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REVIEW ARTICLE

Lifestyle Drugs: A Review

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ABSTRACT

The medical literature boosts more than 23 operational definitions of lifestyle drugs. Simply speaking, these are the drugs used to treat non-life threatening and non-painful conditions such as baldness, impotence, wrinkles or acne, without any medical relevance at all or only minor medical relevance relative to others. Lifestyle drug industry is booming and anecdotal data says, it worth's more than $29 billion worldwide. It is argued that this resource being spent frivolously in lifestyle drugs could have been better utilized researching cures for more serious medical conditions. The blatant advertisements and unceasing flaunting of products with supposed improvement in the physical, mental and sexual performances is corroding the mind of every age group especially fragile youngsters. No side-effects claim and easy access to these drugs have led to self-diagnosis and self-medication. Emerging of growing insecurities in the modern-day man and a world where there is constant pressure that we must be bigger, better and faster have irrigated this industry. In the arena of sports, it is not new that every other day we hear some high-profile doping cases and drug-induced deaths among athletes. These performance enhancing drugs provide unfair advantage to athletes over their clean competitors creating an uneven playing field. Now illegal, these drugs are difficult to be identified today but in near future they are going to be impossible to be identified. Again, Nootropics in academia has invited what is called "academic doping". Nepal, being one of the poorest countries, with leading maternal and infant mortality, if not prioritize its health-care needs today; the outcome may be devastating tomorrow.

Key words: Lifestyle drugs, Anecdotal data, Self-Diagnosis and Self-Medication.

1 INTRODUCTION

The use of drugs to treat conditions outside or peripheral to what is normally considered disease treatment or prevention is not new. Illicit drug use in the world of sports, called doping, is a well-known problem discussed internationally. The use of drugs such as stimulants in high-risk environments, most recently as part of 'raves' or 'clubbing culture' is similarly well known and well documented [1].

Known by different synonyms- Smart drug, Quality-of-life drug, Vanity drug, lifestyle drug is an imprecise term of recent origin commonly applied to medications which treat non-life threatening and non-painful conditions such as baldness, impotence, wrinkles, or acne, without any medical relevance at all or only minor medical relevance relative to others [2]. They modify or change non-medical or non-health-related goals that lie at the boundary between a health need and a lifestyle wish [3] or between medical and social definitions of health [4]. Attempts to treat baldness and enhance mental agility are not matters of health, but preference [5]. The term is sometimes also used to describe medicines that are used to treat 'lifestyle illnesses', i.e. diseases that arise through 'lifestyle choices' such as smoking, alcoholism or overeating [6]. The person taking the drug perceives that it will increase his or her happiness, and a significant portion of society, does not consider the target symptom or symptoms to be a "real" disease or disorder [5]. Where to draw the line between

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lifestyle purposes and legitimate medical use is debated vigorously [3]. In total, 23 different definitions are presented in the scientific literature. Time has come to properly define the term lifestyle drugs and lifestyle medicine.[6] However, there are few complicating facts. The perception of what is illness and what is not depend on whether one is a potential patient or a potential 'payer' [3]. Again**,** perception does depend on social and cultural norms. For instance, most people would agree that the prescription of sildenafil for a healthy man unhappy with his sexual performance is a lifestyle use, but would be considered differently in the case of a diabetic man with neuropathy [3].

Lifestyle drugs have to be differentiated from lifestyle medicine. It should not be interchanged with 'lifestyle medicine'**.** Lifestyle Medicineis are established branch of medicine. It encompasses the lifestyle's contribution to health in addition to non-pharmacological intervention in the treatment and management of lifestyle diseases, such **asexercise in diabetes mellitus or weight** management in obesity [6].

Eternal Debate has always surrounded the matter of life-style drug and will do so in the foreseeable future. Against it, people argue that scarce medical research resources are being spent frivolously when they could have been better spent researching cures for more serious medical conditions. On the other hand, protagonist point out that improving the patient's subjective quality of life has always been a primary concern of medicine, and these drugs are doing just that. Examples of few life-style drugs from inexhaustible stores:

Medicines approved for specific indications[2]

Example (s)	Primary clinical Use	'Lifestyle' use
Sildenafil	Erectile dysfunction	Erectile enhancement
Orlistat	Obesity	Weight loss
Sibutramine	Anorectic agent	Weight loss
Oral Contraceptives	Preventing conception	Preventing conception
Bupropion	--	Managing nicotine addiction
Methadone	--	Managing opiate addiction

Medicines approved for specific indications that can also be used to satisfy 'lifestyle choices' or to treat 'lifestyle diseases' [2]

Example(s)	Primary clinical use	'Lifestyle' use
Minoxidil	Hypertension	Regrowth of hair
Methylphenidate	ADHD*	Improving academic performance
Modafinil	ADHD*	Cognitive enhancement
Opiates	Analgesia	'Recreational' usage

*****Attention Deficit Hyperkinetic Disorder

Drugs that have slight or no current clinical use but which fall into the lifestyle category [2]

Example(s)	Primary clinical use	'Lifestyle' use
Alcohol	None as such	Widespread component of drinks
Botulinum Toxin	Relief of muscle spasm	Cosmetic alteration
Caffeine	Migraine treatment	Widespread component of drinks
Cannabis	Managing chronic pain, nausea	'Recreational' usage

Drugs (generally illegal) that have no clinical utility but which are used to satisfy lifestyle requirements [2]

Example(S)	Primary clinical use	'Lifestyle' use
MDMA* or 'Ecstasy'	None as such	'Recreational' usage
Tobacco (Nicotine)	None	'Recreational' usage
Cocaine (Some Formulations)	Local anaesthesia	'Recreational' usage

*****Methylenedioxymethamphetamine

Natural products, largely unregulated with claimed (often anecdotal and unsubstantiated) effects but which cater to lifestyle needs or desires [2]

Example(S)	Primary clinical use	'Lifestyle' use
Fish Oils	Slight Nutritional supplement	Widespread, for many conditions
Ascorbic Acid	Slight Nutritional supplement	Widespread, for many conditions
Melatonin	None	Widespread, for many conditions
Numerous Herbal Preparations	None	Widespread, for many conditions

2 WHY ARE LIFESTYLE DRUGS BOOMING?

Current market of lifestyle drugs is a phenomenal $29 billion [7]. Again, the concept 'lifestyle drug' is neither clearly limited nor defined, as shown by the results of a literature study [1]. Boom may be due to misplaced priorities of the pharmaceutical industries, surfacing of growing insecurities in the modern day man [6], and the availability of 24×7 telecasting tools of many media [8].

Everybody tries to solve the problem in a very reductionist, mechanical and biomedical way.People search the answer for every simple health problem in a pill.This bent of the human psyche has further been exploited by some pharmaceutical industries, which obviously have an interest in selling all sorts of pills. These pills may then be dominated by quacks and other media.Like any business, most drug companies also try to develop drugsbased on incentives.They want to sell the most products to the most people as if the money is going to fix the little problems of everyone instead of fixing the big problems of just a few people [6].

3 DISEASE MONGERING

"Disease mongering can include, turning ordinary ailments into medical problems, seeing mild symptoms as serious, treating personal problems as medical, seeing risks as diseases, and framing prevalence estimates to maximize potential markets" [8]. Drug development is often driven by potential profitability rather than by public health needs [3]. Although advertising directly to consumers is prohibited in the European Union, companies are able to target patients indirectly through disease awareness campaigns, sponsorship of information materials, and press releases [3].

4 LIFESTYLE DRUGS IN SOUTH-ASIAN PERSPECTIVE

Just2 months after the launch of Viagra on December 26th, 2005, Pfizer has exceeded its targets by capturing 1.8% of the market that is estimated to be worth Rs. 80 crore. Is this a tip of an iceberg or an indicator of what lifestyle drugs could do to India? [6]. Most people unfortunately are inclined to accept a pill as the answer to all life's problems. Attempts to increase longevity through drugs go back to our earliest record such as using of "*Amrit* (Nectar of Immortality)" that would make an individual to live forever [6].

As of now, lifestyle drugs are common in the reach of affluent class but in due course of time, it might spread to other social classes, virtually untapped so far. If the same trend including the use of more lifestyle drugs goes on, then chances of increased proportion of population below poverty line will be enlarged [6].

Fuelled by ample and frequent direct to consumer advertising, these lifestyle drugs could have some devastating consequences on young, vibrant and ambitious South –Asian population. The blatant advertisements and unceasing flaunting of products with supposed improvement in the physical, mental and sexual performances lead to an assault on the fragile minds of youngsters. This is a matter of serious psycho-sociological concern. Mental and emotional health can be corroded by the steady destruction of self-esteem by these kinds of advertisements [6].

5 A CASE AS AN INSTANCE IN SOUTH-ASIAN SCENARIO

It's a myth that taller people do better at sports, and height also plays an important role in decisions related to employment, politics and choice of marital partners [4]. It is publicized that height increase pills are essential for all shorter persons! These height increase pills or herbal products are assumed to be free from adverse effects! Tall claims are made that these medicines increase height up to 4-5 inches even after 30th birthday? Who grows after puberty or 25 years of age? As per the laws of the Drugs and Magic Remedies Act in India, no person can claim to increase height using any medicine; it is punishable under the law. Probably there might be some loopholes which are being exploited. Lawmakers should consider these ineffective "herbal" medicines and start protecting consumers' interests, as consumers are spending their valuable cash on this nonsense [6].

6 SWITCH FROM 'LIFESTYLE' TO 'MAINSTREAM' USE & VICE VERSA

Once, exclusively a means to relieve suffering and cure disease, today drugs are also used in the interests of prevention and enhancement. However, the use of drugs to enhance and improve the life quality or ability of ordinary healthy people is not new [1]. Atropine was first used as a beauty aid since it dilates pupil [2]. Cocaine was first described as a lifestyle drug in South America. It satisfies the hungry, gives new strength to the weary and exhausted and makes the unhappy forget their sorrows' so said-Garcilaso de la Vega in 1609 [9]. Subsequently, it was assimilated into medicine as a local anaesthetic. It is now largely returned to lifestyle drug status and, regrettably, is the basis of an illegal multimillion dollar international drugs industry [2]. Cannabis, considered as a recreational drug, is now in clinical trials for relief of chronic pain and nausea [2].

7 PERFORMANCE ENHANCING DRUGS

Ben Johnson &Lance Armstrong are among the few names from the endless list of athletes found guilty in doping test. Rajendra Bahadur Bhandari, a Nepalese local hero winning two silver medals in 9th Asian Games and two gold medals in 10th Asian Games, was tested positive for Deca Durabolin, a prohibited anabolic steroid.[10]The World Anti-Doping Agency (WADA) which was established partly in response to some high-profile doping cases and drug-induced deaths among athletes publishes an annually updated list of prohibited substances that may not be used by sportsmen or sportswomen either in or out of competition.

Drugs used in sports [2]

Example (s)	Effects
Erythropoietin	Increases RBC count Increases oxygen transport Used mainly for endurance sports Increases blood viscosity causes hypertension and risk of strokes and coronary attacks
Human Growth Hormone	Increases lean body mass and reduces fats Accelerates recovery from tissue injury Causes cardiac hypertrophy, acromegaly, liver damage and increased cancer risk.
Androgenic Steroids (Testosterone, Nandrolone etc)	Increased muscle development Increased aggression and competitiveness Serious long-term side effects.
Clenbuterol	Combined anabolic and agonist action on β_2 adrenoceptors may increase muscle strength
β-Adrenoceptor Antagonists Propranolol etc	Used to reduce tremor and anxiety in 'precision' sports (e.g. shooting, gymnastics, diving) Not banned in most sports where they actually impair performance
β_2-Adrenoceptor Agonists Salbutamol And Others	Used by runners, cyclists, swimmers, etc. to increase oxygen uptake (by broncho-dilatation) and cardiac function Controlled studies show no improvement in performance
Stimulants Ephedrine and Derivatives Amphetamines Cocaine Caffeine	Many trials show slight increase in muscle strength and performance in non-endurance events (sprint, swimming, field events, etc.) It is the most widely used group, along with anabolic steroids
Diuretics Thiazides Furosemide	Used mainly to achieve rapid weight loss before weighing in Also to mask presence of other agents in urine by dilution
Narcotic Analgesics Codeine Morphine	Used to mask injury-associated pain

8 DIFFICULTIES FOR REGULATORY BODIES

Every year newer, difficult to identify performance enhancing drugs are being used by athletes. These newer drugs represent a continuing problem to the authorities charged with detecting and identifying them. Again, anabolic steroids produce long-term effects and are normally used throughout training, rather than during competition, so out-of-competition testing is necessary [2].

9 LITTLE IF ANY BENEFITS

Although anabolic steroids, when given in combination with training and high protein intake, undoubtedly increase muscle mass and body weight, there is little evidence that they increase muscle strength or sporting performance over and above the effect of training. On the other hand, they have serious long-term effects, including male infertility, female masculinisation, liver and kidney tumours, hypertension and increased cardiovascular risk, and in adolescents premature skeletal maturation causing irreversible cessation of growth. Anabolic steroids produce a feeling of physical well-being, increased competitiveness and aggressiveness, sometimes progressing to actual psychosis. Depression is common when the drugs are stopped, sometimes leading to long-term psychiatric problems. Psychological effect of stimulants is probably more than physiological effect [2]. In very few cases, controlled trials have shown that the drugs actually improve sporting performance among trained athletes. May be there is only marginal improvements in performance (often 1% or less), which are difficult to measure experimentally. This marginal probable improvement makes the difference between winning and losing therefore the competitive instincts of athletes and their trainers generally carry more weight than scientific evidence [2].

10 UNEVEN PLAYING FIELD

Among athletes, the mantra is “nobody remembers second place. The difference between winning and losing would be determined not on the running track but in the chemical laboratory. It is often concluded, therefore, that doping in sports is a form of cheating, because it provides doping athletes an unfair advantage over their clean competitors [11].

11 SMARTNESS IN A BOTTLE-NOOTROPICS

In Greek, ‘Noo’ means ‘mind’ and ‘tropo’ means ‘change’.These are cognition-enhancing drugs. Nootropics has broad appeal even to students with normal or above average cognitive functioning. A world where there is constant pressure that we must be bigger, better and faster, who does not want to break the barriers created by biological limitations?Nootropics in academia has, however, invited what is called “academic doping” [11].

12 CRITICISM OF NOOTROPICS

Ground is already uneven since academic performance is not merely the product of hard

work, discipline and other laudable personal attributes, but, it would seem, is a competition partly won by the genes and socioeconomic background of one's parents.Home computer access, private tuition and even better childhood nutrition are all examples of environmental factors that contribute to improved academic performance, less readily available to individuals from lower socioeconomic backgrounds. There never was an even playing field to begin with!! [11].

But, nootropics would probably make an already uneven playing field even more unfair. Not only do the rich get richer, but in the future it seems that they might also get smarter [11].

13 EVERYBODY ELSE IS TAKING THEM

Although it is difficult to determine the prevalence of drug use in sports, anecdotal reports suggest up to 95% of elite athletes have taken them [11]. McCabe *et al* reported that in the USA the non-medical use of methylphenidate and amphetamine in the previous year (2011) is as high as 25% in some college campuses. Prevalence of methylphenidate is over two times greater at colleges with more competitive admission criteria [11].

14 ARGUMENT: WHY NOT HELP OURSELVES?

Should those who are less smart or less happy accept the mental state allocated to them by their genes and environment, or should they be allowed to take compounds that will move them toward the upper half of the distribution curve? [5]. Should parents not be allowed to help their children gain a university education in part through pharmacology if the only adverse effect to the parents and child is financial? [5]. The increasing availability of drugs that can be used to alter our appearance, our physical and mental capabilities or even our characters is changing the social fabric of our culture and poses a difficult challenge to our healthcare systems [9].

15 PERFORMANCE-ENHANCING DRUGS ARE DANGEROUS

Taking methylphenidate as an example, aside from abuse potential, it may aggravate mental illness, produce sleep disturbances and is associated with cerebrovascular complications. Enhancing memory might not only increase the ability to recall exam material, but also negative and traumatic experiences that might otherwise be forgotten [11].

16 DRUG USE WOULD BE IMPOSSIBLE TO CONTROL

How often have we heard '*Summa Cum Laude'*being stripped of his title for testing positive for 'modafinil'—a drug that gave him near-superhuman levels of mental endurance. In future, when highly effective nootropics will be developed, would the prohibition of these drugs for academic gain even be possible? [11].

Again let's take an example of Caffeine. Caffeinereliably increases performance in a range of sports including swimming, cycling and running. Yet despite being a form of "cheating" in the same vein as anabolic steroids, caffeine's use in sport is permitted because it is relatively harmless. Question remains, what to do tomorrow if a highly effective but harmless performance enhancing drug is discovered? Will we, our self not take that drug? Current anti-doping measures are, therefore, inadequate.

Today causes of widespread and increasing use of lifestyle drugs among athletes are the competitive advantages derived from their use, the low likelihood of drug testing and the relatively minor punishment for getting caught [11].

17 SELF-DIAGNOSIS-SELF TREATMENT

'Lifestyle drugs' are revolutionizing the traditional relationship of doctor and patient [6]. It raises issues about the rights to, and limits ofself-diagnosis, self-prescription, internet prescription, direct to consumer advertisement (DTCA) and the online "free samples" of food supplements, vitamins and drugs like sildanefil. Where are evidence-based decision making, efficiency, ethics, laws and standards of regulatory policy [6].

18 PUNISHMENT BY LAW

No side-effects claim can also mean that these drugs might have no efficacy either.Lifestyle drugs should too be tackled as other counterfeit medicines. According to the WHO, counterfeit medicine is defined as those which have been deliberately and fraudulently mislabelled with respect to identity and/or source. Even products with correct ingredients or with wrong ingredients or without active ingredients or with insufficient quantity of active ingredient are punishable [6].

19 CONCLUSION

Nepal's biggest remaining challenges are education and health care. Nepal still has world's highest rate of maternal and infant mortality, malnourishment, and endemic rural health

problems like diarrhoea, malaria etc. At this point of time we cannot afford to misplace our priorities. The government has an important role in helping us understand what drugs are available, and what drugs we will require in future. Drugs that are advertised inappropriately should be reported to the drug controlling unit/regulatory authority. If timely action is not taken then a situation like "Pharmageddon" may be created similar to the movie "Armageddon" in which the world was saved by a few cowboys; but Pharmageddon would be far more serious [6]. Pharmageddon is defined as "a scenario wherein medicines produce more ill-health than health, and medical progress does more harm than good".

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