

## Personal Energy Audit (PEA) Through Energy Labeling: A New Concept for Environment Conservation and Healthy Living

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### Abstract

**Purpose:** The health is not merely an absence of disease as it has many dimensions to it for e.g. physical, mental and social. We all have knowledge of healthy practices, but most of us do not understand them well enough to follow them diligently. The proposed new concept of Personal Energy Audit (PEA) through energy labeling can address the problem of non-adherence to healthy lifestyles and can help in environment conservation.

**Aims and Objective:** This novel concept can have potential in achieving targets of healthy living and environment conservation. The effect of environment on good health is a well-known fact, but the effect of bad health on environment is nobody's concern. The time has come when we as an individual stop recognizing good health as a self-centered concept, but efforts put in to maintain good health can help to decrease the energy requirement of the nation and will indirectly put fewer burdens on natural resources.

**Personal Energy Audit (PEA) through Energy Labeling:** The concept involves putting an energy label on all medicines and treatment devices used in the treatment of lifestyle diseases alongwith price tag so that person knows, how much energy is being consumed if good health is not maintained, thus resulting in the need for a particular treatment device or medicine (e.g. implant, stent, artificial joint etc.).

**Conclusion:** The energy spent (in terms of medicine /device manufacturing, manpower requirement, infrastructure requirements) on treatment of these life style diseases can be saved by healthy living and will help to create positive energy balance. The day is not far when we might be questioned by our peers, if we are not maintaining good health.

**Keywords:** Energy; Environment; Personal energy audit; Preventive dental visits; Healthy living; Non-Communicable diseases

### Introduction

Healthy Living involves creating and maintaining health, which World Health Organization (WHO) has defined as a state of complete physical, mental and social well-being. Healthy living is a desirable virtue for almost everyone. If things needed to achieve this virtue are not done then it leads to poor health. Poor Health due to unhealthy living lowers the quality of life and impacts social and economic development of individual and nation. The unhealthy life styles and diet pattern in most part of the world has increased the incidence and prevalence of lifestyle or Non-Communicable Diseases (NCDs) – namely, cancer, cardiovascular disease, chronic obstructive pulmonary disorder, mental ill health, and type 2 diabetes and dental caries. The major risk factors for NCDs are smoking, alcohol abuse, a sedentary lifestyle and an unhealthy diet. If these risk factors are addressed adequately, 40–50% of non-communicable disease-related, premature deaths can be prevented [1]. Non maintenance of healthy lifestyles which leads to various lifestyles diseases, is generally considered an individual's own responsibility towards himself or herself. However, we as an individual often fail to understand that for managing these lifestyles diseases lot of natural resources (in the form of medicines and device manufacturing) are being consumed and these could have been

avoided if healthy living is maintained. This article aims to provide a new thinking in the management of life style diseases wherein the individuals are sensitized about loss happening to environment due to unhealthy lifestyles.

### Economics and Ergonomics of Unhealthy Living (A Review)

#### General health

There is a huge economic burden attached to treatment of NCDs, e.g. cumulative output loss of US\$ 47 trillion is attached to NCDs over the next two decades. In India, the loss will be \$6.2 trillion for the period 2012-30, and is nearly nine times the total health expenditure during the last 19 years of \$710 billion. Further, the ischemic heart disease shall be the single most costly non-communicable disease in India with an estimated loss of about \$1.21 trillion over 2012-30, followed by chronic obstructive pulmonary disease (COPD). On the contrary, it is estimated that a 12.5% reduction in ischemic heart disease, could lead to economic savings of \$25 billion per year over the period 2011-2025 [2].

It is estimated that in the next 20 years, restriction of salt intake and improved dietary fat quality can prevent 8000-13,000 CVD cases in Finnish adults as compare to 2007. Moreover the reduced incidence

of CVDs can give 26,000-45,000 quality-adjusted life years and saving of €150-225 million [3]. The estimated cost for approximately 20 million diabetic patients in India can be Rs.90,200/- million (US\$2.2 billion) for diabetes health care [4]. The ADA in 1993 reported that direct cost of diabetes health care in USA was US\$45.2 billion [5].

The major factors influencing the susceptibility to NCDs are Diet and lifestyle. Other factors e.g. smoking, drug and alcohol abuse, and lack of exercise may also increase the risk of developing certain diseases, especially later in life [6-8].

The dietary changes in Western countries, towards increased consumption of meat, dairy products, vegetable oils, sugary foods, and alcoholic beverages during the latter half of the 20th century lead to increased incidences of cancer of colorectal, breast, prostate, endometrial and lung tissues. In contrast developing countries, showed lower rates of these cancers as diets were low in sugar starchy foods with little meat or fat [9]. Further, sedentary lifestyles lead to increase in obesity.

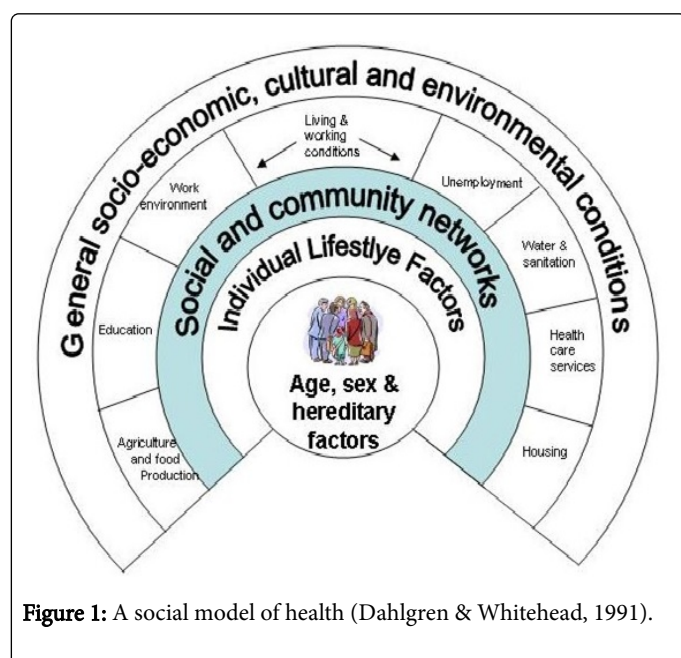


Figure 1: A social model of health (Dahlgren & Whitehead, 1991).

In a Social model of health (Dahlgren & Whitehead, 1991) [10] (Figure 1) the individual life style factors were found to be at the core. Out of various life style factors, physical activity, is important for muscle strength, aerobic capacity and psychological well-being, and also help in moderating health risk factors such as obesity, high cholesterol and hypertension [11]. It is recommended to have physical activity levels equivalent to 2.5 hours per week of moderate-intensity activity (i.e., an effort equivalent to brisk walking, or approximately 4000 kJ/week) to achieve health benefits [12]. It is suggested that walking for half an hour a day, five days a week, may increase life expectancy by 1.5 to 3 years depending on the intensity [13]. The increase in physical activity and its associated health benefits are seen immediately [14,15].

Despite all the above, regular physical activity is hindered by two main barriers i.e., time limitations and dissatisfaction, since many do not enjoy exercise [16]. Australian health surveys conducted between 1995 and 2005, suggested that 70% of adults are either sedentary or have a low activity level and the proportions of Australians reporting

sedentary or low exercise levels have not changed markedly over these ten years [17,18].

Inactivity or sedentary lifestyle is associated with greater risk of all-cause mortality [19], increased risk of cardiovascular disease [20], ischemic stroke [21], non-insulin dependent (type 2) diabetes [22], colon cancer [23], osteoporosis [24], hip fracture following falls [25] and depression [26]. In Australia's 7% of health burden has been attributed to physical inactivity, with the greatest contributors being ischemic heart disease (51%), type 2 diabetes (20%) and stroke (14%) [12]. So, encouraging increased physical activity levels is important and there are range of interventions effective for reducing inactivity, including those that provide professional guidance and on-going support [27], targeted information, behavioral and social interventions (e.g. community based social support programs), and environmental and policy interventions [28,29].

Physical activity or inactivity is totally a self-controlled variable having a direct cause and effect relationship with NCDs. There are few studies which have quantified the economic costs of physical inactivity. In studies from Canada, Switzerland, the United Kingdom (UK) and United States (US), annual direct healthcare costs attributable to physical inactivity ranged from 1.5% to 3% of total direct health costs [30]. There are many benefits from regular physical activity as it improves general health and productivity, help the Governments by savings in avoidable health care expenditure, increased income taxation and fewer welfare payments. Similarly, businesses benefits include reduced absenteeism, lower recruitment and training costs associated with replacing staff besides individuals benefiting from more income and increased quality of life.

It was found that a feasible reduction in prevalence of physical inactivity can lead to total potential opportunity cost savings of AUD258 million, with 37% of the savings arising in the health sector. Further, these savings would be much larger if all physical inactivity was eliminated (AUD672 million in health sector, AUD1, 135 million [FCA] in production and leisure) [31].

## Dental health

The treatment of dental problems is also an economic burden. The dental problems have both physical and psychosocial aspects and later are addressed in orthodontics, as Orthodontists takes care of social and esthetic aspect of dental deformity along with physical aspect. Good oral hygiene practices include, brushing twice daily or after every meals, flossing, preventive dental visits at regular intervals. In dentistry, there are a lot of misconceptions about dental health for e.g. loosing teeth is normal with age, but the fact is otherwise as given below:

1. Our teeth are destined to stay for the whole life. You can actually take them with you, just like any other organ which you take.
2. Dental problems are all painless to start with.
3. Mere fact that there are 32 teeth, does not mean that you can lose few of them. Because losing even one of them will start a cascade of events potentially leading to major dental health problems. Further, it will put more stress on the already existing one and shorten their life also.

These misconceptions deter people from getting preventive dental checkup. Meyerhoefer et al. [32] in a study classified all dental services into one of three categories using common cost-sharing tiers found in a survey conducted by the National Association of Dental Plans (2008): *preventive* services (for example, exams, cleanings, sealants, x-

rays), *basic* restorative services (fillings, extractions, periodontics, endodontics, oral surgery), and *major* restorative services (crowns, bridges, root canals, dentures). Mean observed out-of-pocket price among users was found to be \$41 per preventive visit, \$210 for the first episode of basic treatment, and \$605 for the first episode of major treatment. Similarly Don TNM et al. [33] reported huge economic burden of periodontitis to the tune of MYR 32.5 billion, responsible for 3.83% of the 2012 Gross Domestic Product of the Malaysia.

It has been said that it is not possible to have healthy people on a sick planet. Reducing waste, changing patterns of consumption and limiting the amount of adverse chemicals entering the breathable air of a dental office are achievable and realistic goals. So the concept of Eco-friendly dentistry has evolved due to the limited capacity of planet's eco-system to absorb further degradation and depletion. So the importance of preventive services can be seen from the environmental perspective, as it will lessen the need for major restorative services, which usually add to degradation and depletion.

There seems no doubt that healthy living through healthy lifestyles practices and getting regular preventive dental checkups can lead to huge monetary saving which can be easily translated to less energy requirements and environment conservation. Despite so much knowledge and awareness about lifestyles disease and potential benefits of preventive dental checkups, healthy living looks like a farfetched dream. The big question remains, despite having knowledge how many of us do the required physical activity which can help to fulfill the

dream of healthy living. Is there anything else, which should be done to get this focus back? We don't need to have knowledge about it but need to understand it. There remains a huge difference between knowing and understanding. e.g. reaching to a station or airport on time. You will only understand if you have missed the train or flight. Similarly, to facilitate the understanding of healthy living we need to change the focus from internal (own health) to external (environment), i.e., we should tag the unhealthy lifestyle of individuals with the environment conservation. The new concept of PEA aims to incorporate individual as strong partner in healthy living resulting in additional benefits to environment, and is analogous to incorporation of patient empowerment model for overall benefit of patient having cardiovascular disease (CVD), diabetes, heart failure, and/or at risk of cardiovascular disease (CVD risk) [34].

### Personal Energy Audit (PEA) through Energy Labeling (A new Concept for Environment Conservation)

The amount of economic loss to different nations (Table 1) has been expressively made in various reports of World Economic Forum, but it has failed to calculate the loss in terms of energy requirement or in terms of loss to environment or use of natural resources, which are needed to meet the requirements of treating NCDs and major dental restorative services arising out of unhealthy living by not opting for preventive dental checkups respectively.

Country	Economic Burden					Achievable Economic savings	
	Economic Loss (NCD)	Ischemic Heart Disease (IHD)	Diabetes	Physical inactivity (Direct Cause & effect with NCD)	Dental	IHD/CVD	Elimination of physical inactivity.
India	USD 6.2 trillion	USD 1.21 trillion	USD 2.2 trillion			USD 25 billion /year (2011-2015)	
USA	USD 47 trillion		USD 45.2 billion	1.5% to 3% of total direct health costs.	USD 41 per preventive visit USD 210 per basic restorative visit USD 605 per major restorative visit		
Canada							
Switzerland							
UK							
Australia						7% of health Burden	
Finland						€150-225 million	
Malaysia					Periodontitis. MYR 32.5 billion, = 3.83% of GDP. (2012)		

**Table 1:** Economic audit of NCDs including dental health.

One has rightly said we can't manage what we can't measure, e.g. weight and speed. Similarly we cannot prevent our natural resources until we know where and how they are being used? One cannot study effect of individual bad health on environment till the time we measure the strain put on environment in terms of energy spent (in terms of

medicine/device manufacturing, manpower requirement, infrastructure requirements) due to bad health in terms of treatment of life style diseases which have a direct relationship with the unhealthy living. The monetary cost attached to treatment of lifestyle diseases in general consider profits also, so, it may be a better idea to calculate

energy spent on making medicines and made this information available to potential users by putting an energy label on medicines and treatment devices along with price tag so that person knows how much energy is being consumed if good health is not maintained which has necessitated the need for a particular treatment device or medicine (e.g. implant, stent, artificial joint etc.) or treatment procedure. In fact the putting energy labels on every consumable medical item and also on treatment procedures across different disciplines can help each one of us to be more sensitive about energy conservation and might help in decreasing the requirement and results in saving of natural resources. The energy labels will tell the potential users the amount of energy used in manufacturing of particular medicine unit, treatment device (e.g. implant, stent, artificial joint etc.) or treatment procedures. It is so paradoxical to say that we want energy audit for factories and industries, but never have we realized that we need to audit our personal energy requirements. That indirectly would mean, when we do not maintain good health we tend to create a negative energy balance in terms of increased energy requirements. Though we are capable of meeting this increased energy demand from affordable and personal perspective, but we will still like to save it for environment conservation. It is similar to something like “despite having capacity to pay for water and electricity bill, there is a need to conserve water and electricity as inadvertent use is straining our limited natural resources. So, we shall attach an energy cost and resultant strain on environment and natural resources in case we are not doing enough to maintain the good health. That would indirectly put more responsibility on the individual and might work for better. This observation might need some analysis or study, but we are trying to see a different aspect of our behavior onto the environment i.e., when we don't do enough in terms of maintaining good health, we are eating away precious natural resources meant for our younger generations. So maintenance of good health through healthy lifestyle is not only helping you, but Environment too. You should either maintain it first for the environment & then for yourself or may be vice versa. There is a general feeling in the society that if someone is not maintaining good health, it is harmful to him only (A self-centered concept). But contrary to above, energy labels would remind the person that when you don't maintain good health, you are harming environment also (Environment conservation concept).

A thoughtful conjecture of this concept, if successful, might lead to change in the tag line of many companies selling healthcare products e.g. “Help environment by keeping yourself healthy. It is good for you Too!” or “Your health may not be important for you but it is for us, be healthy for us.” So being healthy would mean shooting two birds with one arrow. Further energy labels can be designed in such a way, so as not to escape attention of the individual buying medicine or treatment device. This might prick the conscious of the individual and help in sensitizing the individuals for environment protection.

## Conclusion

The energy labeling of all medicine and health related products, including devices used for treating all lifestyle diseases across different disciplines, can help people to sensitize more about their consumption and in turn help to minimize energy requirement. This will further help to conserve natural resources and lead to sustainable development. This also opens a new task of putting energy labels on all medicines and medical devices and procedures (dental procedures) across all disciplines. Thus energy labeling can provide another handle

for environment protection. The day is not far when we might be questioned by our peers, if we are not maintaining good health.

## Competing Financial Interests

None.

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