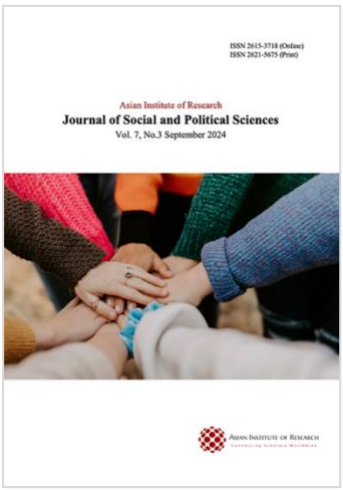

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A Brief Literature Review of Fatigue in Lower-income Countries: Afghanistan

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Abstract
Fatigue does not have a universal definition. In multiple medical literature, fatigue is described as a feeling of tiredness, weakness, and lack of energy. Fatigue has various types, and it is classified into multiple forms based on duration, nature, and cause. For example, fatigue can be defined as physical manifestations, mental fatigue, or a combination of physical and mental fatigue. People with fatigue may have different symptoms, including physical exhaustion, cognitive impairment, emotional instability, decreased motivation, and difficulties concentrating or performing daily tasks adequately. It is essential to manage fatigue appropriately. In lower-income countries like Afghanistan, fatigue can be caused by various factors, including inadequate sleep, excessive physical or mental exertion, stress, poor nutrition, medical conditions, medications, or lifestyle habits. Effective fatigue management involves addressing underlying causes, maintaining healthy lifestyle habits, prioritizing self-care, and seeking professional help to improve overall well-being and energy levels so people can function appropriately. The purpose of this review is to highlight the etiology, common types, and management of fatigue in lower-income countries like Afghanistan.

Keywords: Fatigue, Lower-Income Countries, Types of Fatigue, Etiology of Fatigue, Management of Fatigue

1. Introduction

In medicine, the term fatigue is used to describe a condition when an individual has difficulties performing an activity (subjective sense of weakness), diminished concentration, and experience subjective description of brain fog (UptoDate, 2024). In practice, in different cultures, patients might describe fatigue in situations where they feel excessive daytime sleepiness and lack of energy (Mota & Pimenta, 2006). According to Van't Leven et al. (2010), people can experience symptoms associated with fatigue that last for less than six months (short-term fatigue) or more than six months (chronic fatigue). Study results on the prevalence of fatigue vary from 4.9% to 67.9% among the general population (Moreh et al., 2010; Van't Leven et al., 2010). Variations in the prevalence of fatigue can be due to gender, age, socioeconomic status, and cultural differences (Galland-Decker, 2013). Once

fatigue is defined, it is necessary to investigate the possible etiologies of fatigue, specifically in low-income countries.

2. Etiology of Fatigue in Lower-income Countries

The etiology of fatigue in developing countries like Afghanistan is multifactorial, with its nature and influence resulting from various socio-economic factors specific to the culture and challenges found in lower-income countries (Smartt et al., 2016). For instance, a study by Sadeghniiat-Haghighi & Yazdi, (2015) on fatigue indicated that many lower-income countries like Afghanistan have labor-intensive industries with long working hours, poor working conditions, and inadequate health and safety standards, which can cause high levels of fatigue among workers, affecting their productivity, health, and overall well-being.

Other common causes of fatigue are infectious diseases such as malaria, tuberculosis, human deficiency virus, dengue fever, and parasitic infections, which are common in many lower-income countries (Chang et al., 2023; Coyle et al., 1994; Hickie et al., 2006; Yang et al., 2022). According to Rashid (2004) 43% of deaths from infectious diseases happen in lower- and middle-income countries like Afghanistan. Infectious conditions can lead to fatigue due to the body's immune response to infections, as well as the direct effects of the pathogens on energy levels (Yang et al., 2019).

Poor hygiene and lack of access to clean water and sanitation facilities can lead to waterborne diseases such as diarrhea, cholera, and typhoid fever. These conditions can cause dehydration, electrolyte imbalances, and fatigue (Gonzalez et al., 2019; Semrad, 2012). Moreover, in lower-income countries, a lack of proper diet results from inadequate access to food, poor dietary diversity, and micronutrient deficiencies, which are common causes of fatigue (Seligman et al., 2010). According to Fagbamigbe et al. (2022) the prevalence of underweight is 16% in urban areas and 30% in rural areas of lower- and middle-income countries. Poor diet and malnutrition can lead to fatigue, weakness, and reduced physical and mental energy levels in lower socioeconomic populations (Ma et al., 2022).

Another possible cause of fatigue may be iron deficiency anemia (IDA). IDA is widespread in lower-income countries, particularly among women and children (World Health Organization, 2024). According to the World Health Organization (2024) anemia is commonly prevalent in lower- and middle-income countries with 40% children, 37% pregnant women, and 30% women aged 15-49 years. IDA can cause fatigue, weakness, dizziness, and reduced capacity for physical activity due to the body's decreased ability to transport oxygen to tissues, causing fatigue in anemic population (Azzolino et al., 2020; Azzolino et al., 2021). See Table 1 for other causes of fatigue.

Table 1: Causes of Fatigue

Cause	Symptoms	Physical Exam	Laboratory
Congestive heart failure	Dyspnea on exertion, orthopnea, leg swelling	S3 gallop, inspiratory rales, elevated jugular venous distension, peripheral edema	Chest radiograph, echocardiogram
Chronic obstructive pulmonary disease	Dyspnea, chronic cough, sputum production	Evidence of hyperinflation, wheezing, rales	Chest radiograph
Sleep apnea	Snoring, interrupted breathing during sleep	Obesity, hypertension	Sleep study
Endocrinologic/metabolic			
Hypothyroidism	Cold intolerance, weight gain, constipation, dry skin	Bradycardia, goiter, slow deep tendon reflex relaxation phase	Thyroid function tests
Hyperthyroidism	Heat intolerance, weight loss, diarrhea, moist skin	Tachycardia, goiter, ophthalmopathy	Thyroid function tests
Chronic renal disease	Nausea/vomiting, mental status changes, decreased urine	Hypertension, peripheral edema	Renal function tests/ serum electrolytes
Chronic hepatic disease	Abdominal distention, gastrointestinal bleeding	Jaundice, palmar erythema, gynecomastia, splenomegaly, evidence of ascites	Hepatic function tests
Adrenal insufficiency	Weight loss, salt craving, gastrointestinal complaints	Hypotension, hyperpigmentation, vitiligo	Morning cortisol/ACTH, ACTH stimulation test
Electrolyte abnormalities			
Hyponatremia	Nausea, malaise, cognitive dysfunction	Generally normal exam	Serum sodium level
Hypercalcemia	Anorexia, polydipsia/polyuria, nausea	Generally normal exam	Serum calcium/albumin levels
Hematologic/neoplastic			
Anemia	Dizziness, weakness, palpitations, dyspnea	Tachycardia, pallor	Complete blood count
Occult malignancy	Weight loss, localized symptoms may be present depending upon type	Variable	Variable depending upon type
Infectious diseases			
Mononucleosis syndrome	Fever, sore throat, tender lymph nodes	Fever, exudate pharyngitis, tender cervical adenopathy	Complete blood/differential count
Viral hepatitis	Fever, nausea/vomiting, abdominal discomfort	Fever, jaundice, tender hepatomegaly	Hepatic function tests, viral hepatitis serologies
HIV infection	Weight loss, variable localized complaints	Variable physical findings	HIV serology
Subacute bacterial endocarditis	Fever/chills, night sweats, myalgias	Fever, new (regurgitant) murmur, peripheral manifestations	Blood cultures, echocardiogram
Tuberculosis	Fever/chills, night sweats, fatigue, weight loss	Cough, chest pain, dyspnea, hemoptysis	PPD/gamma-interferon assay, chest radiograph
Rheumatologic			
Fibromyalgia	Chronic diffuse muscle pain	Multiple "tender points" on palpation	None
Polymyalgia rheumatica	Aching/morning stiffness of shoulders, neck, and hips	Decreased range of motion of shoulders, neck, and hips	Erythrocyte sedimentation rate
Psychological			
Depression	Sad mood, anhedonia, altered sleep, cognitive dysfunction	Generally normal exam	Screening test (e.g., PHQ-2, PHQ-9)

ACTH: Adrenocorticotropic hormone, HIV: *human immunodeficiency virus, PPD: Purified protein derivative, and PHQ: Patient health questionnaire.*
UpToDate (2024). Approach to the adult patient with fatigue. https://www.uptodate.com/contents/approach-to-the-adult-patient-with-fatigue?csi=12e40d0a-894b-4fed-9771-e793632e8204&source=contentShare.

3. Types of Fatigue

In medical literature, fatigue is categorized into different forms. Some of the common types that are reviewed here are (a) physical fatigue, (b) mental fatigue, (c) emotional fatigue, and (d) compassion fatigue (Billones et al., 2021). It is important to appropriately categorize the cause of fatigue in order to understand its scope and posit potential interventions. Each type of fatigue has unique symptoms and may respond to unique interventions strategies.

Physical fatigue is characterized by a sense of physical weakness, heaviness, or exhaustion(Behrens et al., 2023). It can result from prolonged physical exertion, inadequate rest or sleep, poor nutrition, or underlying health conditions (Behrens et al., 2023). Physical fatigue can lead to muscle weakness, reduced coordination, and general weariness (Wan et al., 2017).

Mental fatigue is described as a feeling of cognitive exhaustion or mental weariness, and can result from prolonged periods of concentration, stressful decision-making, or overly intense cognitive tasks (Proost et al., 2022). Mental fatigue symptoms may include difficulty concentrating, memory problems, slower processing speed, and reduced mental clarity (Kunasegaran et al., 2023). Mental fatigue can be caused by factors such as stress, multitasking, and information overload (Kunasegaran et al., 2023; Proost et al., 2022).

Feelings of emotional drain, apathy, or burnout describe emotional fatigue. Emotional fatigue can result from prolonged exposure to stress, emotional turmoil, trauma or challenging interpersonal situations (Jin et al., 2020; Kunasegaran et al., 2023). Emotional fatigue symptoms may include mood swings, irritability, emotional numbness, or a sense of emotional depletion and can also lead to symptoms of depression and anxiety (Jin et al., 2020; Kunasegaran et al., 2023).

Compassion fatigue is a type of fatigue that is mainly experienced by people who care for or provide support to others experiencing trauma or suffering(Gallagher, 2013). Compassion fatigue is commonly seen in service

professionals such as healthcare providers, social workers, first responders, and caregivers (Gallagher, 2013). Service professionals may develop compassion fatigue from repeated exposure to others' pain and distress which may be amplified in lower-income populations (Gallagher, 2013). People with symptoms of compassion fatigue report emotional exhaustion, feelings of hopelessness, and a reduced ability to empathize (Lagher, 2013; Paiva-Salisbury & Schwanz, 2022).

4. Possible Causes of Fatigue

4.1. Poor Sleep Hygiene

Fatigue resulting from insufficient or poor-quality sleep is common for many individuals. According to study results, the prevalence of insomnia varies worldwide from 10% to 30%, and some study results suggest the percentage is even higher, from 50% to 60% (Buysse et al., 2008; Nguyen et al., 2019; Taylor et al., 2007). A higher percentage of insomnia is common in older people with medical and mental health diseases (Buysse et al., 2008; Nguyen et al., 2019; Taylor et al., 2007). Sleep deprivation, sleep disorders (e.g., insomnia, sleep apnea), irregular sleep patterns, and disruptions in circadian rhythms can all contribute to fatigue (Chotinaiwattarakul et al., 2009; Felden et al., 2015). In lower- and middle-income countries, high levels of psychological stress, smoking, poor quality of life, and food insecurity are positively associated with insomnia (Al Karaki et al., 2020; Chan et al., 2021; Jacob et al., 2023). In addition to suboptimal sleep hygiene practices in lower-income countries, environmental factors can significantly affect and contribute to fatigue symptoms.

4.2. Environmental factors

In many lower-income countries, people use solid fuels such as wood, coal, or biomass, leading to high indoor and outdoor air pollution levels. Globally, around 7.3 billion people are exposed to air pollutants containing tiny particles that are 2.5 microns or less in diameter, making them more invasive with widespread exposure of airborne and waterborne toxins to lower-income populations (Rentschler & Leonova, 2023). Eighty percent of these populations live in lower-and-middle countries like Afghanistan (Rentschler & Leonova, 2023). According to Hahad (2024) in 2019, air pollution in Afghanistan was associated with significant health impacts and contributed to 37033 deaths (14.72% of total deaths). Chronic exposure to poor air quality can lead to a number of health complications.

According to an analysis, from 1990 to 2019, lower respiratory infections, neonatal respiratory disorders, ischemic heart disease, stroke, COPD, lung cancer, and diabetes mellitus were the main causes of death and disease burden resulting from air pollution in Afghanistan (Hahad, 2024). Prolonged exposure to air pollutants and smoke can increase the risk of various diseases, such as chronic obstructive pulmonary disease, causing fatigue (Duan et al., 2020; Gall et al., 2013; Szymanska-Chabowska et al., 2021). To adequately address symptoms of fatigue, it is necessary to review potential factors involving the delivery of healthcare services to address the causes of fatigue related to either reduced access to healthcare or inadequate healthcare services in lower-income countries.

4.3. Factors Related to Health Care Services

In countries like Afghanistan, people have limited access to high-quality healthcare services, including diagnostics, medications, and medical providers, which can cause delays or inadequate treatment of underlying health conditions (Khan et al., 2022). In addition, psychological factors such as anxiety, depression, and trauma can also contribute to physical fatigue and worsen overall health outcomes (Hawks et al., 2020; Orach, 2009; Peters et al., 2008).

Afghanistan's healthcare system is facing severe difficulties due to continuous conflict and political instability. Afghanistan ranks second lowest for health worker density within the Eastern Mediterranean Region (EMR), with only 4.6 medical doctors, nurses, and midwives per 10000 people, well below the critical shortage threshold of 23 healthcare professionals per 10000 (World Health Organization, 2020). This reduced access to healthcare services can significantly affect the diagnosis and treatment of chronic fatigue symptoms.

Furthermore, pregnant women and young children in lower-income countries like Afghanistan are vulnerable to fatigue due to factors such as inadequate prenatal care, poor nutrition, and lack of access to essential healthcare services (Felden et al., 2015; Lin et al. 20009; Mohseni et al., 2023). Maternal fatigue can impact pregnancy outcomes, while childhood fatigue can affect growth and development (Crawley, 2018; Mortazavi & Borzoee, 2019). Study results indicate that fatigue and lack of physical activity in pregnant women can increase the risk of labor complications and postpartum depression, excessive gestational weight gain, hypertension, and gestational diabetes mellitus (Mortazavi & Borzoee, 2019; Syed Nor et al., 2022). Physical activity is also necessary for children's physical and mental growth and health, and fatigue and lack of physical activity during childhood can increase the risk of multiple chronic conditions such as obesity, diabetes, and cardiovascular disease (Carson & Janssen, 2011; Gupta et al., 2012; Suchert et al., 2015).

Addressing the root causes of fatigue in lower-income countries is a complex task that requires a comprehensive approach. It is not enough just to treat the symptoms; we must also tackle the underlying impacts of social, economic, and environmental determinants of health.

4.4. Impacts of fatigue

Fatigue can have critical impacts on various aspects of human functioning and life, including physical health, mental well-being, cognitive performance, emotional stability, and overall quality of life (Maisel et al., 2021). Studies have investigated some key effects of fatigue on quality of life and performance of daily activity tasks. Recognizing these effects will allow for a more thorough diagnosis of the root cause of fatigue and its effect on health. Studies by Barroso et al. (2015) and De Raaf et al. (2012) suggest that prolonged fatigue can weaken the immune system, making people more vulnerable to illnesses and infections. Study results indicate that there is a causal relationship between fatigue and inflammation. For example, Brenu et al. (2014) indicated a lower activity of natural killer cells, increased regulatory T cells, and dysregulation in cytokine levels.

Fatigue can cause muscle pain, joint pain, headaches, and physical discomfort (Jaime-Lara et al., 2020). Study results indicated that hallmark symptoms of patients with chronic fatigue are new-onset headaches, regular exercises followed by feeling worse discomfort, and delays in recovery, commonly more than one day (Rowe et al., 2014). Salit (1997) states that patients might report flu-like symptoms. Besides impairing physical activity, fatigue also impacts mental health.

Effects of fatigue on mental health can include, increasing symptoms of anxiety, depression, irritability, and mood disturbances, leading to heightened stress responses and reduced resilience to life's challenges (Tylee et al., 1999). Moreover, patient populations with chronic fatigue syndrome have reported problems with attention, analyzing new information, and impairment in tasks that need working memory (Cockshell & Mathias, 2010).

Fatigue can impair cognitive functions such as attention, concentration, memory, and decision-making (Slimani et al., 2018). Mental fatigue can result in slower processing speed, decreased mental clarity, and difficulties with problem-solving tasks. Individuals may also experience lapses in judgment, reduced creativity, and impaired reaction times when fatigued.
Fatigue can significantly impact performance at work or school (Boksem & Tops, 2008). Productivity levels may decline, concentration may falter, and errors or accidents may increase when individuals are fatigued (Marcora et al., 2009; Wascher et al., 2104).

Fatigue poses safety risks in various settings, including workplaces, transportation, and healthcare facilities (Cunningham et al., 2022). Fatigue-related errors and accidents can have serious consequences, endangering individuals' safety and the safety of others (Van Cutsem et al., 2017; Wascher et al., 2016). In safety-critical industries such as aviation, transportation, and manufacturing, fatigue management is essential to prevent accidents and injuries (Tavakoli Kashani et al., 2022).

Fatigue-related absenteeism can also affect academic achievement (I. M. Ilić & M. D. Ilić, 2023; Kim et al., 2023). Knight et al. (2018) indicated school absenteeism and poor academic performance, suboptimal school-related life

quality, diminished participation in school activities, and less school connectedness among adolescents with chronic fatigue syndrome.

Fatigue can significantly impact an individual's overall quality of life. Persistent fatigue can lead to reduced engagement in social activities, hobbies, and personal relationships. Individuals may experience limitations in daily activities and a decreased sense of enjoyment and fulfillment in life due to fatigue (Leikas, 2020). In addition, fatigue can strain interpersonal relationships, leading to communication difficulties, emotional distance, and conflicts within relationships (Lampert et al., 2019). Partners, family members, and friends may struggle to understand or cope with a fatigued individual's needs and limitations, affecting the dynamics of their relationships, which negatively affects their overall quality of life (Murphy et al., 2021). See Figure 2

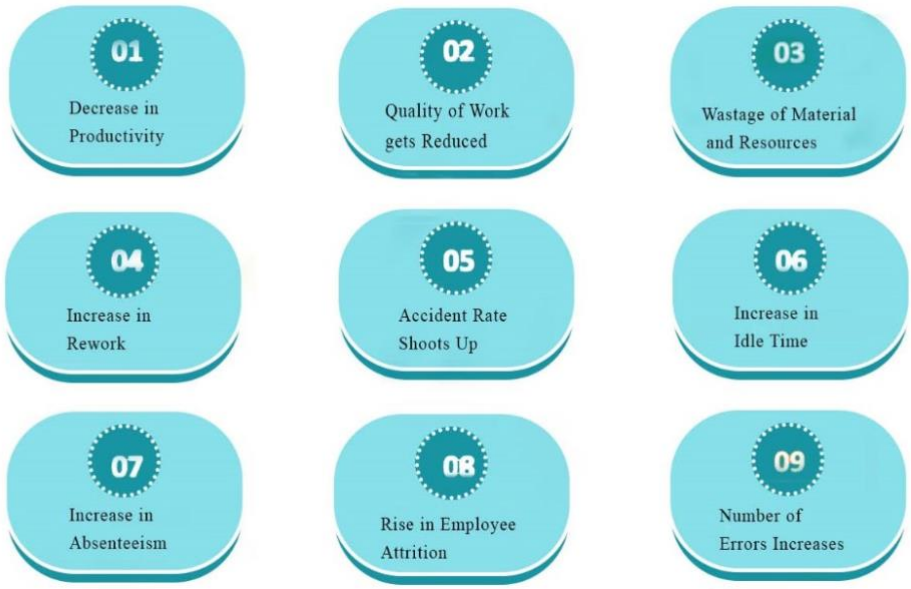

Figure 2: Impacts of Fatigue

5. Management of Fatigue: Practical Recommendations to Mitigate Symptoms

5.1. Sleep

Effective fatigue management involves a combination of lifestyle modification, stress reduction techniques, healthy habits, and self-care practices to address underlying factors contributing to fatigue. Ensuring adequate and restful sleep each night may be an effective initial strategy. Many guidelines recommend 7-9 hours of quality sleep to allow the body and mind to rest and recharge (Watson et al., 2015). People with fatigue due to poor sleep quality should establish a bedtime routine, create a conducive sleep environment, and avoid stimulants like caffeine and electronic devices before bedtime (Irish et al., 2015). Mitigation of sleep disturbance may be problematic in lower-income countries where housing insecurity may adversely affect sleep. Dealing with the root causes of housing insecurity is outside the scope of this paper and must be at the government policy level. In addition to housing insecurity, many lower-income populations experience food insecurity, lacking access to adequate nutrition, which can affect the levels of fatigue.

5.2. Nutrition

It is also essential to maintain a well-balanced diet rich in nutrients to support energy levels and overall health. Afghanistan remains one of the most fragile nations in South Asia, with a serious hunger crisis, ranking 103 out of 116 countries in the Global Hunger Index (Rahmat et al., 2023). Afghanistan is also ranked 42 among 45 countries on the Hunger and Nutrition Commitment Index (HNCI), which assesses how committed governments are to combating hunger and malnutrition (Sharma et al., 2021). In 2021, 14 million Afghans were reported to not have access to adequate food supplies, with 95% of households not consuming enough food (3). It was expected that, in 2021, half of Afghan children under five years old would suffer from acute malnutrition, and at least 1 million children would die from severe malnutrition (United Nations International Children's Emergency Fund, 2021).

According to the Food and Agriculture Organization of the United Nations (2024), the Ministry of Public Health, affiliate organizations, international health agencies, public education programs, food aid programs, and subsidies should implement food enrichment and dietary supplementation that can boost overall nutrition. Moreover, it is essential to modify dietary practices, especially for infants, mothers, and other vulnerable groups, which is pivotal. Finally, increasing the availability of nutrient-rich foods will significantly improve the health outcomes of the Afghan population (Fahim et al., 2023).

It is better to abstain from excessive consumption of sugary or processed foods, which can lead to wide fluctuations in blood glucose which can lead to fatigue. Eating regular, nutritious meals can assist in sustaining energy levels throughout the day (National Guideline Center, 2021). In addition to providing essential nutrition, chronic dehydration can often lead to symptoms of fatigue, so it is vital for populations to stay hydrated (Shaheen et al., 2018), especially in hotter regions.

5.3. Exercise

Performing regular exercise and physical activity can boost energy levels, improve sleep quality, and reduce feelings of fatigue. It is critical to do aerobic exercise, strength training, and flexibility exercises to enhance physical fitness and stamina, starting with activities that are enjoyable and sustainable and then gradually increasing the exercise intensity (Larun et al., 2017). Other helpful strategies include stress-reducing techniques such as mindfulness, meditation, deep breathing, yoga, or progressive muscle relaxation to alleviate mental fatigue and promote relaxation (Boehm et al., 2012; Puetz, 2006). Finally, identifying sources of stress in life and developing coping strategies to manage stress effectively can be helpful.

5.4. Work-life Balance

Maintaining a healthy balance between work, personal life, and leisure activities can decrease fatigue. It is essential in the management of fatigue to avoid overcommitment and learn to delegate tasks when possible as well as organize and prioritize responsibilities to prevent feeling overwhelmed and fatigued (Schjoedt et al., 2016). Managing work-related fatigue is essential to maintain productivity and job satisfaction. Study results recommend a number of strategies to mitigate and manage work-related fatigue such as taking breaks, maintaining healthy style, incorporating mindfulness techniques to decrease stress and improve focus at work (Wong & Swanson, 2022). In cases of persistent or severe fatigue it is fundamental to consult healthcare providers to establish a diagnosis and then manage underlying medical conditions such as sleep disorders, thyroid imbalances, anemia, or chronic fatigue syndrome (Sapra, & Bhandari, 2023). See Figure 3

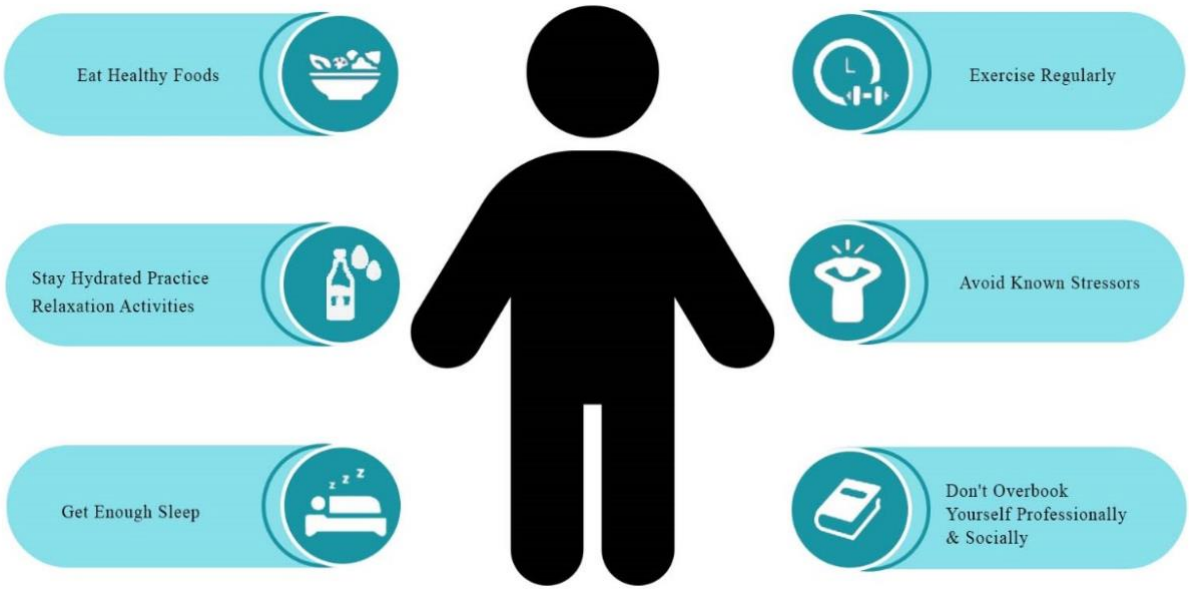

Figure 3: Key Points in the Management of Fatigue

6. Conclusion

In lower-income countries such as Afghanistan factors such as infectious diseases, chronic malnutrition, anemia, air pollution, limited healthcare services, psychosocial stress, and maternal and child health issues all contribute to the prevalence and impact of fatigue among general populations. Addressing fatigue in lower-income countries such as Afghanistan requires a holistic and integrated approach that considers the multiple aspects of social determinants of health. Strategies such as improving access to clean water and sanitation, promoting healthy nutrition programs, enhancing healthcare infrastructure, providing occupational health and safety measures, addressing infectious disease burden, and implementing mental health support services are all crucial.

Sustainable solutions to combat fatigue can also involve investigating prevalent causes of fatigue locally and nationwide and creating evidence-based solutions to improve access to healthcare services, promote public health interventions, enhance nutrition programs, address infectious disease burden, provide occupational health protections, and increase awareness and resources for mental health support. By implementing comprehensive strategies and fostering collaboration between governments, healthcare organizations, non-governmental agencies, and communities in Afghanistan and other lower-income countries, it is possible to mitigate the burden of fatigue, enhance quality of life, and promote overall well-being. Only by adopting a holistic approach can we reduce the burden of fatigue and improve the well-being of individuals in lower-income countries.

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