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Life style and infectious diseases

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Abstract

Lifestyle is an important area of human life. It affects different aspects of human life including body and soul health. The infection development and infectious diseases rate and severity are affected by human lifestyle. It influences survival of infectious agents in the body and environment, their spreading and prevention of diseases.

In this chapter, the need to pay attention to lifestyle to help infectious diseases prevention and control will be presented in different fields: diet and nutrition style, sexual relationships, religious beliefs and practices, family lifestyle, sleep and awakening pattern, physical activities, social lifestyle, recreation and entertainment activities.

It is recommended to continue researches about powerful effects of lifestyle on human health aspects such important infectious diseases prevention and control.

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Introduction

In recent years, lifestyle has attracted many peoples with different levels of literacy and academic education. The scientific and non-scientific findings related to lifestyle regarded as an important part of major social media. Lifestyle is a way or style used by people in their life in special time and place and includes behaviors and functions of individuals. Lifestyle is formed in specific geographical, economic, political, cultural and religious context and influenced by them [10]. On the other hand, Infections are one of the major problems in the world today with an estimated one billion people living with one or more infections .Sociopolitical, economic, and health costs to the society from infections are enormous [14]. Therefore, any effective intervention for decrease rate of infections, prevention and control infectious diseases is interested. Lifestyle management or promotion may be regarded as effective action for this propose.

The influence of lifestyle on different aspects of human life

Lifestyle is an important and very effective agent in human beings life including the human-human, and human-environment interactions. If human regarded as whole, the thoughts, perspectives and practices affect his body and soul directly or non-directly. Many philosophical, religious documents and excellent scientific findings in psychology, biology and medicine

favor it [17]. Therefore, human health is influenced by lifestyle, also. WHO, has estimated that 60% of related factors to individual health and quality of life are correlated to lifestyle [10]. Pay attention to complex, but, define networks in neuro-immuno-endocrine communication could be elucidate some aspects of lifestyle effects on human health.

Influences of lifestyle on infectious diseases occurrence

Lifestyle as an important and very effective agent in human beings life, affects different human relationships: the human-human, human-animal, human-plants and human-nonviable things such as potentially infectious materials. It affects the survival of infectious agents in the body and environment, therefore, the rate of infection development may be influenced. In this article, the need to pay attention to lifestyle to reduce infections, will be presented via categorization of some important variables of lifestyle that influence on infection development as the following items:

Diet and Nutrition Style

Diet has been regarded as one of the greatest factors in lifestyle and has a direct relation with health. Poor, imbalanced diet and its consequences like obesity is the common healthy problem in urban societies. Unhealthy lifestyle can be measured



by some indexes such as Body Mass Index (BMI) that could be related to nutrition and metabolism of human body [10].

Recent studies suggest that dietary intake affects infection risk via effect on immune function and/or other effects. Some important nutritional situations that affected by lifestyle will be discussed as the followings:

Food poverty

Underweight children and adolescents have a significant risk factor for infection especially if they suffer from malnutrition and poor hygienic standards [9]. In general, the more malnourished the host, its susceptibility to the infection development and the severity of infectious disease will be greater. This is especially true for very young hosts [16].

Poor nutrition induces measles severity and involves in the death of the disease [3].

Overeating and obesity

Some data indicate that infection rate is also increased in obese children and adolescents in industrialized countries. A U-shaped increased infection rate in both underweight and obese adults suggested by some researchers. In obese adults, the skin, respiratory tract and surgical-site infections have been more common than in normal-weight participants. Nevertheless, some factors such as malnutrition, hygienic status, underlying or contemporary illnesses may influence assessment of the impact of body weight on infection risk [9].

Specific nutritional needs

Malnutrition and nutritional deficiency diseases can affect host defense responses. In vitamin deficiencies and protein-energy malnutrition (PEM), skin and mucous membranes are affected and also complement synthesis, neutrophil chemotaxis, antibody development and function and T cells decreased [3,24].

Corynebacterium diphtheriae induces more toxicity in iron deficiencies persons [3].

Eating habits

Dietary "pattern" and eating habits is an approach to examining the relationship between diet and the risk of developing diseases. Instead of looking at individual nutrients or foods, diet pattern analysis examines the effects of overall diet. Eating habits may be influence infection susceptibility directly or indirectly (with effects on immune system, gut microbiome and etc). Eating habits are the important determinants of the microbial populations of the gut, and their multiplicity and metabolic activities [7].

Healthy eating habits or dietary "pattern" may prevent germs and infectious diseases from spreading, but unhealthy eating habits may be prepare the ways of infection development, spreading and aggravation [18]. Some examples of eating habits with potentially effect on infectious diseases would be regarded as the followings:

-The Mediterranean Diet (MD) or Mediterranean Diet Pattern (MDP), as one of the healthiest dietary models may express beneficial effects on infectious diseases prevention. The beneficial effect of MD adherence on reduction of the incidence of major diseases (e.g., cancers, metabolic and cardiovascular syndromes, neurodegenerative diseases, type 2 diabetes and

allergy) has reported. The effect of the MD is due to the synergic and interactive combinations of nutrients, rather than to isolated nutrients.

The consumption of cereals (preferably as whole grains), legumes, nuts, vegetables and fruits, in high amount and frequency; reduced consumption of fish or seafood, white meat and eggs, moderate to small amounts of poultry and dairy products and low ethanol intake, use of olive oil as the principal source of dietary lipids, an adequate daily intake of water and physical activity in order to maintain a healthy physical and mental status are the characteristics of Mediterranean dietary patterns (MDPs) [7].

-The "Western" diet (Western pattern diet or standard American diet) diffused in industrialized countries, with higher intake of animal-derived foods (saturated fats), eggs, sweets, desserts and a lower eating of fruits, vegetables (fibers and micronutrients) and whole cereals [7] may underlies many so-called diseases of civilization, including coronary heart disease, obesity, hypertension, type 2 diabetes, epithelial cell cancers, autoimmune disease, and osteoporosis [4]. With the intervention of infectious agents, these undesirable conditions may be resulted in deleterious and harmful consequences.

Furthermore, eating in restaurants is a part of western lifestyle especially in USA. Almost one-half of every dollar spent on food in the United States is spent on food from restaurants and 1 in 6 eats >5 meals per week in restaurants. Eating food prepared in restaurants is an important source of infection. Foodborne disease causes ~76 million illnesses and ~5000 deaths in the United States each year. The proportion of these illnesses that result from the consumption of food from restaurants is unknown, but it is clear that the restaurant industry plays an important role in the safety of the US food supply [29].

- Alcohol drinking habits: Alcohol misuse has been part of many human societies for centuries. Between 2006 and 2010 in the United States, excessive alcohol consumption resulted in approximately 88,000 deaths (data based on 11 U.S. States) with death rate: 28.5 per 100,000 population. The potential life lost attributed to alcohol averaged about 2.5 million years annually. In addition, the estimated cost of excessive drinking including: loss of productivity, health care costs and criminal justice was \$223.5 billion in 2006 [30]. The deleterious role of alcohol drinking on body such as helping to infection development will come later.

- Traditional foods: In different countries, some traditional foods may affect infection development. In some countries, traditional yogurt act as probiotic food and is positively effective on infection prevention [18], but, some other foods such as traditional Japanese fish dishes sashimi as a raw food may increase the risk of fishborne and foodborne parasitic zoonoses especially anisakiasis. Such fishborne and foodborne parasitic zoonoses are also endemic in many Asian countries that have related traditional cooking styles. Despite the recent increase in the number of travelers to areas where these zoonoses are endemic, travelers and even infectious disease specialists are unaware of the risk of infection associated with eating exotic ethnic dishes [34].

Cultural and religious factors ("Halal" or permissible foods versus "Haram" or forbidden foods)

It is believed that cultural and religious factors affect different aspects of nutrition such as diet quantity and quality, food

sources and etc. For example, *Quran*, the holy book of Muslims, even though is not a medical, biologic and nutrition book, but it has mentioned some guide lines, important points and examples related to human nutrition such as: The nutrition important and its effect on human life, diversity of nutrients and their classification as: Materials with herbal origin (vegetables and etc.) and animal materials (meats, milk and etc.), "Halal" or permissible foods such as vegetables, fruits, meat of lamb, goat, beef, chicken and fish, "Haram" or forbidden foods such as alcoholic drinks, pork, carcasses meat, blood and filthy materials, necessity of fasting during *Ramadan*, necessity of carefulness about foodstuff usage and evaluation of the benefits and harms of potential foods, forbidden of overeating and food extravagance and finally, therapeutics effects of honey [1]. It is suggested that Islamic lifestyle especially in nutrition, express beneficial effects for normal nutrition and prevention of obesity and nutritional disorders and therefore may be influence infection development, prevention and also treatment. Prohibition of eating potentially deleterious materials known as "Haram" substances such as blood, urine and feces in Islam may decline the rate of infections and can help to prevention of infectious diseases development and interfere with emergence or re-emergence of diseases [17].

Some traditional foods as a routine diet of people may be essential role in people health and longevity. Mediterranean diet and natural foods containing probiotics such as yogurt with health beneficial effects involve in prevention of infectious diseases [16].

On the other hand, based on studies across mice and humans, It is suggested that the modern Western lifestyle common aspects, including antibiotics and high-fat diets, can persistently alter commensal microbial communities. Those microbial disturbances may increase pathogen susceptibility and also, obesity and auto-inflammatory disease, important maladies with partial more frequency in the industrialized world [6].

It would be concluded that pay attention to importance of different aspects of human nutrition and their interactions with infection susceptibility and spreading and therefore management of nutritional lifestyle, certainly could help to prevention and control of infectious diseases.

Lifestyle and sexual relationship

Despite continuous efforts for prevention and control of Sexually Transmitted Diseases (STDs), many peoples suffers from STD with very considered wasted expenses for anybody and for community. Human lifestyle especially sexual relationship lifestyle is one of most important factors influences STD development and spreading,

The different human relationships and therefore, infectious agents survival in the body and environment, the rate of infection, The quantity and quality of sex relationships, beginning age, different types, freedom or limitations of sex connections is related to human lifestyle.

Sexual relationship lifestyle may be influenced by many factors such as religion, culture, custom, social media, regulations, economy and etc. Religion may be regarded as an important factor affecting human lifestyle in the field of sexual behavior. Abrahamic religions especially Islam, express essential phrases for sex relations that positively influence sex health and affect STD prevention and control.

Some important findings from Islamic lifestyle with potential effect on STD prevalence are included:

- Encouraging the marriage
- Necessity of purity and hygiene of human bodies against filthy such as urine, feces and semen
- Not unrestrained sexual activity, nor sexual asceticism but legal sexual activities that restricted to marriage
- Prohibition of unlawful and illicit relationships (adultery, pederasty and same-sex relationships)
- Encouraging the chastity and forbidden of indecent behaviors.
- Forbidden sexual relationship during menopause
- Prohibition of alcoholic beverages and therefore prevention of uncontrolled behaviors
- Punishment for overt unlawful sexual relations and sex crimes [19, 20]

It can be concluded from the above evidences that achievement in prevention and control of STD requires to sexual relationship lifestyle discourse and management.

The religious beliefs and practices

Cultural and religious beliefs and community regulations may be regarded as some important factors affecting human lifestyle, therefore, pay attention to relationships between above factors, lifestyle and infectious disease development, progress, prevention, control and treatment is necessary.

The majority of the world people, have religious beliefs and therefore, religion affects different aspects of their life directly or indirectly. In addition to the powerful effect of religion on lifestyle, the effects of religious practices on infectious diseases rate and severity must be regarded. Different religious practices may be included some private and/or communications and multidisciplinary works with important effects on development or control, prevention and treatment of infectious diseases. Some religious practices have integrated with lifestyle and may be express powerful effects on human health especially prevention or control of infectious diseases. Understanding religious practices may allow public health officials to communicate with populations, more effectively target them and encourage infectious diseases prevention using religious beliefs and so on. Some religious, spiritual, and traditional beliefs and practices influence infectious diseases development, spreading, control and prevention. For example, in Islam, there are some essential rules with controlling effect against infectious diseases as the following:

- Emphasis on the necessity of pay attention to keep healthy and preventing harmful health effects
- Necessity of pay attention to the rights of others
- The emphasis on spiritual health strengthening, piety and abstinence "Taghva"
- Encouraging the marriage and regarding the family lifestyle as important principles for management of essential unit of community
- Encouraging the acquisition of health related sciences and underlining that: "for any pain, there is a cure"

- The emphasis on the importance of medicine and preventing the non-scientific intervention on human health
- Insistence on: “*prevention is better than cure*”
- Purity and hygiene of human bodies against filthy: carcass (corpse), blood, urine, feces and semen
- The effects of some religious practices on infectious diseases control and prevention: For example, the need to cleanse the body before some worships in Islam (Washing some parts of body: ablution “*Vuzu*” before official praying “*Salat*” and washing whole body “*Ghosl*” after sexing.
- Prohibition of Jobs with potential harmful effects such as infection development and spreading [17]
- Circumcision as a religious obligatoy: It is the surgical removal of the foreskin, the tissue covering the head (glans) of the penis that usually performed on the first days after birth. It is an ancient practice that has its origin in some religions especially Islam and Jewish.

The American Academy of Pediatrics (AAP) found that the health benefits of newborn male circumcision outweigh the risks. There are some evidences indicating health benefits of circumcision, including: Decreased risk of urinary tract infections and some sexually transmitted diseases in men, protection against penile cancer and a reduced risk of cervical cancer in female sex partners, prevention of balanitis (inflammation of the glans) and balanoposthitis (inflammation of the glans and foreskin), phimosis (the inability to retract the foreskin) and paraphimosis (the inability to return the foreskin to its original location). Circumcision also makes it easier to keep the end of the penis clean [21].

Improvement of qualitative and quantitative studies about powerful effects of religious beliefs and practices on infectious diseases will help to beneficial use of them for infectious diseases prevention and control.

Family lifestyle

The family as the divine building block of society is an important contact area for people with different age and a natural place for immunity development especially in the babies. A healthy, happy and qualified lifestyle in the family including good nutrition, physical activity, love, spirituality support and respect each other would be helpful for improvement of individual and society health.

Family lifestyle could be affect human health including prevention and control of infectious diseases as the following:

Family formation time

As essential unit of society, the time of family formation is very important. After family formation, human relationships would be developed at higher scale and different physiologic and spiritual needs may be managed correctly. Family formation could prepare best situation for safe sex as it recommended by Abrahamic religions (Christianity, Judaism and Islam) and some others to saving sex for marriage. Health reasons, moral beliefs and to get a happier and more romantic marriage, support of it [13]. It seems the marriage without delay and the limiting sexual relations to the spouse, would be beneficial for infection prevention and control specially STD.

The rate of infections

Although there are different findings about infections rate depending on individual, environmental, economic, cultural and social factors and also pathogen related factors, but, it seems that under equal conditions, the rate of some infectious and non-infectious diseases in married persons is lower than non-married [15]. The results may be more available for STD. The relationship between marital status and sexually transmitted Infections has been evaluated in many studies. Data from National Survey of Family Growth in USA (2002) about the effect of marital status on prevalence of sexual indicate that the 12-month prevalence of multiple partners and high-risk partnerships was lowest among currently married, intermediate among cohabiting, and highest among formerly and never-married respondents [13,28].

It is an important finding that encouraging of family formation along with good life, expresses different beneficial effects on human soul and body aspects such as infectious diseases prevention and control.

Sleep and awakening pattern

Sleep and awakening pattern is an important part of the lifestyle. The relationship between sleep and awakening pattern and rate and severity of infections may be elucidated with pay attention to some findings as the following:

-Sleep can help people to recover from disease faster, because sleep can strengthen immunity and help fight infections. It has demonstrated that fruit flies that slept more after infection had a higher survival rate.

Williams, et al. showed that in fruit flies infected with *Serratia marcescens* or *Pseudomonas aeruginosa*, both groups: sleep-deprived and non-sleep-deprived, tended to sleep more after infection. The duration of post-infection sleep determines the flies' recovery rate from infection.

The Penn et al showed that fruit flies, genetically induced to sleep for longer periods of time prior to infection, survive and recover better than the fruit flies that slept normally [35].

Sleep duration has also been suggested to be associated with upper respiratory tract infections (URTI) and sleep disturbance may be a risk factor for inflammation. In some experimental and observational studies, the incidence of common cold after experimental viral exposure was increased with shorter sleep duration. However, the effects of long sleep duration on infections are not well established in some other studies.

Sleep deprivation may negatively affect the immune response and long sleep duration and bad sleep quality have been found to be associated with the immune profile measured by CD4 and cytokines [11].

Synchronization of human sleep and wakeup pattern with the nature, would be helpful for his health and may be benefits to infection prevention and control.

Physical activities

There are different scientific findings about relationship between physical activity and infections, some support beneficial effect of physical activities on infection prevention, but in others this finding has not certified. Some important selected findings are presented as the followings:

1. Relationship between physical activity and viral infections: The physical activity effect on viral infection risk is suggested to be J-shaped; that is, regular moderate physical activity may reduce the incidence and severity of primarily viral infections, such as upper respiratory tract infections, but sedentary behavior, exhaustive high-intensity exercise has been reported to increase the risk of upper respiratory tract infections among athletes [15].

Some studies have shown that 60–90% of people who exercise regularly experience fewer colds than more sedentary peers. In contrast, a large cohort study in Finland did not find an association between physical activity and the risk of common cold. Previous studies have been criticized for their lack of validated methods for measuring incidence of URTI and insufficient control of confounding [11].

2. The potential preventive effect of physical activity on bacterial infections: Few studies have examined the relationship between physical activity and risk of bacterial infection risk. Papp et al, on the basis of filled antibiotic prescriptions hypothesized that increased levels of leisure-time physical activity are related with a lower risk of bacterial infections. Further, low and moderate levels of physical activity were associated with the statistically significant reduction of suspected cystitis. No reduction in suspected respiratory tract infections was statistically significant and associated with physical activity compared with sedentary behavior [15].

3. Physical activity and immune functions: Many evidences indicate that physical activity and light to moderate exercise positively affects the immune system and therefore, the positive effect on infection prevention is acceptable [15,23].

Although, the potential beneficial effect of physical activities on prevention of infectious diseases could not be totally denied, some previous studies indicating potential confounding of age, sex, body mass index, smoking, education, self-reporting mistakes, disease underreporting, and alcohol consumption must be regarded [11,15].

Social lifestyle: Relation between Individual and Society

Interpersonal relationships with people within their immediate surroundings or general public are known as social life. [38], but, But, some researchers limit social life as the part of a person's time spent doing enjoyable things with others [39].

In this article the general concept of social life has regarded excluding family which discussed separately.

Social life versus personal life

Everybody life is included personal and social aspects with different quantitative and qualitative degrees. It is overallly believed that human being as a social being needs to communicate with other people. Therefore, suitable social life induces beneficial effects on human health and social isolation and loneliness may negatively affect human health aspects.

Social isolation is an objective measure of the lack of social connections or interactions, but, Loneliness, as the disagreement between a person's desired and actual social relationships, is an emotional response to social isolation. Consequently, loneliness is thought to be more related to relationship quality than quantity.

Cultural, social and demographic changes have led to an

increased prevalence of loneliness and social isolation in many societies specially modern societies. With increasing lifespan, the number of people aged 60 years and older has tripled since 1950. Older age is usually associated with reduced social interactions, longer periods of time living alone, and higher prevalence of loneliness. However, loneliness can be experienced at all stages of life.

The prevalence of loneliness has increased with delayed marriage, increased two-income households, and increased residence in single-family homes. In addition, the Internet has completely changed the way people live and interact. Despite increased digital connectivity, more people are experiencing social isolation.

Social isolation and loneliness are clearly risk factors for Cardiovascular Disease (CVD) such as elevated blood pressure and atherosclerosis.

The relationship quantity and quality have been inversely correlated with health risks. Strong social relationships can increase the likelihood of survival by as much as 50% relative to individuals whose relationships are weaker. An increase in mortality has been correlated with both loneliness and social isolation. Social isolation, loneliness, and living alone increased the possibility of death by ~29%, 26%, and 32%, respectively.

Perceived Social Isolation (PSI) has damaging effects on the physical health manifested by activation of the Hypothalamic–Pituitary–Adrenal (HPA) axis and the sympathetic nervous system (SNS), and behavioral alteration, including physical inactivity, smoking, and sleep disruption, increased depressive behavior, chronic stress and etc. Repeated and chronic social stress leads to glucocorticoid resistance, enhanced myelopoiesis, up regulated pro inflammatory gene expression, oxidative stress and enhanced cytokine production by immune cells. Cytokines, in turn, can potentiate glucocorticoid resistance.

Glucocorticoids govern many physiological functions, such as immunity, metabolism, cardiovascular activity, and apoptosis [33].

It is obvious that transmission of infectious diseases is related to people living together and their communication, therefore, social isolation may reduce the risk of some infections, but otherwise seems that social isolation and loneliness may be increased the risk of infection development via reduced physical activity, obesity, smoking etc. Moreover, in isolated situations and when a person who lives in seclusion from society needs health cares, the wound management is more difficult and some wound complications such as bed sore may be developed.

Gatherings

Human beings prepare many gatherings for different purposes including: Familial, social, political, religious, sport and other gatherings. In the gatherings, peoples communicate together and may be nearly contact together, therefore, the possibility of infection transmission may be increased. In the Mass Gatherings (MGs) such as sport events and religious festivals, millions of people travel around the world. Therefore, by large number of individuals staying in confined areas, the risk of infectious diseases outbreaks may be increased.

Tabatabaei S M and Metanat M. (2015) were searched electronic medical databases including PubMed and EMBASE from 1990 to 2014 on the subject of epidemiology of infectious diseases related to MGs with keywords including "mass gathering",

"crowding", "infectious diseases", "communicable diseases", "outbreak" and "surveillance" and reported that: The spread of infectious diseases has been a major public health challenge related to MGs. Food-borne diseases and respiratory infections have been the most common outbreaks reported during MGs. *Hajj* is an example of good practice which involves millions of pilgrims, in which comprehensive infectious diseases surveillance is in place to monitor health risks and reinforce evidence-based planning for preventive measures [26].

Participation in gatherings are due to the lifestyle of individuals and are related to their opinions, thoughts, customs and religions. Moreover, human as a social creature needs to some suitable communications, therefore, The opposition to human suitable gatherings is not the solution, but their management of various dimensions, especially health care is necessary.

Social media

Social media as important characteristic of modern lifestyle are potentially useful tools for the effective communication between people and universal source for medical and other suitable information to the public. Social media have been instrumental in informing the public about recent Emerging Infectious Diseases (EID) outbreaks such as the Ebola outbreak in 2014 and the H1N1 outbreak in 2009 [28].

In spite of undeniable benefits of social media on health, there are potentially harmful effects on the health that may be resulted from social media. Some important challenges of using social media in the field of infectious diseases could be classified as the following:

- There are potential risks regarding the distribution of poor-quality information, damage to professional image, breaches of patient privacy, violation of personal–professional boundaries, and licensing or legal issues.

- Information about Emerging Infectious Diseases (EIDs) on social media are user-generated and is not always accurate or useful. It may be contains rumors, misinformation, and conspiracy theories [30].

Moreover, some social media disadvantages especially in addicted form such as: Increased risk of obesity, sleep disorders, sexual problems and deviations with porn websites, promotion of unhealthy behaviors may be effective in infection spreading.

It is necessary to progress of studies for achieving a comprehensive system of personal and social relationships with beneficial use of sciences, experiments and religious teachings.

Recreation and entertainment activities

Leisure spending by different activities, recreation and entertainments as an important part of human life, prepare circumstances that may be helpful to expose people to a growing list of pathogenic microbes, some new and increasingly resistant to current therapies. The type of recreation depends on the people lifestyle. Some important and current recreation and entertainment activities are regarded for possibility of infection spreading as the following:

Outdoor recreation

Camping, playing sports, interacting with animals and mountain climbing, all have the potential to cause illnesses that may be difficult to diagnose and treat.

Travel and Tourism events

Travel is part of human life and it expanded by technological advances. Different lifestyle–related purposes: religious, economic, entertainment and etc induce people to prepare millions trips annually in the world with different consequences. Improvements in transportation infrastructure and increasing human mobility are enabling rapid and extensive connectivity between populations at both local and global scales, allowing for the rapid dissemination of pathogens. Humans are able to introduce diseases into immunologically naïve populations through direct transmission or by introducing them into the environment and travel plays a critical role in the spatial spread of influenza, polio, cholera, and dengue, as drug resistance pathogens such as malaria and antibiotic resistance bacteria [33].

The lifestyle has essential role in quantity and quality of travel events.

Hajj as an universal annual Muslim trip, is an example for religious lifestyle with spiritual and cultural benefits, but needs extensive and programmed health management for prevention and control of infectious diseases. Moreover, in tourism events, people feel more free to experience unknown or new activities, traditional customs and eat unusual foods with unknown Health consequences.

Smoking

Smoking as a habit may be an inalienable part of life of some peoples. Depending on the quantity and quality of smoked-material and the consumer situation, it will be induce a range of harmful effects against human health. Tobacco is the most common substance smoked especially with cigarettes.

Infectious diseases may rival cancer, heart disease, and chronic lung disease as sources of morbidity and mortality from smoking. Cigarette smoking is an important risk factor for some bacterial and viral infections such as invasive pneumococcal disease, influenza and tuberculosis. Smoking increases the risk of infections by structural changes in the respiratory tract and a decrease in immune response. Moreover, the importance of smoking cessation as part of the therapeutic plan for people with serious infectious diseases or periodontitis has been emphasized [2].

Drug Abuse & Addiction

Substance abuse still remains one of the major problems in the world with important social, economic and health consequences and millions of people abusing legal and illegal drugs today.

Substance abuse is one of the major problems in the world today with an estimated 200 million people abusing illegal drugs regularly. In the USA, according to the 2005 National Survey on Drug Use and Health, about 110 million Americans age 12 years and older (46%) used at least one illicit drug (e.g., amphetamines, cocaine, heroin, or marijuana) in their lifetime. Substance abuse imposes enormous sociopolitical, economic, and health costs to the society. Legal and illegal substance abuse costs the American society an estimated one-half a trillion dollars annually.

Drugs of abuse affect almost every physiological/biochemical system in the body. Drug users are more likely than nonusers to contract a variety of infectious diseases and, when infected, to progress to serious illness. Some infections specially: Hu-

man Immunodeficiency Virus (HIV) and hepatitis C virus (HCV) infections are prevalent among substance abusers. Injection drug use (IDU) directly and indirectly accounts for more than one-third (36%) of AIDS cases; about 80% to 90% of HIV positive IDUs may also be infected with HCV. Other viral and bacterial infections such as mycobacterial leading to tuberculosis (TB), sexually-transmitted infections, streptococcal and staphylococcal infections (leading to endocarditis) and others have all been reported in drug abusers.

Injecting drug use and drug use associated impulsive sexual activity further promotes transmission of sexually-transmitted and blood-borne infections.

The majority of HIV infections are attributable to injection drug use, high-risk heterosexual practices and sexual contact between men who have sex with men [14].

Alcohol and infection susceptibility

Many evidences indicate that alcohol has a systemic effect on different organs of the body. Patients with a history of heavy acute or chronic alcohol use, have higher rates of hospitalizations, longer hospital stays, major complications of poly trauma and bleeding disorders, increased mortality, higher intensive care unit admissions, and greater postoperative complications, compared with patients with no history of alcohol use. Physicians have recognized for more than a century that alcohol use is associated with infections and alcoholics are especially at risk for some infections especially pneumonia and tuberculosis and this is confirmed by epidemiological data [30]. Alcohol has been shown to be a risk factor for infection with Hepatitis C [14].

Higher expression of serum bacterial DNA as measured by the abundance of 16S rDNA, bacterial translocation and higher levels of endotoxin and some other molecules found in the outer membrane of Gram-negative bacteria (i.e., lipopolysaccharide) in the blood are indicating a destructive role of alcohol on body responses against infectious agents. This increased risk of infection may be attributed to alcohol's deleterious effect on different systems:

-Gastrointestinal system: Alcohol increases permeability of the intestine. Bacterial overgrowth in the small intestine probably contributes to higher endotoxin blood levels.

-Immune system: Alcohol negatively affects the immune system especially intestinal mucosal immunity.

The effects of alcohol intake undermine immune defenses in both the upper and lower airways: Alveolar macrophage displayed decreased membrane expression of the GM-CSF receptor, impaired bacterial ingestion, lower intracellular zinc levels and decreased phagocytic activity when exposed to *Staphylococcus aureus* in vitro. In rodent models, Alcohol also affects lung immunity with alterations in the recruitment of white blood cells (i.e., neutrophils) into the alveolar space, impairment of neutrophil movement in response to infection, and decreased activation of proteins that induce an immune response.

Furthermore, alcohol seems to produce abnormalities and decreased numbers in natural killer (NK) cells (In mouse models of alcohol consumption). Predisposition of alcoholic patients to viral infections like cytomegalovirus and influenza as well as certain tumors may be related to NK-cell dysfunction.

-Skin: Alcoholism is associated with higher rates of wound infection and delay in wound closure. It is associated with in-

creased risk for *Staphylococcus aureus* infection, including methicillin-resistant *Staphylococcus aureus*, *Streptococcus pyogenes*, and *Vibrium vulnificus*.

Upon findings in mouse models, it seems that ethanol impairs dermal fibroblast function (which plays a role in wound healing), decrease epidermal immune cells (i.e., Langerhans cells) which is likely to account for decreased immune surveillance once the host encounters a pathogenic organism in the skin and can also affect skin T cells [30].

Other recreation and entertainment activities

Some other recreation and entertainment activities may involve transmission of infection. Receiving body modifications could predispose a person to infection. **Body modifications** including tattoos are a globally growing trend. Overall prevalence among adults in industrialized countries is around 10–20%. A systematic review identified 67 cases published between 1984 and 2015, mainly documenting serious bacterial infectious complications after intradermal deposition of tattoo inks. Both local skin infections (e.g. abscesses, necrotizing fasciitis) and systemic infections (e.g. endocarditis, septic shock) were reported. The manufactured tattoo product itself may be a source of infection. In a bacteriological survey, two of 39 colorants were contaminated with aerobic mesophilic bacteria [8].

Continuing studies to achieve the desired form of entertainments with beneficial effects on human health along with suitable and effective management and restricting the harmful recreations are necessary for prevention and control of infectious diseases.

Conclusion

What has been above mentioned is indicating an essential role of lifestyle on development, transmission, frequency and incidence of infections. Therefore, **carrying out in-depth studies** about lifestyle and infectious diseases relationship with understanding, thinking deeply and beneficial use of human experiences, cultural and religious teachings will be helpful to take proper decisions for proper modifications in lifestyle, in the process of acquiring healthy communities.

References

1. Holy Quran, Translated by: MH Shakir, Ansariyan Publications, Qum, Islamic Republic of Iran.
2. Arcavi L, Benowitz NL: Cigarette Smoking and Infection. Arch Intern Med. 2004; 164: 2206-2216.
3. Black J G. Microbiology: Principles and explorations, 4th edi. by John Wiley & Sons Inc. 1999; 383; 479.
4. Carrera-Bastos P, Fontes-Villalba M, O'Keefe JH, Lindeberg S, Cordain L. The Western diet and lifestyle and diseases of civilization. Research Reports in Clinical Cardiology. 2011.
5. Dalvand A, Baghr Maddah SS, Khankeh H, parvaneh S, Bahrami F, et al. The Health-Oriented Lifestyle in Islamic Culture. J Qual Res Health Sci. 2013; 1: 332-43.
6. David LA, Materna AC, Friedman J, Campos-Baptista MI, Blackburn MC, et al. Host lifestyle affects human microbiota on daily timescales. Genome Biology. 2014; 15: 89.
7. Del Chierico, F. Vernocchi P, Dallapiccola B, Putignani L. Mediterranean diet and health: Food effects on gut microbiota and disease control, International Journal of Molecular Sciences. 2014; 7: 11678-99.

8. Dieckmann R, Boone I, Brockmann SO, Hammerl JA, Kolb-Mäurer A, et al. The risk of bacterial infection after tattooing. *Deutsches Arzteblatt international*. 2016; 40: 665-671.
9. Dobner J, Kaser S. Body mass index and the risk of infection - from underweight to obesity. *Clin Microbiol Infect*. 2018; 24: 24-8.
10. Farhud DD. Impact of lifestyle on health. *Iranian Journal of Public Health*. 2015; 44: 1442-4.
11. Ghilotti F, Pesonen AS, Raposo SE, Winell H, Nyrén O, et al. Physical activity, sleep and risk of respiratory infections: A Swedish cohort study. *PLoS ONE*. 2018; 13: 0190270.
12. Jaladat, Amir Mohammad. Sexual ethics in Iranian medicine, Islamic Lifestyle Centered on Health. 2003; 1: 43-7.
13. Jimmy Im. The Arguments for and against saving sex for marriage. 2017.
14. Khalsa, J. Treisman G, McCance-Katz E, Tedaldi E. Medical consequences of drug abuse and co-occurring infections: research at the National Institute on Drug Abuse. *Substance abuse*. 2008; 29: 5-16.
15. Pape, Ryttergaard L, Rotevatn TA, Nielsen BJ, Torp-Pedersen C, et al. Leisure-time physical activity and the risk of suspected bacterial infections. *Medicine & Science in Sports & Exercise*. 2016; 48: 1737–1744.
16. Prescott LM, Harley JP, Kelen DA. *Microbiology*, 4th edi. By WCB, McGraw Hill Company. 1999; 591-593.
17. Rabbani M. *Culture and Health: Science and Religiousness*, Basij Asatid Organization Publications. 2005.
18. Rabbani Khorasgani M, Shafiei R. Traditional yogurt as a source of lactobacilli and other lactic acid bacteria in Iran. In: Shah NP, editor. *Yogurt in health and disease prevention*. Cambridge, MA: Academic Press. 2017; 285-94.
19. Rabbani Khorasgani M. Effectiveness of the lifestyle modifications in prevention and control of sexually transmitted diseases (STDs): Focus on Islamic lifestyle. *Clin J Obstet Gynecol*. 2018; 1: 056-057.
20. Rabbani Khorasgani M, Atyabi SR. Renal diseases and Islamic religious beliefs and practices, *Austin Journal of Nephrology and Hypertension*. 2017; 5: 076.
21. Robinson J. *Circumcision: Pros vs Cons, Benefits, Risks, Procedure*. 2018.
22. Schlossberg D. *Infections of Leisure, Fifth Edition: Electronic Publication*. 2016
23. Sharp NC, Koutedakis Y. Sport and the overtraining syndrome: immunological aspects. *Br Med Bull*. 1992; 48: 518-33.
24. Spicer WJ. *An Illustrated Color Text: Clinical Bacteriology, Mycology and Parasitology*. Churchill Livingstone. 2000; 27: 193.
25. Stahre M, Roeber J, Kanny D, Brewer RD, Zhang X, et al. Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Prev Chronic Dis*. 2014; 11:130293.
26. Tabatabaei SM & Metanat M. Mass gatherings and infectious diseases epidemiology and surveillance, *Int J Infect*. 2015; 2:22833.
27. Tang L, Bie B, Park SE, Zhi D. Social media and outbreaks of emerging infectious diseases: A systematic review of literature. *Am J Infect Control*. 2018; 46: 962-972.
28. Taylor EM, Adimora AA, Schoenbach VJ. Marital status and sexually transmitted infections among African Americans. *Journal of Family Issues*. 2010: 31; 1147–1165.
29. Timothy FJ, Frederick JA. Eating in restaurants: A risk factor for foodborne disease?, *Clinical Infectious Diseases*. 2006; 43: 1324–1328.
30. Trevejo-Nunez G, Kolls JK, De Wit M. Alcohol use as a risk factor in infections and healing: A clinician's perspective. *Alcohol Research: Current Reviews*. 2015; 37.
31. Ventola CL. Social media and health care professionals: benefits, risks, and best practices. *P T*. 2014; 39: 491-520.
32. Wesolowski A, Stresman G, Eagle N, Stevenson J, Owaga, et al. Quantifying travel behavior for infectious disease research: A comparison of data from surveys and mobile phones. *Scientific Reports*. 2014; 4: 5678.
33. Xia N, Li H. Loneliness, social isolation, and cardiovascular health. *Antioxid Redox Signal*. 2018; 28: 837–851.
34. Yukifumi N, Christoph H, Johannes B. Sushi delights and parasites: The risk of fishborne and foodborne parasitic zoonoses in asia, *Clinical Infectious Diseases*. 2015; 41; 1297–1303.
35. Zagorulya M. Sleep fights infection, *J of Young Investigators*. 2015.
36. Sleeping away infection: Penn researchers find link between sleep and immune function in fruitflies. 2014.
37. Surprising results from research about sleep and illness. 2014.
38. https://en.wikipedia.org/wiki/Social_life
39. <https://www.merriam-webster.com/dictionary/social%20life>