage these activities after evening when dusk descends. This would lead to many accidents and injuries during the households, farms and cattle shed management. There is no light in farms and cattle sheds which reduces the working potential of people and consumes more time and efforts. Almost all these households currently use kerosene lanterns or *dibri* (wick lamps) as a lighting source. These lamps because of their poor quality and inefficiency not only provide very dim and inefficient light and emit toxic smoke, hazardous to the health of children who are reading or women who are working, generally use these lamps, but also consume much of the family's income. They also have a negative impact upon people's health, education and security.

It was proposed to introduce solar lighting gadgets for hill families which may be helpful in safety and health management. Therefore, present paper focuses the impact of introduced solar light lighting gadgets on the task performance and quality of life of the hill families.

■ RESEARCH METHODS

A bench mark survey was carried out by investigators. The multi-stage, purposive-cum-random sampling techniques was used to select the study area *i.e.* state, districts, blocks, villages and families. From Uttarakhand state districts Almora and Nainital were selected purposively. Hawalbag block and Bhimtal block from districts Amora and Nanital, respectively were selected purposively. The unit of enquiry was family and the key informant was head of the family.

Total sample size comprised of 120 families selected randomly from the four villages which were selected purposively from the above blocks. The data were collected from two different phases, *i.e*. in phase-I descriptive data using interview schedule from the whole sample of 120 families. In phase –II, the experimental data were collected. Twelve families of low income group were taken for experimental data. In second phase solar lantern, solar torch and solar multifunctional light were distributed for 30 days to the families and impact of these solar gadgets had been assessed with the help of check list. All the responses received on the data sheet were categorized and analysed using both descriptive and the rational statistics including frequency, percentage, mean, standard deviation and t-test.

■ RESEARCH FINDINGS AND DISCUSSION

The results of the present study as well as relevant discussions have been presented under following sub heads:

Extent of comfort, ease and safety among families on task performance:

Extent of comfort, ease and safety among families on the task performance while performing different activities with both the lights *i.e.* existing light and solar energy gadgets in the absence of electric light is summarized in Table 1.

Extent of comfort, ease and safety for indoor activities:

Table 1 shows that while performing different indoor activities, during studying, cooking, stitching and other skilled activities, more than 80 per cent families reported that they were not comfortable with existing lighting. Further in the absence of electric light, more than 50 per cent families reported that it was not at all easy and comfortable to perform activities like dishwashing, pre-preparation and personal caring with existing light.

On the other hand, while performing activities with introduction of solar lighting gadgets, it was found that among 92 per cent families, study and concentration of the children increased and the task became more comfortable. Dishwashing and stitching activities were found to be comfortable, easy and safe among 75 per cent families. While performing the tasks, *i.e.* cooking, pre - preparation and personal caring, only 33.33 per cent felt the tasks, less comfortable and easy but rest of them felt more comfortable and easy while none of them reported that tasks were, not at all comfortable, easy and safe.

Extent of comfort, ease and safety for outdoor activities:

In the absence of electric light, while harvesting activity was carried out in light of solar gadgets which were distributed, 75 per cent felt that the task was more comfortable, ease and safe to perform. While feeding and caring livestock with introduced solar lighting gadgets about 83 per cent reported they had more comfort, ease and safety in feeding and livestock only 16.6 per cent found less comfort and ease. For fetching of fodder and fuel with the help of solar lighting gadgets, 66.6 per cent families reported having more comfort, ease and safety while only 8.33 per cent families reported having not at all ease and comfort. The reason might be that they did not have space to carry these gadgets while fetching on their head and their both hands were busy. During late evening while coming back from the market to home after transportation of vegetables/fruits/ milk/ milk products/ herbs/spices/condiments/cereals and pulses and carrying solar light along with them for the above activities, more than 80 per cent families found more ease and comfort only 16.6 per cent families reported that they

Table 1: Extent of comfort, ease and safety among families on task performance

Activities	Extent of comfort and ease					
	Existing light			Solar light		
	More	Less	Not at all	More	Less	Not at all
Indoor activities						
Cooking	-	2(16.6)	10(83.3)	8(66.66)	4(33.33)	-
Dishwashing	-	4(33.3)	8(66.66)	9(75.0)	3(25.0)	-
Pre preparation	-	5(41.6)	7(58.3)	8(66.66)	4(33.33)	-
Personal care	-	5(41.6)	7(58.3)	8(66.66)	4(33.33)	-
Studying	-	2(16.6)	10(83.3)	11(91.6)	1(8.33)	-
Stitching	-	2(16.6)	10(83.3)	9(75.0)	3(25.0)	
Outdoor activities						
Harvesting	-	7(58.3)	5(41.6)	9(75.0)	3(25.0)	-
Feeding and caring livestock	-	5(41.6)	7(58.3)	10(83.3)	2(16.6)	-
Fetching of fodder and fuel		0(0)	12(100)	8(66.6)	3(25.0)	1(8.3)
Transportation of vegetable/fruits/milk	-	4(33.3)	8(66.66)	10(83.3)	2(16.6)	-

*Figures in parentheses indicate the percentage value

had less comfort and ease (Table 1).

During the study, it was proposed that solar lighting gadgets improved the task performance of hill families. In order to see the impact of solar lighting gadgets on improved task performance, paired t test was applied on the mean score given by the families to working with existing light and solar light irrespective of different activities. The result has been summarized in Table 2.

It is evident from t- calculated value that there was significant difference in the mean score obtained by present lighting system and solar light at 5 per cent level. On the strength of these findings, the result was found to be significant and it was inferred that the solar lighting gadgets improved the performance of activities in inside and outside the house.

Impact of solar lighting gadgets on the livelihood of the families:

It is revealed from Table 3 that with the use of using solar lighting gadgets, 33.33 per cent families agreed that they could find leisure time in the night for performing other activities such as stitching, embroidering cleaning of pulse and millets and making *ghee* or *khoya* for which they could not found time during day. While all the families disagreed, with the facts that they found opportunity for leisure time in existing light and in the absence of electric light.

With the introduction of solar lighting gadgets, 83.3 per cent families agreed that they could reduce the kerosene

Table 2 : Impact of solar lighting gadgets on the task performance

Activities	Mean score		t- value
	Existing light	After introduction of solar light	
Indoor activities			
Cooking	1.16±1.5	2.66±2.4	9.94*
Dishwashing	1.33±0.24	2.5±0.27	5.63*
Pre preparation	1.41±0.26	2.66±0.24	5.74*
Personal care	1.5±0.27	2.66±0.24	5.63*
Studying	1.58±0.15	2.75±0.08	13.4*
Stitching	1.16±0.15	2.75±0.20	8.20*
Outdoor activities			
Harvesting	1.58±0.26	2.750.20	10.08*
Feeding / caring cattle and livestock	1.41±0.26	2.75±0.20	9.38*
fetching of fuel, fodder and water	1±0.0	2.16±0.33	7.0*
Transportation of vegetable/fruits/milk	1.33±0.24	2.83±0.15	7.70*

* indicate significance of value at P=0.05

Table 3: Extent of acceptance of positive facts of solar lighting gadgets

Important facts	Extent					
	Existing light			Solar light		
	Agree	Somewhat agree	Not at all agree	Agree	Somewhat agree	Not at all agree
Opportunity for leisure time	-	0(0)	12(100)	4(33.33)	8(66.66)	-
Reduction in kerosene consumption	-	3(25.0)	9(75.0)	10(83.3)	2(16.6)	-
Reduction in health problem	-	1(8.33)	11(91.66)	8(66.66)	4(33.33)	-
Reduction in accidents	-	4(33.33)	8(66.66)	10(83.3)	2(16.6)	-
Enhancement in productivity	-	2(16.6)	10(83.3)	5(41.6)	7(58.3)	-

Figure in parentheses indicate the percentage value

Table 4: Impact of solar lighting gadgets **on the task performance and health and livelihood**

Livelihood issues	Mean score		t- value
	Existing light	After introduction of solar light	
Opportunity for leisure time	1±0.0	2.33±0.24	9.38*
Reduction in kerosene consumption	1.25±0.20	2.83±0.15	10.65*
Reduction in health problem	1.08±0.08	2.66±0.24	10.65*
Reduction in accidents	1.30±0.23	2.69±0.23	9.85*
Enhancement in productivity	1.66±0.15	2.41±0.26	6.96*

* indicate significance of value at P=0.05

consumption as they provide sufficient lighting. About 66.66 per cent families agreed that after introduction of solar light there was reduction in health related problems. One of the reasons might be that solar light is safe and clean and does not emit toxins and any kind of pollutants which affect lungs and eyes. Data of Table 3 revealed that 83.3 per cent families agreed that solar light was more safe and helpful in reducing accidents due to its bright illumination and use of clean and safe energy. With the use of introduced solar lighting gadgets, 41.6 per cent families agreed that their productivity enhanced.

In order to see the impact of solar light on the health and livelihood, paired t test was applied on the mean score given by the families to existing light and solar light irrespective of different issues including enhancement in productivity, reduction in accidents, reduction in health problem, reduction in kerosene consumption and opportunity for leisure time in the absence of electricity.

It is evident from Table 4 that the t- calculated value, there was significant difference in the mean score obtained by present lighting system and solar light at 5 per cent level. On the strength of these findings, the result was found to be significant. It could be inferred that the solar lighting gadgets enhanced the livelihood of the families. Barki *et al.* (2008) Radhakrishana *et al*. (2010) have also made some contribution related to the present investigation.

Conclusion:

On the whole, it was found that for both indoor and outdoor activities, solar lighting gadgets had positive impact particularly in work performance of the families as the extent of comfort, ease and safety was found more as compared to performing in existing lighting condition. It was concluded that solar lighting gadgets were helpful in enhancing the livelihood opportunity as it provided extra leisure time which increases productivity. Kerosene consumption which was used for kerosene lamps generally led to many health problems such as breathing problem, headache, and eye related problem, but with use of solar lighting gadgets, safe and healthy environment was created which had direct impact on the health of people.

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