Essential medicines

‘Essential medicine’-funny name indeed. Is there a medicine that is not essential? This is like asking are there gatherings without people? Medicine is always essential medicine. As a general principle people don’t take medicines if they are not necessary. No, let us be serious. World Health Organization (WHO) publishes and updates model list of essential medicines 1. WHO published 19’th list in April 2015. List of essential medicine is the list of minimum medicine needs for a basic healthcare system, listing the most efficacious, safe and cost effective medicines for priority conditions. Priority conditions are selected on the basis of current and estimated future public health relevance, and potential for safe and cost effective treatment. This list contains remedies that vary from oral rehydration salt to modern anti-cancer drug rituximab through intrauterine devices, condoms, oxygen, ethanol (as disinfectant) etc. Essential medicines do not essentially mean lifesaving medicines.

A recent edition of Lancet has published a commission report on essential medicines, more specifically their universal accessibility and affordability 2. A typical example is anti-hepatitis C medicines. Approximately 184 million people are living with hepatitis C infection 3. Fortunately, as a breakthrough in the recent history of medicine, a group of drugs called Direct Acting Antiviral (DAA) medicines have emerged and they may virtually cure this potentially deadly infection. Sofosbuvir, one DAA costs $84,000.00 for a full course 24 weeks treatment 2. It is estimated that treating all eligible patients in the U.S. will mean an expenditure of 15 billion US dollars over five years. Lancet article indicates that pricing has little to do with actual cost, $68 to $132 for a 12 week course and the drug is sold in India for 300.00 $ for a month 2. Lancet however warns falsified products and inappropriate use of such medications where they are sold at low price.

“List of essential medicine is the list of minimum medicine needs for a basic healthcare system, listing the most efficacious, safe and cost effective medicines for priority conditions”
Michael Sofia, inventor of sofosbuvir

Burnout in physicians

There is no job without stress. Even sleeping can be stressful with terrifying dreams. Medical practice is widely regarded as one of the most stressful jobs for reasons that anyone can understand. Burnout is defined as a syndrome consisting of emotional exhaustion, depersonalization and a diminished sense of personal accomplishment, which is primarily driven by workplace stressor 4. Workplace is an important factor in burnout syndrome. In the United States nearly half of practicing physicians reported burnout at some stage in their career, a figure that indicates stressful nature of medical profession 5. Is there a light at the end of the tunnel?

Journal of American Medical Association has published a meta-analysis of controlled interventions to reduce physicians’ burnout 4. The authors have identified 19 studies reported from Europe, the U.S., Canada, Argentina, Australia and Israel. Does this imply burnout in physicians is not a serious problem in other parts of the world? Or no one is interested to address the problem? Who knows? There were interventions for individual physicians and those targeting organizations. Individual based interventions included cognitive-behavioral strategies, mindfulness, communication skills and coping strategies. Organization level interventions focused on reduction of workload, rescheduling shifts, discussion meetings and structural changes within organizations. The studies measured burnout using Maslach Burnout Inventory 6. The results indicate that individual interventions had a significant, but small effect in reducing burnout and organizational level interventions had better effect sizes. However, organization based interventions were rare and the overall achievement from both types of interventions was on small scale. That is still important. For one who is going to drown even hay on the water surface brings hope.

Mayo Clinic has launched a new program to address burnout in physicians. It is called Listen-Act-Develop model 7. Stephen Swenson, the medical director at Mayo and his colleagues developed this program. The program focuses on improving the relationship between physicians and the organization by establishing a formal listening forum to hear from physicians and facilitating their involvement in organization mission. It is based on three factors. 1. Choice: Physicians want sense of control. Organization identifies their genuine values rather than seeing them as construction workers and ensures flexibility. 2. Social connectedness: Dr. Swenson says that simply getting physicians for a meeting or meal lowered burnout. 3. Excellence: Every physician wants a sense of belongingness to the organization. Mayo clinic is one of the largest clinics in the world employing 4500 physicians. Let it be a model for rest of the world.

A painting of burnout
Secret of exercise and metabolomics

The benefits of physical exercise are incontrovertible. Wages of sedentary life is death. We now know that regular exercise is associated with reduced risk of diabetes, dementia, cardiovascular diseases and colon, breast and endometrial cancers. What is the mechanism behind this panacea? In an attempt to find the metabolic changes associated with physical activity Chinese investigators studied 328 plasma metabolites in subjects who undertook various levels of measurable physical activity.

While talking about metabolites it is hard to omit metabolomics. Like genome and proteome we now do have metabolome, which is defined as the complete set of small molecule metabolites found in a particular cell, tissue, organ or an individual. Metabolomics is an emerging field that deals with the metabolites in a given metabolome. Metabolites are studied by spectroscopy, for example nuclear magnetic resonance spectroscopy. The Human Metabolome Database (HMDB) is currently the most up-to-date and comprehensive information system of human metabolites. It is linked with various metabolic pathways, metabolic diseases and gene mutations. So far HMDB has 2180 metabolites but if food additive, plant extract, drug, drug derivative, toxin and cleaning agent or environmental contaminant are taken into account this figure may exceed 100,000.

Physical activity is associated with reduction in Branched Chain Amino-acids (BCAA), carbohydrates (glucose and mannose) and a shift towards high-density lipoprotein and very high-density lipoprotein. During exercise catabolism of BCAA is facilitated. BCAA is linked to obesity, insulin resistance, metabolic disorder, type 2 diabetes, cardiovascular disease, stroke and chronic kidney disease. Mannose is associated with glucose intolerance and metabolic syndrome. In this way, we have far gone in elucidating biological mechanisms of beneficial effects of exercise. The irony is that a number of deadly diseases remain incurable and sometimes their cure appears to recede from us.

References


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