Research Paper

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An Ecological Footprint of Medical Faculties in BJ Medical College & Civil Hospital, Ahmedabad city, Gujarat, India

Medical Science

KEYWORDS : Carbon foot print, Eco foot print, Food footprint , Housing foot print, Medical Faculty

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ABSTRACT

Background: Ecological footprint measures human consumption of natural resources in comparison to Earth's ecological capacity to regenerate them. It represents the human impact on the Earth in a clear manner. Material & methods: This cross-sectional study was carried out among faculty members of BJ Medical College-Civil hospital-Ahmedabad during June-October 2011. Study Participants included 125 medical doctors of different departments of the college and hospital interviewed by pre-designed and a pre-tested questionnaire. Coded data were analyzed in Epi info version 3.5.1. Percentages have been presented. Results: Male:female ratio 56:44.Their carbon foot-print was poor because 88% of them didn't use share-based vehicles or public transport. Only 5.6% had solar devices at home. Housing-footprint was good as 100% of them used water-saving-techniques at home. Use of elevator (40.6%) was found common. 62.4% never used organic food. Goods & service foot-print was poor; only 13.6% didn't use plastic bags on daily basis. 23.2% never bothered about usage of mobile phones, 12.8% were not interested in tree-plantation.

Introduction

Ecological footprint measures human consumption of natural resources in comparison to Earth's ecological capacity to regenerate them. Using this assessment, it is possible to estimate how much of the Earth (or how many planet Earths) it would take to support humanity if everybody followed a given lifestyle. For 2007, humanity's total ecological footprint was estimated at 1.5 planet Earths; that is, humanity use resources 1.5 times as quickly as Earth can renew them. Every year, this number is recalculated through statistics and relevant research (1). Claude Martin, director-general of World Wildlife Fund International in Gland, Switzerland, says that at current rates of consumption, the human "ecological footprint" will reach twice the Earth's regenerative capacity by 2050. As its originators note, the Ecological footprint calculations have reinforced the view that if everyone enjoyed a North American standard of living then globally this would require three earths although finding two other planets would be difficult (2).

Calculating ecological footprints require complex calculations(3) Individually, each of us has a "footprint" which can be used as an indicator(4) because then only we can measure the impact of our lifestyle on our environment. It is also important to set a goal to change our lifestyle to sustain the resources available with us and for our future generations. Calculation of the footprint takes into account everything we do; the food we eat, the house we live in, the car we drive, paper we use, how many plants we grow and likewise.

Living in a healthy environment is one of the major determinants of preventive as well as curative medicine. But before advising anybody the benefits of healthy environment it is very important for a medical doctor to watch his or her environmental impacts.

Materials and Methods

The cross sectional study was carried out among faculty members of B.J.Medical College and Civil hospital Ahmedabad, Gujarat, India in June to October 2011. A total of 125 doctors were interviewed which included 17 professors, 16 associate professors, 56 assistant professors and 36 tutors. These interviews were conducted on a predesigned and a pretested questionnaire and checklist. The data was coded and entered in epi info version 3.5.1.

Results

A total of 125 Doctors were included in our study with male female ratio 56:44. Majority of the faculty hold the masters degree (69.6%) (Table 1). Among the surveyed group majority (88%) uses their personal vehicle to reach at service site. Very few uses car pooling (7.2%) or public transport (4%) for same purpose. To our surprise 28.8% prefer plane/cruise for vacation touring. But still 54.8% prefer to use train. At home faculty prefers tube light (66.4%) but only 27.2% uses CFL lights at their homes. Only 5.6% are using solar energy devices .to this contrast 76% of doctors have never heard of same. (Table 2).

Total 78.4% faculty believes in switching off electrical appliances when not in use. Solar heaters (6.4%) are not so popular for boiling the water during winters. Nearly 18.4% doctors prefer to use terrace or courtyard at night in summer. Liquidator (66.4%) is common mosquito repellant by them. In contrast to this only 15.2% uses bed net at night. 32% of doctors don't turn off their vehicle engine at traffic signal but 57.6% regularly go for PUC. On the good part 56.8% don't print any paper daily. Nearly 85% of doctors dispose their waste paper by giving it to local waste paper collector. 72% of them switch off their computer and laptops when not in use(Table 2)..

Half (50.4%) of the faculty members lives in flat of 3 BHK or more. Only 19.2% are having individual bungalows / row house. The preference for wooden furniture was there in 76% of cases but there are people who love old and antique furniture (16.8%). Majority of them (64%) prefer to change furniture when damaged. About water saving habits all of them uses bucket to take bath and 70.7% even prefer buckets to wash their car. At the good part 88.8% closes tap when not in use and nearly same (84.7%) run washing machine when fully loaded. To all above information total contrast was seen with only 3.2% of doctors fix the leaks immediately. Nearly one fourth of the doctors don't use elevators. (Table 3).

62.5% prefer to eat vegetarian diets. 11.2% of doctors go for organic food whenever possible while 62.4% had never ate organic food. Kitchen garden is not very popular among the doctors. (Table 4).

63.2% of doctors never see tags before purchasing any good. Surprisingly 86.4% of doctors still use plastic bags and among the users half of them give used plastic bags to local waste paper collector. (Table 5).

56% of faculty watch less than 1 hour television per day. Among doctors 56.8% don't play Holi but 6.4% play Holi with artificial colour,In Diwali 23.2% of the doctors enjoy burning crackers with lots of noise & smoke but 40.8% of doctors celebrate it,by lighting diyas & eating sweets. (Table 6).

Discussion

In 1970 the first Earth Day served as an activator for behavior analysts to embark on a new challenge. We were reminded that human behavior causes serious damage to the earth's environment and threatens the future of humans and other species (5). Among the surveyed doctors, majority were holding class one post with master degrees. As we interviewed regarding their individual carbon foot print, only 11% doctors uses car pooling, shared vehicle or public transport to reach service campus. Changing transportation behaviors is a crucial area for intervention, not only for conservation of resources, but also because the use of motor vehicles is a major cause of greenhouse gases. Behaviors targeted for change include reducing the miles traveled in personal vehicles (6), increasing miles per gallon through changes in the driving behaviors of professional drivers (7), and increasing the use of carpools (8), public transportation (9), and bicycles (10). There are 76% doctors who had never heard or bought solar energy devices.

Nearly 70% of them switch off electrical appliances when not in use. Despite their great potential, compact fluorescent lights (CFLs) have not yet been adopted on a wide scale because CFLs cost ten times more than incandescent bulbs, while the monetary savings over the five-year life of the bulb ($30- $50) and the environmental benefits are remote and relatively invisible (11) Decreasing home energy use is also important, as 36% of all electricity is used in residences, and most electricity consumed in the United States is generated by burning fossil fuels (12). In our survey we found electric heater (53.6%) was common source of boiling water during winter while air condition was common source of cooling in summer. Decreasing the energy used in buildings for the purposes of heating, cooling and lighting has also drawn considerable attention. This is an important area for intervention, since burning fossil fuels accounts for nearly 70% of all electricity generation (13).

Air condition contributes to dirty air, acid rain and global warming. Based on government data, Stan Cox, a scientist at the Land institute, Kansas, calculated that more than 1500 kg of carbon dioxide is emitted each year due to air conditioning the average US homes (14).

Use of liquidator is popular among the doctors as mosquitoes repellant. Researchers proved that pyrithroids used in repellants leads to hyper excitation of nervous system & prolong uses results in corneal damage & asthma. About 12% of users are seriously affected by use of repellants. (15)

About 68% of faculty told us that they turn off engine at traffic signals.

Most of the doctors don't use printer on daily basis (56.8%) and majority of them give waste paper to local waste paper collector (84.8%). (16) Austin et al (1993) increased the rate of paper recycling by 54% over baseline by placing signs describing items appropriate for recycling and disposal over recycling bins and garbage can (17).DeLeon and Fuqua (1995) demonstrated that combining a public commitment to recycle paper with feedback resulted in a 40% increase in the weight of recycled paper for residents of an apartment complex.(18)

Doctors have 3 BHK flats (50.4%) or bungalow (19.2%) as a residential place. Among them 76% prefer wooden furniture. They all have good water saving habits like taking bath with bucket (100%), car washing with bucket(70.7%) and run washing machine when fully loaded (84.7%) . But fixing leaks immediately is not seems to their priority (3.2%).In an intervention, Thompson and Stoutmeyer (1991) found that a message focusing on the long-term environmental consequences of water conservation was more effective in decreasing household water consumption than a message that focused solely on the personal economic benefits that could be gained from conservation (19). We have 32(25.6%) doctors who don't use elevators and prefer stair most of the time. It is said that if everyone who could take the stairs did take the stair, we can see some significant energy saving. Since stair climbing requires that we expand nine times as much energy as we do standing still, a collective boycott would probably lead us to higher food consumption (20).In our survey it was seen that 65.6% doctors were vegetarian. According to a 2006 survey, it notes that only 40% of India (1.2 billion people) identifies themselves as vegetarian (21).

Use of organic food is not that common in our doctors' community, only 11.2% always prefer organic food and 26.4% uses it sometimes. Organic food, farming, & lifestyles are global trends that are finding their way into India. It means going back to traditional means of producing food that Indian farmers utilized for centuries till artificial pesticides and fertilizers came in under the Green Revolution banner.This revival of organic food production and retail has been fraught with multiple debates around the cost of such produce, lower yields and the resulting inability to feed India's growing population, coupled with a lack of awareness around the benefits of organic produce by end consumers (22).

Very few (7.2%) doctors have kitchen garden at their home. In congestion of urban city life, vegetable gardens for apartment dwellers seems like an impossible prospect. However, the concept of Kitchen gardens is picking up in India, as more people staying in apartments want their own home grown vegetables (23). Nearly 90% of faculty never bothered to see tags before purchasing goods. To our surprise 86.4% of doctors uses plastic bags in day to day routine. Among them majority (46.4%) either give unused bags to local waste paper collector or just throw them away (24%). Single-use bags, both paper and plastic, represent a huge threat to the environment. This threat is not only related to the sheer volume of their ending up in landfill, but also to the resources needed to produce, transport and (occasionally) recycle them, and the emission resulting from these processes. Single - use plastic bags are also well known for their interference in eco system and the part they play in flood events, where they clog pipes and drains (24).

To our surprise 23.2% never bother regarding the use of mobile phones for long time, but 35.2% said that they prefer cutting long calls.

There are 3.5 billions cell phone in use worldwide. The China is the world leader in cell phone ownership, followed by India. (25) HuiMin & Marina says that there is lot of radiation that is given off by cellular phones that could potentially burn our brain tissue. (26)

There are 12.8% of faculty who never participate in tree plantation, 22.2% of the faculty has planted more than 15 trees at their job sites.

Conclusion

Given that environmental degradation threatens the well-being of all inhabitants of our planet, environmental preservation may be one of the most important health & social issues that must required great focus attention with responsibility to create awareness & build environment friendly practices that implemented in regular use.

Table 1: Profile of Doctors (study subjects)

Profile	Characteristics	Frequency	Percentage
Sex	Male	70	56
	Female	55	44
Designation	Tutor	36	28.8
	Assistant Professor	56	44.8
	Associate Professor	16	12.8
	HOD & Professor	17	13.6

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Degree	M Sc	1	0.8
	MBBS	18	14.4
	MD	87	69.6
	MS	19	15.2
Department	Clinical	58	46.4
	Non clinical	67	53.6

Table 2: Carbon Footprint

Questions asked	Variables	Frequency	Percentage
Vehicle used to reach the service campus	Car/two wheeler	110	88
	Car pool/share based vehicle	9	7.2
	Public transport	5	4.0
	Cycle	0	0
	Walking	1	0.8
Vehicle used during vacation touring	Plane/cruise	36	28.8
	Car/two wheeler	11	8.8
	Bus	5	4.0
	Train	73	58.4
Type of light sources used at home	Electric bulb	1	0.8
	Tube light	83	66.4
	LED light	7	5.6
	CFL light	34	27.2
Use of solar energy device	Never heard	95	76
	Heard but don't use	23	18.4
	Yes, using it	7	5.6
Switch off electrical appliances when not in use	No	4	3.2
	Yes	88	70.4
	Yes and also remove the plug	10	8.0
	Yes and also advice others to do the same	23	18.4
Source used to boil water during winter	By burning wood	1	0.8
	Gas	41	32.8
	Electric heater/geyser	67	53.6
	Solar heater	8	6.4
	Don't use boil water	8	6.4
Preference for cooling during summer at night	Air conditioner	62	49.6
	Air cooler	6	4.8
	Fan	34	27.2
	Terrace/ courtyard(without fan/ Air cooler)	23	18.4
Protection from mosquito bite	Aerosol spray	11	8.8
	Coil	12	9.6
	Liquidator	83	66.4
	Bed net	19	15.2
Turn off vehicle engine at traffic signal	No	40	32
	Yes	85	68
Regular PUC(Pollution under check) certificate	No	15	12
	Occasionally	38	30.4
	Yes regularly	72	57.6
Daily print out for personal use	More than 50 papers	0	0
	21-50 papers	1	0.8
	6-20 papers	2	1.6
	1-5 papers	51	40.8
	Nil	71	56.8
Waste paper disposal	Burn them	1	0.8
	Through them away	12	9.6
	Give it to local waste paper collector	106	84.8
	Reuse it	6	4.8
When not using computer/ laptop	Keep it on	2	1.6
	Turn off monitor/ screen	21	16.8
	Hibernate mode	12	9.6
	Switch off	90	72

Table 3: Housing Foot Print

Questions asked	Variables		Frequency	Percentage
Type of House	One room /hostel		21	16.8
	Flat 2BHK(Bedroom Hall Kitchen)		17	13.6
	Flat 3 BHK or more		63	50.4
	Bungalow/row house		24	19.2
Type of furniture	Wooden		95	76
	Plastic		6	4.8
	Glass /Iron		3	2.4
	Old /Antique		21	16.8
Duration preferred to change the furniture	Within 5 years		2	1.6
	5 to 10 years		23	18.4
	>10 yrs		20	16
	When Damaged		80	64
Water saving habits (multiple answer are accepted & facilities not available with them are opted out from those questions)	Taking bath	With bucket	125	100
		With shower	91	72.8
	Car wash (N=89)	With bucket	63	70.7
		With running pipe water	26	29.3
	Close tape when not in use	yes	111	88.8
		no	14	11.2
	Washing machine run when fully loaded (N=92)	yes	78	84.7
		no	14	15.2
	Fix leaks immediately	Yes	4	3.2
		no	121	96.8
Use of Elevator	Yes		51	40.8
	Beyond 4th floor		42	33.6
	Don't use		32	25.6

Table 4: Food foot-print

Type of questions asked	Variables	Frequency	Percentage
Type of diet	Vegetarian	82	65.6
	Mix vegetarians	43	34.4
Use of organic food	Mostly	14	11.2
	Sometimes	33	26.4
	Never	78	62.4
Kitchen garden	Present	9	7.2
	Absent	116	92.8

Table 5: Goods & services foot print

Type of questions asked	Characteristics	Frequency	Percentage
Do you see tags before purchasing goods (recyclable, natural ,organic, or made by alternate fibers)	Almost never	79	63.2
	Sometimes	34	27.2
	Always	12	9.6
Do you use plastic bags	Yes	108	86.4
	No	17	13.6
Disposal of unused plastics bags	Burn them out	02	1.6
	Through them away	30	24
	Local waste paper collector	58	46.4
	Reuse it	35	28.0

Table 6: Miscellaneous

Questions asked	Variables	Frequency	Percentage
Hours of watching TV/day	More than 5 hrs	2	1.6
	3-5 hrs	8	6.4
	1-3 hrs	45	36
	< 1 hrs	70	56
Celebration of Holi	Oil paints	0	0
	Artificially	8	6.4
	Natural colour	33	26.4
	Plain water	13	10.4
	Don't play holy	71	56.8
Diwali celebration	Cracker make noise	29	23.2
	Cracker don't make noise	45	36
	Celebrate without fire crackers	51	40.8
Limitation of mobile usage	Never bothers	29	23.2
	Cutting down unnecessary long calls	44	35.2
	SMS whenever possible	15	12
	Switch off when not in use	8	6.4
	Land line	29	23.2
Tree planted so far	Nil	16	12.8
	1-5	53	42.4
	6-10	18	14.4
	11-15	10	8
	More then 15	28	22.4

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