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Knowledge and practice on conservation of electricity for sustainable development-micro level assessment among graduate level students

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Abstract

Electricity is a most important part of our modern-life. Electricity is use in every sector like industries, residents, transportation, agriculture, health, education sector etc. Electricity became an indispensable part of modern society, supporting everything from basic daily needs to complex technological advancements. In terms of estimation of consumption of electric energy, domestic or residential sector plays a significant role.

Students being important population segment of society, are expected to have more concern about consumption and conservation of electric energy in day to day activities and contribute towards sustainable development. Considering this, present study was undertaken to understand students knowledge and practices towards energy saving strategies in day to day activities as part of sustainable development. The study was carried out in randomly selected three colleges of Jorhat district of Assam. By the proportional allocation method total 208 students were selected as respondents.

In order to access respondents' knowledge on energy conservation techniques and practices in day to day activities comparative knowledge index and practice index was obtained with estimation of obtained score over obtainable score. Findings revealed that respondents knowledge in terms of conservation techniques of electric energy in day to day activities almost in all aspect found very high but when it comes to application of same in everyday life except few practices there is a gap between knowledge and practice. There is still need to inculcate habit of utilizing their knowledge into practice towards conservation of electric energy for better future.

Keywords: Energy, electric energy, student, knowledge, practice

Introduction

Electric energy plays a crucial role in modern society, driving various aspects of our daily lives, industries and technological advancements. Today we cannot think of a world without it. Electricity became an indispensable part of modern society, supporting everything from basic daily needs to complex technological advancements. But electricity being an important source of energy is wasted the most by humans. There are many hidden ways of wasting precious electricity without realizing it. Forgetting to turn the lights off, leaving electric appliances plugged in even if not using, using incandescent bulbs, using dryer even in sunny days, running dishwasher when it's not full, stash warm leftovers in the fridge, holding refrigerator door open for long and many more. These wasteful practices have come with a severe cost, as widely use electricity in homes comes from the burning of fossil fuels such as oil or coal. These resources are limited and non-renewable; therefore, the greater the rate of use and the greater the amount of electricity generated, the faster it will run out. Moreover when fossil fuels (gas, coal, oil) are burned in power plants to produce electricity, greenhouse gas emissions are also produced. According to IPCC (Intergovernmental panel on Climate Change) since the mid 20th century, it is probable that the increase in anthropogenic greenhouse gas emissions is the primary contributor to the global average temperature rise, resulting in the warming of the Earth's surface. (Alradhi *et al.*, 2022) ^[1].

On the other side minor changes in our thinking and behaviour can bring major impact for our environment and contribute in sustainable development. Studies have also shown human behaviour has significantly affected the energy consumption. In a study it is revealed that behavioural changes of human can reduce residential energy consumption by about 7.4% (Delmas, 2013) ^[3]. In case of conservation of electric energy knowledge and practice of a person are closely related.

Because knowledge provides the foundation of understanding about facts, information, concepts, principles or theories for effective energy conservation and practice helps in repeated and purposeful engagement of knowledge in an activity i.e. applying the knowledge gained in real-world situation.

There is still a lack of systematic researches on knowledge and practices of college students in terms of conservation of electricity in day to day activities for both economic and environmental benefits. Students being important population segment of society are expected to have concern about consumption and conservation of electric energy and are more receptive to adopting sustainable behaviours. Present study is to understand knowledge and practices of students towards energy conservation strategies as part of sustainable development.

Materials and Methods

The present study was carried out in Jorhat district of Assam by following proportional allocation techniques. From the Jorhat District of Assam, four colleges were selected by Simple Random Sampling technique. By the proportional allocation method 5 percent students from each college were selected as the respondents for the present study. Thus, the sample size for the current study was 208 respondents.

Interview method was adopted to collect information from respondents for the present study. Various statements in terms of knowledge and practice related to electricity were featured in the interview schedule. Their responses were recorded as yes/no/not sure in terms of knowledge and yes/no/sometimes

in terms of practice. To compare the knowledge on energy conservation techniques with their practice in day to day life, respondents knowledge and practice index were analysed with mean value.

Results and Discussion

It was found important to understand personal and demographic characteristics of the respondents before analysing consumption and conservation practices of energy (electricity) because these characteristics can significantly influence individuals' behaviour, attitudes and practices related to energy use. The age of the respondents found that 52.8 percent of the respondent belonged to the age group of 20-22 and only 5.3 percent respondents belonged to the age group of 22-24 years. Majority of the respondents were found female i.e. 68.8 percent and 31.2 percent of the respondents found male. Table shows that 67.3 percent of respondents belongs to small family, having 2-4 no. of members in their family, respondents belong to large size family, having more than 7 members in their family was only 1.9 percent. It was found that highest percent of respondents i.e. 36.5 percent of the respondents belong to the family having farming as primary source of income, 29.8 percent having govt. job and 26.5 percent having business. The highest percent, i.e. 49.0 percent of the respondents' family monthly income falls in the category of less than Rs 20,000 and only 0.9 percent respondents come in the category of earning more than Rs 100,000 per month. In this category, families are mostly from group of govt employ and business.

Table 1: Distribution of respondents according to demographic profile

Characteristics	F	P	Characteristics	F	P
Age of the Respondents			Primary source of income of the family		
18-20	87	41.9	Govt. employee	62	29.8
20-22	110	52.8	Business	55	26.5
22-24	11	5.3	Farming	76	36.5
Gender			Other	15	7.2
Male	65	31.2	Monthly income of the family		
Female	143	68.8	Less than 20,000	102	49.0
Size of the family			Rs 20,001-Rs 50,000	87	41.9
Small family	140	67.3	Rs 50,001-Rs 1,00,000	17	8.2
Medium family	64	30.8	More than Rs 100,000	2	0.9
Large family	4	1.9			

Knowledge and practice often go hand in hand because they complement and reinforce each other in a powerful way. Knowledge without practice can remain theoretical and disconnected from real-world application, while practice without a foundation of knowledge can lead to shallow or ineffective actions. Similarly in case of conservation of electric energy knowledge is the foundation upon which the practice of conserving electric energy is built. For conservation of electric energy individual first need to understand the importance and techniques and practicing those techniques in day to day life by realizing their understanding. Responses of respondents in both aspects (i.e. knowledge and practice) were recorded in three categories. For knowledge it was yes/ not sure/no and for practices it was yes/ sometimes and no. To compare knowledge and practices of respondents knowledge index and practice index were made based on obtainable score of respondents and are presented in Table 2.

Data presented in the table 2 shows that application of knowledge into day to day practices in terms of conservation

of electricity was found 100 percent in case of turned off kitchen chimneys immediately after use and turned off decorative lights unless some occasion. Apart from these two a notable gap of application of knowledge into day to day practices was observed in terms of conservation practices of electricity like- adjusting the freezer temperature during summer and winter which helps to consume less electricity, cleaning the lamp and the lamp housing (armature) when it is dirty and dusty so that it do not obstruct light, checking the classroom before leaving and switch off electric appliances to save electricity, unplugging kitchen appliances when not required, keep excess hot water in hot flux instead of warming again for further consumption, switching off air-conditioner ½ hour before leaving the room to save electricity as atmosphere in the room will remain cool for the same time.

In case of practices like closing doors and windows before switch on the AC, not keeping switch on the charger point without charging mobile or laptop, putting off lights when sufficient light is available, not wasting electricity by switching on television and playing mobile simultaneously,

the knowledge score index was found to be almost equal to practice score index. This reveals that respondents were utilizing their knowledge into practice in the above mentioned electricity conservation measures. This showed that they are concerned about these measures for electricity conservation.

Overall table 2 revealed that respondent's knowledge in terms of conservation techniques of electric energy in day to day activities almost in all aspect found high but when it comes to application of same in everyday life except few there is a

notable gap. This may be because of their ignorance or unable to understand thoroughly the importance of conservation of electricity for the environment. It was understood during study that respondents were more concern about to reduce electricity bill of their homes by adopting certain conservation practices than for the betterment of environment. There is still need to inculcate habit of utilizing their knowledge into practice towards conservation of electric energy for better future.

Table 2: Distribution of Knowledge vs. Practice of electricity conservation among respondents n=208

Aspects	Knowledge index	Practice index
1. Keeping refrigerator door open for long time increase energy consumption	80.7	56.5
2. Close all doors and windows of the room before switch on the AC helps to save electricity	91.3	89.5
3. Adjusting the freezer temperature during summer and winter helps to consume less electricity	73.0	56.5
4. Frequent opening and closing of refrigerator door increase electricity consumption	78.0	71.4
5. Keeping switch on charger point without charging mobile or laptop consumes more electricity	82.6	80.6
6. Putting off lights when sufficient light is available in day time can save electricity	100.0	97.4
7. Switching on television and playing mobile simultaneously are wastage of electric energy	83.4	79.1
8. Clean the lamp and the lamp housing (armature) when it is dirty and dusty so that it do not obstruct light	77.8	43.5
9. Checking the classroom before leaving whether any appliances are switches on can help to save wastage of electricity	100.0	51.2
10. Switch on geyser without using it can consume electricity	68.4	65.3
11. Computer/laptop should be turn off if leaving the working space of more than 30 minutes helps to save electricity	93.9	90.7
12. Keep excess hot water in hot flux instead of warming again for further consumption can save electricity	92.3	55.1
13. Using light bulbs with higher wattages instead of using 3-4 lower wattage bulbs in a room can help in saving electricity	76.2	70.5
14. Switching off air-conditioner ½ hour before leaving the room helps in saving electricity as atmosphere in the room will remain cool for the same time	57.6	37.5
15. Kitchen chimneys should be turn off when not using to save electricity	100.0	100.0
16. Using zero watt bulb also consume electricity	81.4	79.4
17. Decorative light should be turn off when not using to save electricity	100.0	100.0
18. Running washing machine with fully loaded cloth can save electricity	89.1	80.7
19. Kitchen appliances should be unplugged when not required to save electricity	96.3	63.4
20. Turning on the water tap while brushing is wastage of water	91.0	71.7

Following are the graphical representation of comparing respondent's knowledge in terms of common conservation

practices and their actual implementation (practice) in day to day activities.

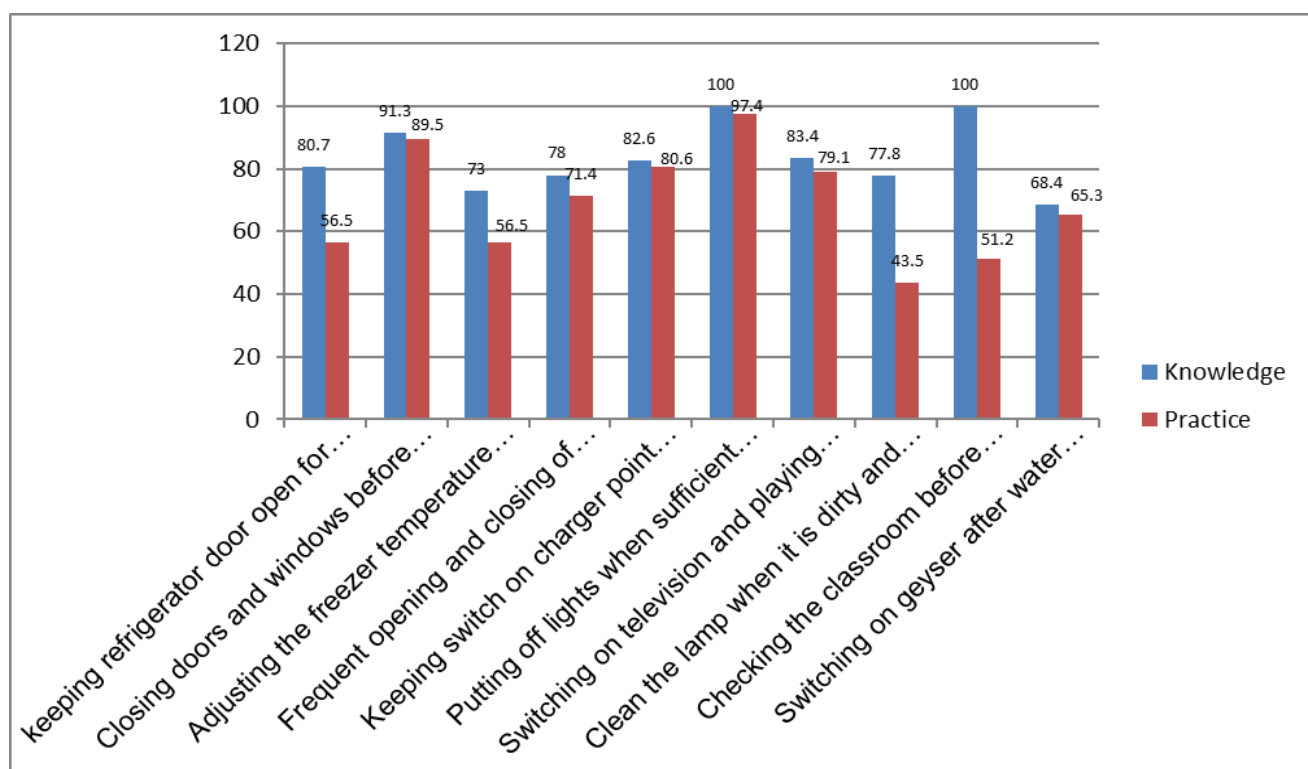


Fig 1: Diagrammatic representation of knowledge and practices index of respondents

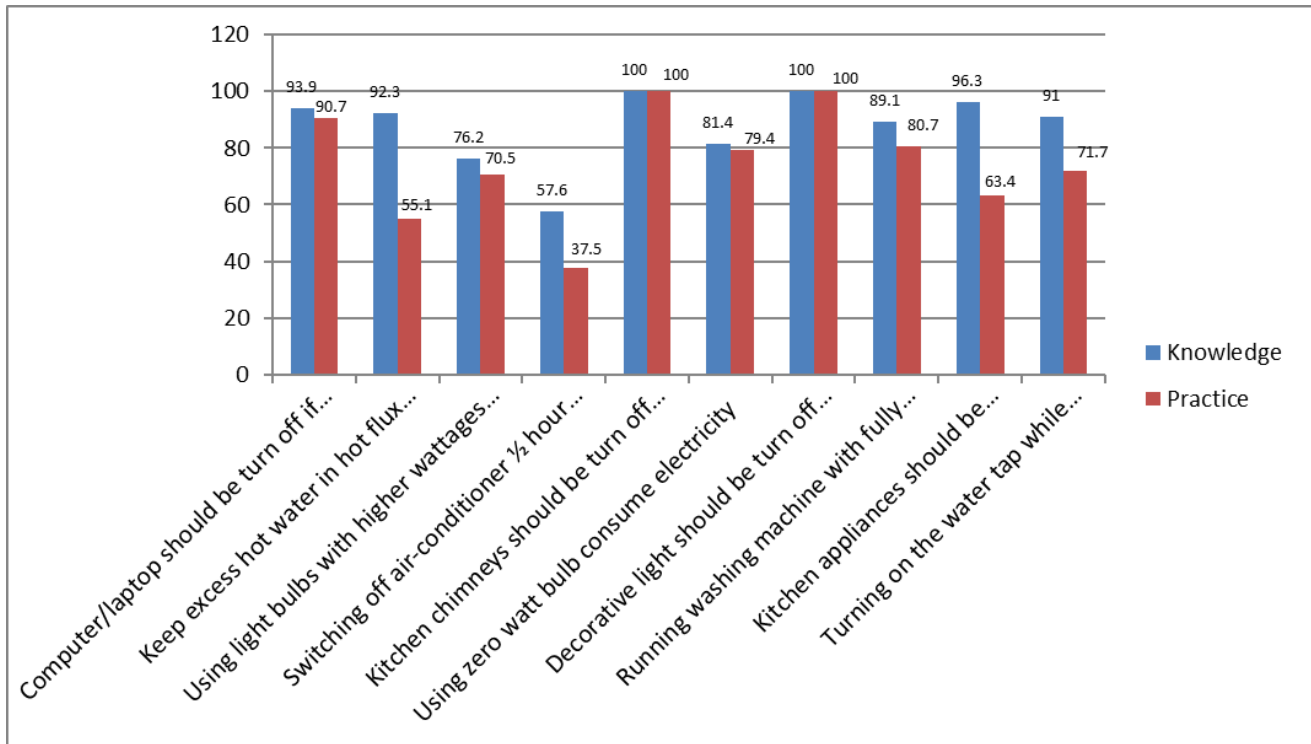


Fig 2: Diagrammatic representation of knowledge and practices index of respondents

Conclusion

Electricity is a clean and relatively safe form of energy when it is used, but the generation and transmission of electricity affects the environment. Nearly all types of electric power plants have an effect on the environment. Most mechanisms for generating electricity release carbon dioxide and other greenhouse gases - gases that absorb and emit radiation -into Earth's atmosphere. The generation of electricity has greatly increased the presence of greenhouse gases in the planet's atmosphere. Therefore conservation of electricity is important.

The respondents targeted in the study have good understanding about importance of energy conservation for betterment of their household in terms of reducing electricity bill as well as protecting environment. Application of their knowledge in day to day activities for conservation of electricity is remarkable in certain aspects. Not practicing some conservation techniques in spite of having knowledge is because of their ignorance.

It is expected that respondents understanding of importance of conservation of electric energy can bring significant impact for sustainable development in near future.

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