

INTERNATIONAL JOURNAL OF UNANI AND INTEGRATIVE MEDICINE



E-ISSN: 2616-4558
P-ISSN: 2616-454X
www.unanijournal.com
IJUIM 2024; 8(3): 119-123
Impact Factor (RJIF): 6.3
Peer Reviewed Journal
Received: 23-06-2024
Accepted: 24-07-2024

Dr. Sana Fatima
PG Scholar, Department of
Kulliyat, Govt Nizamia Tibbi
College, Charminar,
Hyderabad, Telangana, India

Dr. Mir Wajahath Ali Shah
Assistant Professor,
Department of Kulliyat, Govt
Nizamia Tibbi College,
Charminar, Hyderabad,
Telangana, India

Dr. Mohd Yousuf Uddin
Professor and HOD, UG & PG
Department of Kulliyat, Govt.
Nizamia Tibbi College,
Charminar, Hyderabad,
Telangana, India

Corresponding Author:
Dr. Sana Fatima
PG Scholar, Department of
Kulliyat, Govt Nizamia Tibbi
College, Charminar,
Hyderabad, Telangana, India

An overview on *Malancholia* (a depressive disorder) in Unani system of medicine and its prevention through *Asbaab-E-Sittae Zarooriah* (six essential factors)

Dr. Sana Fatima, Dr. Mir Wajahath Ali Shah and Dr. Mohd Yousuf Uddin

DOI: <https://doi.org/10.33545/2616454X.2024.v8.i2b.288>

Abstract

Depression is not described in classical Unani literature but the clinical features of *Malekholiya* described in Unani literature mimics the clinical features of depression as described in modern medicine. Unani Physician has narrated this disease under the heading *Nafsiyati Awamil* 1 and mentioned in their ancient scripture that making changes in our life style through *Asbab e sitta zarooriya* now we can offer long-term benefits to the mental health. In the Unani system of medicine, *Tabiyat* is an individual's internal power or capacity to withstand or combat disease or perform normal physiological functions. Strengthening *tabiyat* can better be obtained with moderation in *Asbab-e-Sitta Zarooriya*. Unani medicine recognizes six factors called as *Asbab-e-Sitta Zarooriya* which are essential in establishing a synchronized biological system and thus living a balanced existence.

These six essential factors are: *Hawa-e-Muhit* (Atmospheric Air), *Makool-wa-Mashroob* (Foods and Drinks), *Harkat-wa-Sakoon-e-Jismani* (Rest and Physical activity), *Harkat-wa-Sakoon-c- Nafsan* (Psychological activity and Repose), *Naum-wa-Yaqzah* (Sleep and Wakefulness), *Istifragh-wa-Ihtibas* (Elimination and Retention). Going through the Unani classics, it is revealed that a very elaborative discussion regarding *Malekholiya* (Malancholia / Depression) and its management is available in Unani System of Medicine. Unani scholars have strongly advocated the use of *Asbaab-e-Sittae Zarooriyah* in *Malenkholia*.

Keywords: Depression, malenkholia, malekholiya, nafsiyati awamil, asbab-e-sitta zarooriya, black bile

1. Introduction

According to WHO Depressive disorder or depression is a common mental health condition that can happen to anyone. It is characterized by a low mood or loss of pleasure or interest in activities for long period of time ^[1]. Approximately 15% of the population experiences a major depressive episode at some point in life and 6-8% of all out-patients in primary care settings satisfy diagnostic criteria for the disorder. 4-5% of all depressed patients will commit suicide ^[2].

- **Depressive episode:** Clinical features include symptoms that almost always occur (e.g. depressed mood, loss of interest and pleasure, reduced energy) and other symptoms ^[3]. Within this general depressive syndrome, some symptoms (termed 'biological', 'somatic' or 'vegetative') have special significance - they indicate the presence of 'endogenous' or 'melancholic' depression. These symptoms include anhedonia (complete inability to take interest or pleasure in anything, leading to a flat or unvarying mood), some psychomotor symptoms (retardation, agitation) and marked loss of appetite, weight and libido ^[3]. The episode can vary from mild to severe, depending on the number and severity of symptoms and on the disturbances they cause to work and family commitments. Depression is commonly associated with symptoms of anxiety or with coexisting anxiety disorders such as agoraphobia or social phobia ^[30]. Hallucinations and delusions may occur in severe cases when these symptoms are present, the illness is termed 'Psychotic Depression' ^[3]. Depression can generally be distinguished from other syndromes when four or more symptoms of a depressive episode are present ^[3]. Depression is not described in classical Unani literature but the clinical features of *Malekholiya* described in Unani literature mimics the clinical features of depression as described in modern medicine.
- Unani Physician has narrated this disease under the heading *Nafsiyati Awamil* ^[4].

Methodology

A systematic literature review was performed by surveying relevant peer-reviewed research articles retrieved from several online bibliographic databases such as Research Gate, PubMed, Scopus, Google, Google Scholar, Science Open, and Springer Links. Central Library of GovtNizamiaTibbi College and Hospital, Hyderabad was also accessed for the literature search. Inclusion criteria were literature sources such as peer reviewed journal articles, conference/ seminar proceedings, thesis and dissertations, refereed books and abstracts. Online search strategy involved keywords like Depression, Malencholia, *Malekholiya*, *Nafsiyati Awamil*, *Asbab-e-Sitta Zarooriya*, Black bile.

Concept of Depression in Unani medicine

Malencholia is a greek word which is composed of two words *mali* means *Sawda* (Black bile) and *Khuliya* means humour. Since the causative factor of this disease is *Sawda* (Black bile) therefore it is named as *Malekholiya* [5, 6].

Hakeem Ajmal Khan Sahab mentioned in his book Haziq that the patient of this disease loses the dignity of humanity & is no longer useful for religion & the world. He becomes the person devoid of all senses. He also mentioned that it can be expected that the disease can be treated in the beginning and it becomes difficult to reform when it is old [7]. Abdul Hasan Al'Qamri mentioned in his book Ghina-muna that the causative factor of *Malekholiya* is the dominance of *Sawda* (Black bile) in the blood, initiate in blood vessels of brain or whole body [8].

Abubakar Mohammed bin Zakariya Razi has mentioned references of *Buqrat* (Hippocrates) *Jalinoos* (Galen) *Xerophilus* and *Serapion* on the disease in his book *Kitab al Hawi* [9].

According to Buqraat (Hippocrates) sometimes the altered temperament of *Ruh* (pneuma) may give rise to *Malekholiya*. It may be caused due to sue *Mizaj haar yabis* (morbid hot and dry temperament) of heart particularly when the brain temperament is moist [9].

According to Jalinoos, *Malikhuliya* refers to a mental disorder mainly caused by humoral derangement. If a person feels relief in his symptoms after vomiting, stool, belching than the causative factor is *Maraq* (Peritoneum). Whenever the specific symptoms are severe than the disease will be within the brain not in the *maraq* [9].

According to Xerophilus it may be secondary where the pathology lies in the brain but the real source of the disease is *masareeqa* (mesentery) in which *Mizaj haar* (hot temperaments) leads to thickening of the blood [9].

According to Serapion malencholia is a name of *waswase balahimi*

It is of three types

- In which *khilt e sawda* (black bile) is present in brain
- In which *khilt e sawda* (black bile) is present in whole body
- It is called as *imraaq*—> which is caused due to accumulation of morbid materials in the vessels of liver that leads to formation of *Raddi bukharaat* (bad vapours) which reach the head [9].

According to Ibn sina (980-1037 AD), it may be secondary where the pathology lies in brain but the real source of disease is either the stomach, uterus, liver, *maraq*

(peritoneum) or *masareeqa* (mesentery), in which *waram-i haar* (hot inflammation) exists that leads to formation of morbid *melanchole* producing *radi bukharaat* (bad vapours) These vapours when reach the brain vitiate the *ruh-i nasani* (brain pneuma) or causing excessive heat and dryness resulting in *malikhuliya*. Accumulation of *mawaad* (morbid materials) which is supposed to be habitually evacuated from the body through menstruation, hemorrhoids, epistaxis, etc also leads to melancholia [9, 10, 11, 12].

Asbab E Marz (Etiology)

- Dominance of *khilt e sawda* (black bile)
- Excessive sexual inter course
- Excessive physical activity
- Prolonged exposure to excessive hot climate or wind
- Excessive use of Salt and spices
- Eating and drinking sour items
- Living in narrow and dark places
- Wearing black color clothes
- Accumulation of *mawaad* (morbid materials) which is supposed to be habitually evacuated from the body through menstruation, hemorrhoids etc.
- *Ihtiraq* (exhaustion/combustion) of any of the four body humors [7].

Signs and symptoms of melancholia [5, 6, 10, 11, 13]

Based on involvement of humours

- *Damvi melancholia* (Sanguineous melancholia)
- The patient is fond of laughter, sportive and thinks or hallucinates joyful things.
- *Balgami melancholia* (phlegmatic melancholia)
- Patient become dull and lethargic
- *Safravi malencholia* (Bilious melancholia)
- Patient will have restlessness, insomnia, irritability
- *Sawdavi melancholia* (melancholic melancholia)
- Patient will have general weakness, blackish complexion and hyper pigmentation of skin.
- *Quruh* (Wounds) and itching may be present in the later stage.
- Pulse become small and hard and urine remains *raqeeq* (clear with low specific gravity)
- *Sehar* (insomnia) is profound feature in case of *malikhuliya* due to *Su-i Mizaj Yabis* (dry temperamental dyscrasia).

General	Somatic
Hopelessness	Appetite disturbance
Helplessness	Weight change
Low mood	Constipation
Reduced energy	Amenorrhoea
Suicidal thoughts	Low Libido
Loss of interest	Sleep Disturbance
Poor concentration	Anxiety
Guilt	
Pessimism	Tension
Depersonization	Apprehension
	Phobias

Criteria for a depressive episode [3]

A to D must all apply

- A. Atleast 5 or more of the following symptoms (including

1 or 2) present for atleast 2 weeks, representing a change from previous functioning.

1. Depressed mood almost every day for most of the day.
2. Markedly reduced interest or pleasure in all, or almost all activities almost every day for most of the day.
3. Significant wt. loss or wt. gain when not dieting, or increased or decreased appetite almost every day.
4. Insomnia or hypersomnia almost every day.
5. Agitation or retardation almost every day.
6. Fatigue or loss of energy almost every day.
7. Feelings of worthlessness or excessive or inappropriate guilt almost every day.
8. Reduced ability to think or concentrate or indecisiveness almost every day.
9. Recurrent thoughts of death or suicide.

B.

1. No organic cause
2. Not caused by bereavement

C. No delusions or hallucinations in absence of mood symptoms for as long as 2 weeks during the course of the illness

C. Not superimposed on schizophrenia or other psychoses.

Prevention and management of Malencholia (depression) through *Asbaab e sittae zarooriya* (Six essential factors)

In the Unani system of medicine, *Tabiyat* is an individual's internal power or capacity to withstand or combat disease or perform normal physiological functions. Strengthening *tabiyat* can better be obtained with moderation in *Asbab-e-Sitta Zarooriya*. Unani medicine recognizes six factors called as *Asbab-e-Sitta Zarooriya* which are essential in establishing a synchronized biological system and thus living a balanced existence. The word *sitta* stands for six. When all the six factors are in equilibrium, health is maintained; otherwise it needs moderation and modification. These six essential factors are:

1. *Hawa-e-Muhit* (Atmospheric Air)
2. *Makool-wa-Mashroob* (Foods and Drinks)
3. *Harkat-wa-Sakoon-e-Jismani* (Rest and Physical activity)
4. *Harkat-wa-Sakoon-e-Nafsani* (Psychological activity and Repose)
5. *Naum-wa-Yaqzah* (Sleep and Wakefulness)
6. *Istifragh-wa-Ihtibas* (Elimination and Retention)

Hawa-e-Muhit (Atmospheric Air)

Great importance is given to clean air in Unani medicine as clean and good air is essential for good health; many diseases occur due to variations in the air. *Ibn Sina*, a renowned Unani scholar described in his famous treatise, *Canon of medicine*, that the change of environment relieves the patients of several ailments. He has also highlighted the need for open airy houses with proper ventilation, playgrounds, and gardens in cities so that everyone has adequate fresh air and a proper ecological balance is upheld^[14].

The two main functions of air are:

- *Tarveh* is for moderation of hot temperament of *ruh*. This modification is attained by means of inspiration or inhalation through the lungs.
- *Tanqiya* (purification) is for expulsion of waste product of *ruh*. This purification is attained by means of

expiration or exhalation^[15].

Makool-wa-Mashroob (Foods and Drinks)

The word *makool* stands for foods and *mashroob* for drinks. Hippocrates stated 'the cause of sickness is overeating and the cause of health is eating like a bird', 'take diet only when you have desire', and 'good wines in small quantity is the friend of body and apple is the friend of the soul'^[16].

Another statement of Hippocrates (460-370BC) is 'let your food be your medicine, and medicine be your food', and 'leave your drugs in the chemist's pot, if you can heal the patient with food'^[17].

Pythagoras (570-495BC) acknowledged that 'people should take care of their health; the diet, coitus, and exercise should be in a balanced way'¹⁵ whereas Razi said that 'good nutrition, adequate rest, happiness and best line of treatment are the pillars for curing of diseases'. He also stated that 'the amount of desired food items should be less for a patient, and 'whenever possible, treatment of the diseases should be done by diets only not by drugs'^[18].

Abubakar Mohammed bin Zakariya Razi has mentioned reference of *Sikandar* (Alexander)

It is better to treat malencholia in the beginning with the help of *hammam*(bath), *makool wa mashrubat*(food and drinks) to keep the patient hydrated followed by *mushil* (purgative) then advised the patient to take rest for few days along with cool bath and *martoob ghiza*^[9].

Harkat wa sukoon e badani (Body movement and response)

According to Burhaanuddin Nafis, when matter come in action from the power it is called as *harkat* and the meaning of rest is to remain in action or in the power, Whatever an individual executes the movements result in liberation of *hararat* (heat). In Unani medicine, it is believed that *hararat* is the tool of all *quwa* (faculties). Faculties accomplish the action of processing in food, metabolism and expel the waste materials out of the body. If these waste materials are getting accumulated and not expelled out of the body regularly, it leads the extinction of *hararate-ghareeziyah*. Thus, the *hararat* liberated by physical activity stimulate *hararat-e ghareeziyah* and the *quwa* performs the appropriate action either for assimilation or elimination.^[20,21]

This ancient Unani concept is much alike to the modern concept that physical activity releases endorphins that can help to boost mood. Regular exercise is also linked to higher self-esteem, better sleep, less stress, and more energy^[20,21]

Harkat wa sukoon e nafsani (Psychological movement and response)

Greek- Arab physicians have a view that certain diseases and mental disorders are caused, in most cases, by emotional strain and maladjustment. *Nafsiwati Awamil* (Psychological factors) such as happiness, sorrow, fear, anger, etc. have significant effect to the health of a human being. There is a branch of Unani medicine known as "*Illaj Nufsania*" (Psychological treatment) which deals with the above mentioned factors, and lots of diseases are treated with psychological means *Ibn-e-Nafis* substantiated that excess of *sukoon-e-nafsani* produces coldness and low mental state^[9, 20].

Naum-wa-Yaqzah (Sleep and wakefulness)

Normal sleep and wakefulness are essential for health. The advantage of sleep is that, it provides rest to the *nafs* (Psyche) and organs which makes a person more active and it also helps in digestion which makes person healthier. Sleep plays an important role to repair and regenerate the body function. Healthy persons should be particularly careful about sleep, it should be regular moderate, and not too long. Every individual needs proper 7 to 8 hours of sleep to repair body functions. Alteration in sleeping patterns affects the body's immune function, hormone secretion, and mental and physical stamina.

Zakariya Razi has mentioned that eight hours of sleep is very essential for health. He also says that sleep strengthens the vital faculty, pneuma, and promotes digestion & by retaining *hararat-e-ghareziyah*.^[24] Movements cause the formation of *hararat* (innate heat) and help in removing the waste products by disintegrating them and also preparing food for combustion.

Therefore, sleep is necessary before any movement so that body can get nourishment. Majoosi said that *tabiyat* is benefitted in two ways by sleep; one is mental and physical rest and the second is the digestion and concoction of *akhlaat* (body fluids) which causes innate heat to enter the body^[19, 22, 23].

Istefragh-wa-ihtebas (Elimination and Retention)

Istifragh means the elimination of unnecessary substances out of the body because retention of these substances inside the body produces disease e.g., constipation. In the same way, elimination of the substances that must be retained causes the abnormal condition. Elimination is carried through normal channels of the body such as the passage of sweat, urine, stools, menstrual blood, etc; but excess excretion results in an abnormal condition. The excess loss of fluid, salts, and nutrients in the stools, causes abnormalities. The excessive elimination of any matter always causes the coldness and dryness of temperament directly and decreases the innate energy. If elimination and retention are balanced and take place at the time when they are needed; they are beneficial and maintain health^[13, 19].

Discussion

1. Hawa-e-Muhit (Atmospheric Air)

As we have mentioned one of the cause of depression is living in narrow and dark places. We can prevent depression by taking the patient in play grounds, gardens where he can breath fresh air.

Breathing fresh air is good for mental health. And one should avoid excessive heat and cold exposure.

2. Makool-wa-Mashroob (Foods and Drinks)

As we have mentioned one of the cause of malenicholia is eating and drinking sour items, excess use of salt and spices, eating black color food, Hence we can prevent malenicholia by changing our diet and adapting healthy life style.

• Dietary recommendations

Martooob wa Umda Aghziya (Moist and good humor producing diet) and *Aghziya Sari al-Hazm* (easily digestible diet), *Aash-i Jaw* (barley water), *Ma al-Asal* (honey water) during winter and *Ma al-Jubn* (whey) in summer.

• Dietary restriction

Ghaleez wa Muwallid-i Sawda Aghziya (less digestible and melanchole producing diet), like dried meat, salted meat,

meat of wild animals, meat of cow and camel, brinjal, cabbage, lentil, dates, aged cheese, Mulberry and fig, *Aghziya Hamiza* (Sour diet) *Aghziya Maliha* (salty diet)

3. Harkat wa sukoon e badani (body movement and response)

Unani physicians has described depression under the topic of *Nafsiyati awamil* and mentioned in their ancient scripture that making changes in our life style through *Asbab e sitta zarooriya* now we can offer long-term benefits to the mental health e.g. *Harkat wa sukoon e badani*. *Asbab e sitta zarooriya* are the six essential factors which are responsible for the healthy life, *Harkat wa sukoon e badani* (Body movement and repose) is one of them.

4. Harkat wa sukoon e nafsan (Psychological movement and response)

Understanding the psychological mechanisms of how stress can lead to depression can help you prevent it. This is especially important for people who have had a prior episode of depression and would like to prevent relapse. Stress has direct effects on mood. Early initial symptoms of lowered mood can include irritability, sleep disruption, and cognitive changes, such as impaired concentration. However, the indirect effects of stress are often what causes depression to take hold.

5. Naum-wa-Yaqzah (Sleep and wakefulness)

Sleep and wakefulness are essential factors of life. Sleep is analogous to rest and wakefulness to movement. The normal physical and psychosocial functions depend on adequate sleep.

6. Istefragh-wa-ihtebas (Elimination and Retention)

As we have mentioned above that one of the cause of *Malenicholia* (Depression) is constipation, haemorrhoids etc hence it proves that *Istefragh-wa-ihtebas* (Elimination and Retention) plays an important role in the prevention and management.

Conclusion

Depression is a common & serious mental disorder that negatively affects how you feel, think, act and perceive the world.

It has a high rate of Chronicity and recurrence. It is also a significant risk factor for suicide and cause workforce loss.

Burden of Depression and other associated mental health conditions is on upswing globally. It is one of the most important reasons of morbidity in adults.

Approximately 80% of depressed people are not currently having any treatment in modern medicines and the side effects of an Antipsychotic Drugs is well known.

Going through the Unani classics, it is revealed that a very elaborative discussion regarding *Malekholiya* (Malenicholia/Depression) and its management is available in Unani System of Medicine.

Unani scholars have strongly advocated the use of *Asbaab-e-Sittae Zarooriyah* in *Malenicholia*.

These six factors are the efficient causes which are either directly or indirectly responsible for the preservation or transition of existing health.

Any imbalance in the six essential factors may predispose majority of lifestyle diseases. The Physicians while treating any patient should always look for any imbalance in

essential factors and advice the appropriate regimens as per requirement of body. E.g. Avoid heavy spicy food, Avoid water drinking during meal or just after meal etc. A lack of sleep, poor eating habits and not enough exercises are a recipe for Depression.

Awareness about the role of six essential factors on Depression can make the individual skilled enough to live healthy lifestyle.

Conflict of Interest

Not available

Financial Support

Not available

References

1. World Health Organization. WHO Depression: Let's Talk. Online; c2017.
2. Fauci AS, Braunwald E, Kasper DL, Hauser SL, Longo DL, Jameson JL, Loscalzo J. Harrison's Principles of Internal Medicine. 17th ed. Vol II. Golwalla. Medicine for Students.
3. Ghani MN, Khazainul Advia. 2nd ed. Shaikh Mohd. Bashir and Sons; c1926.
4. Jurjani I, Zakhira Khawarazam Shahi, Urdu Translation by Hakim Hadi Husain Khan. Munshi Naval Kishore, Lucknow; NA: 6:24-29.
5. Khan MA. Iksir-i-Azam. 2nd ed. Matba Nami Munshi Naval Kishor, Lucknow. 1906:1:186-213.
6. Masih ul Mulk Hakeem Ajmal Khan Sahar Marhoom. HAZIQ, Idara e Kitab us Shifa; 46-52.
7. Qamri AMH, Ghina Muna. CCRUM, New Delhi. 2008 .p. 15-18.
8. Razi ABMZ. Al-Hawi. CCRUM, New Delhi, India. Vol 1 .p. 56-77.
9. Razi ABMZ. Kitab al-Fakhir. CCRUM, New Delhi. 2005:1:106-129.
10. Baghdadi IH. Kitab al-Mukhtarat fi'l Tibb. Hyderabad: Daira al-Maarif al-USmaniya. 1363:3:40-43.
11. Azma Waseem, Anwar Jamal, Aisha Siddiqui, Afshan Khan, Waseem Ahmad, Mohammad Fazil. Unani perspective of melancholia (A Depressive Disorder): Concept and management. International Journal of Botany Studies.
12. Ibn Sina. Al-Qanun fi'l Tibb. Book 3, part I. Jamia Hamdard, New Delhi; 1411, 93-103.
13. Razi Z. Kitab Al-Mansoor. New Delhi: Central Council for Research in Unani Medicine, Ministry of Health and Family Welfare; c1991.
14. Nasiruddin, Zulkifle, Yashmin Khan. Asbab-e-Sitta Zaruriyya (six essential factors): A unique tool for the maintenance of human health. International Journal of Herbal Medicine. 2015;3(4):22-24.
15. Ibn Abi Usaiba. Uyun al-Amba fi Tabgat al-Atibba Vol I. Urdu translation by CCRUM. New Delhi: Dept. of AYUSH, Ministry of H & FW; c1990. [Google Scholar][PubMed]
16. Glynn J, Bhikha-Vallee N, Bhikha R. Dietotherapy: Background and theory. Ibn Sina Institute of Tibb; Reprint; c2013. [Google Scholar][PubMed]
17. Razi. Kitab al-Murshid. Urdu translation by Nadvi MRI. New Delhi: Director Taraggi Urdu Beuru; c1994. [Google Scholar][PubMed]
18. Naeem Khan, Rizwan Mansoor Khan, Abdul Aziz

Khan. Moderation in Asbab-e-Sitta Zarooriya (Six essential factors): A unique practice for boosting immunity. [PubMed]

19. Nafis I. Kuliyat-e-Nafisi. Urdu translation by Kabiruddin HM. New Delhi: Dara Kitabul Shifa; c1954.
20. Fatima S, Adam. An overview of the concept of depression in Unani medicine and efficacy of Riyazat (exercise) in its management.
21. Maseehi AS. Kitabul Miah. New Delhi: CCRUM, Ministry of Health and Family Welfare, Govt of India; c2008. p. 178-199, 242. [Google Scholar][PubMed]
22. Shah MH. The General Principles of Avicenna Canon Medicine. Idara Kitab us Shifa, New Delhi; c2007. [Google Scholar][PubMed]
23. Ilahi A, Ansari AH, Zulkifle M, Muti MA. Association of exercise, sleep habits, bathing, and house status in the genesis of central nervous system disorders. Hamdard Medicine. [Google Scholar][PubMed]

How to Cite This Article

Fatima S, Ali Shah MW, Mohd Yousuf U. An overview on Melancholia (a depressive disorder) in unani system of medicine and its prevention through *Asbaab-E-Sittae Zarooriah* (six essential factors). International Journal of Unani and Integrative Medicine. Yy;vol(issue):pp.

Creative Commons (CC) License

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.