Cannabis (*Cannabis sativa*) Containing Drug Formulations Mentioned in "*Thalpathe piliyam*": A Review

J. I. D. Diddeniya[1*] and W. M. S. S. K. Kulatunga[1]

[1]*Institute of Indigenous Medicine, University of Colombo, Rajagiriya, Sri Lanka.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Systematic Review

ABSTRACT

Introduction: *Cannabis sativa* is an herbaceous plant which is used as a remedy for many diseases in Traditional Medicine of Sri Lanka. Even though cannabis is the most illicit plant around the world, its medicinal properties are beneficial in numerous ways. The active ingredients of cannabis are Cannabinol, Cannabidiol, Tetrahydro cannabinol, Tetrahydro cannabivarin etc.
Objectives: The aim of this study was to make an overview of the different formulae containing cannabis, their system wise indications, and preparatory methods and to analyze the amount of cannabis percentage in the formulations mentioned in *"Thalpathe Piliyam"*. And also to identify the social economic impact of cannabis to the community through this.
Methodology: For this review all the twenty one *"Thalpathe Piliyam"* books were used and other necessary facts were obtained from published research articles in data bases such as Science direct, PubMed etc.
Results: The results revealed that, majority of drug formulations, that is 49.23% acts on the *Anna pachana Vyuhava* (Gastro intestinal tract) and apart from that 40.77% acts on *Naadi vyuhava* (Nervous system), 7.69% on *Raktha vyuhava* (Circulatory system), 6.54% on *Prajanana sansthaana* (Reproductive system), 5.77% on *Swasana sansthaana* (Respiratory system) and 22.69% on other diseases by giving relief to diseases such as indigestion, vomiting, cancer,

_____

*Corresponding author: Email: jidd1524@gmail.com;

diabetes, piles, cough, diarrhea etc. Among the different preparatory methods of drug formulations which contain Cannabis as an ingredient, *"Guli"* (pills) was the most abundant formulation with a percentage of 48.07%. Other formulations such as *Kalka* (pastes), *Kashaya* (decocotion), *Swarasa* (fresh juice), *Paththu* (poultice) were also mentioned in the book. By analyzing the amount of Cannabis percentage, the highest amount of the drug preparations were in between the range of less than or equal to 5% while the least amount of drug preparations were in the range from more than 20%. This indicates that most preparations contain Cannabis less than 5% as an amount in them.

Conclusion: Therefore it can be concluded that, *"Thalpathe Piliyam"* is a rich repository for the valuable traditional formulae which consist of multiple formulations which contains Cannabis and also very small amount of Cannabis amount can act very efficiently in curing diseases. Furthermore, its socio economic impact to the community can be also measured through it.

Keywords: Cannabis; drug formulations; Thalpathe Piliyam.

1. INTRODUCTION

Cannabis sativa (C. sativa) is an herbaceous plant which belongs to the Cannabaceae family. Almost all parts of this plant such as tender leaves, seeds, fruits and un-pollinated inflorescence are widely used for the medical and recreational purposes. The distribution of *cannabis* is, in the temperate parts of Asia, Southern Siberia, Persia and probably of Northern India and China. It is cultivated in Sri Lanka, illicitly in chenas in the dry zone and in the Himalaya and Kashmeer too. [1].

The active ingredients present in this plant are Tetrahydro cannabinol (THC), Cannabidiol (CBD), Cannabinol (CBN), *Tetrahydro cannabivarin* [2] and it is a central nervous system stimulant. In Sri Lankan Traditional Medicine, *cannabis* is considered as a remedy for digestive, respiratory and gynecological ailments. The pharmacological actions it possess are digestive, aphrodisiac, diuretic, cough suppressing, analgesic, anti-epileptic and anthelmintic actions etc [3]. Therefore it aids in the treatment of cough, asthma, piles, diabetes, cancer, urinary disorders, diarrhea, neuralgia, indigestion etc [1].

Even though this plant gives many valuable uses in the medical field, at present the people make use of this drug illicitly so that it is considered as the most commonly used illegal drug in the world. Hence legal restrictions have been implemented regarding the use, possession, cultivation, selling and distribution of *cannabis* in Sri Lanka [4].

In *"Agada Tantra"* (Toxicology), *C. sativa* comes under the delirient category of cerebral poisons which includes under the neurotic poisons. The

properties of this plant are, it is bitter *(Thiktha)* in taste *(Rasa),* un-unctuous *(Ruksha),* light *(Laghu),* penetrating deep *(Theekshna)* in its properties *(Guna),* Pungent *(Katu)* in post digestive effect *(Vipaka),* Hot *(Ushna)* in Potency *(Veerya*) and Inebrient *(Maadaka)* in specific potency *(Prabhava)* [5].

Many countries have their own medicinal system which is specific to that country [6]. Such a massive and advanced Traditional Medicinal system is found in Sri Lanka too. As it is free from unnecessary side effects and re occurrence of the disease is also less, the attention towards the Sri Lankan Traditional Medicine (TM) is increasing day by day.

Such valuable uses and drug preparations containing *cannabis* are very clearly mentioned in the book series called *"Thalpathe Piliyam"* which is one of the important book series in the TM which has been compiled by using the knowledge of different TM practitioners in Sri Lanka. There are different generations of TM practitioners in Sri Lanka who practice different aspects TM specific to their generations such as *Akshi roga wedakama* (Treatment of eye diseases), *Sarpa wedakama* (Treatment of serpent bites), *Davum pilissum wedakama* (Treatment of burns), *Unmaada Chikitsa* (Treatment of insanity) etc. This book series have been compiled by TM practitioners in Sri Lanka by making use of their written source of knowledge which has been documented in ola leaves. In 1992, the first book was published by the Department of Ayurveda and gradually the rest were also published with the support given by the World Health Organization (WHO). For this purpose ola leaves were taken from the Navinna Research Institute and from the library of Institute of Indigenous Medicine in Rajagiriya.

The ola leaves were given to the department of Ayurveda by the people who owed ola leaves with them. From that, these books have been published and there are twenty one books altogether which have been published in Sinhala medium which were used for this particular review except the last one as it has been published in Tamil medium only.

Therefore this research was conducted with the aim of reviewing and making an overview of the different formulae containing *cannabis*, their system wise indications, different preparatory methods of formulations and to analyze the amount of Cannabis percentage in the formulations mentioned in "*Thalpathe Piliyam*" as well as to conserve the precious knowledge about *cannabis* in the Traditional Medicine so that it would be beneficial in providing a guidance to researchers who wish to conduct future research based on the positive findings of this research. In the present era, the *cannabis* usage has become a social problem which leads for the stoppage of using it among the people. The reason behind it is, the tendency of people to use it in a wrong manner which harms a lot themselves due to addiction. Therefore, as a result of it, many legal issues have been introduced regarding usage of this drug even for the medicinal purposes. Because of that reason, even though it shows a vast number of valuable uses in the medical field, even the medical practitioners do not pay much attention towards using this drug. Therefore this research was also conducted with the aim of finding out the valuable uses of this drug, its different doses etc so that it would lead to enhance the usage of this drug in the society in a favorable healthy manner. Thus, its socio-economic impact to the community will be also overviewed through this study.

2. METHODOLOGY

2.1 Research Question

To make an overview of cannabis containing drug formulations and to enhance its usage in the society in a socio economic friendly manner.

2.2 Study Design

A narrative review.

2.3 Data Collection

By using all the twenty one "*Thalpathe Piliyam*" book series and scrutinizing the formulations in it on several aspects, such as system wise indications of formulations, their different preparatory methods and analyze the amount of *cannabis* percentage in the formulations etc. And research papers published regarding *cannabis* were also studied and relevant data was recorded.

2.4 Inclusion Criteria

All the twenty one books of "*Thalpathe Piliyam*" which have been published in Sinhala medium.

2.4.1 Sources

Science direct, PubMed, Other web pages which have mentioned about facts related to *cannabis* and its usage, legal aspect etc.

2.5 Analysis of Data

The obtained data were analyzed under the three sub headings which are the specific objectives of this research.

2.6 Method of Data Presentation

The identified medicinal uses, preparatory methods and amount of *cannabis* percentage in different formulations were presented in the results in order to make an overview regarding this by using "*Thalpathe Piliyam*" book series.

3. RESULTS

The results revealed that there were plenty of drug preparations which contain *C. sativa* as an ingredient and in some instances it has been used as the grinding media too. According to the 21 book series of "*Thalpathe Piliyam*", 267 total number of drug formulations which contains *C. sativa* have been found and as this review was conducted based on these 267 formulations, the calculations were also based on them [7-27].

3.1 Analysis Based on the System Wise Indications of *Cannabis* Containing Drug Formulations

The 267 total drug formulations which contain *cannabis* as an ingredient, acts on the body systems by curing various disease conditions and there were instances where the same formulation acts on multiple systems of the body too.

According to the Fig. 1, it is clear that among the formulations given in the book series, majority of Cannabis containing drug preparations are used for Gastro Intestinal Tract disorders (49.23%)

followed by 40.77% for the disorders in *Naadi vyuhava* (Nervous system), 22.69% on other diseases, 7.69% for the *Raktha vyuhava* (Circulatory system), 6.54% on *Prajanana sansthaana* (Reproductive system), and the least value which is 5.77% for the disorders in *Swasana sansthaana* (Respiratory system). According to the 21 book series, by acting on these systems, the *cannabis* containing drug preparations are capable of giving relief to diseases and signs and symptoms of diseases such as indigestion, worm infestations, piles, diarrhea, cough, asthma, hiccup, catarrh, epilepsy, cardiac ailments, anemia, skin diseases, ulcers, gynecological disorders, subfertility, fever, diabetes, cancer, serpent bites and urinary disorders etc. It is clear that numerous beneficial effects on multiple systems of the human body can be attained by making use of these formulations.

3.2 Analysis Based on Different Preparatory Methods of *cannabis* Containing Drug Formulations

The book was consist of large number of preparatory methods such as *Kashaya* (Decoction), *Guli* (Pills), *Kalka* (Pastes), *Choorna* (Powder) etc along with their ingredients. The Fig. 2 indicates that, there were multiple preparatory methods of *cannabis* containing drug

formulations and among them *"Guli"* (Pills) is the most abundant formulation with a percentage of 48.07%, which has been mentioned in *"Thalpathe Piliyam"* book series. Apart from that, preparations which are unique to TM of Sri Lanka have been also mentioned in the book such as *Basna* (A nutritional preparation), *Vedu* (Fumigation) etc and they have been categorized in the category named as "Other" as they showed the least values.

3.3 Analysis Based on the Amount of *cannabis* Percentage in the Formulations

When using *cannabis* for drug preparations it is important to know the amount of *cannabis* contain in it as a percentage of total ingredients. Because it is a Narcotic drug, precautions should be taken prior to use them. Therefore, finding the amount of *cannabis* percentage was important. It is clear from the given data that, highest amount of the drug preparations are in between the range of less than or equal to 5% while the least amount of drug preparations are in the range from more than 20%. It can be shown as follows:

There were thirteen *preparations* where *cannabis* have been used as the grinding media of them. As their amount of *cannabis* cannot be calculated as a percentage, they were grouped in another table as follows:
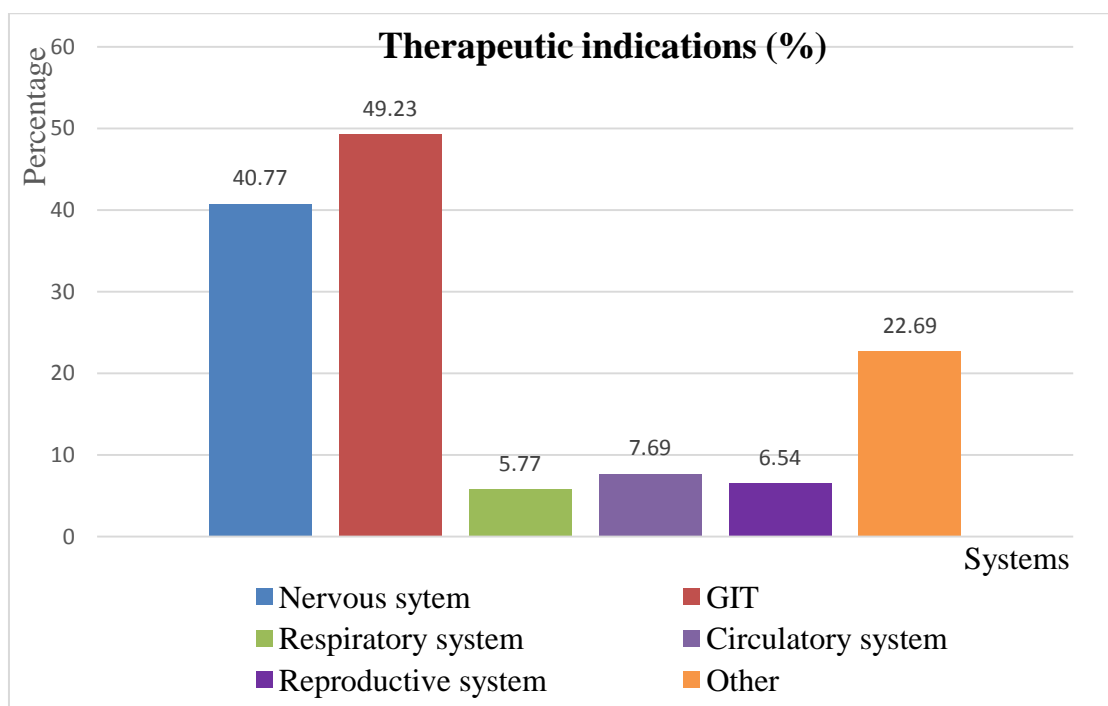

Fig. 1. System wise therapeutic indications of cannabis containing drug formulations

Table 1. The amount of Cannabis contained in formulations as a percentage

Range	No. of preparations	Percentage (%)
≤ 05	164	63.08
5.1 – 10	36	13.85
10.1 – 15	42	16.15
15.1 – 20	10	3.85
≥ 20	2	0.77
Total	254	97.70

Table 2. Drug formulations where Cannabis have been used as the grinding media

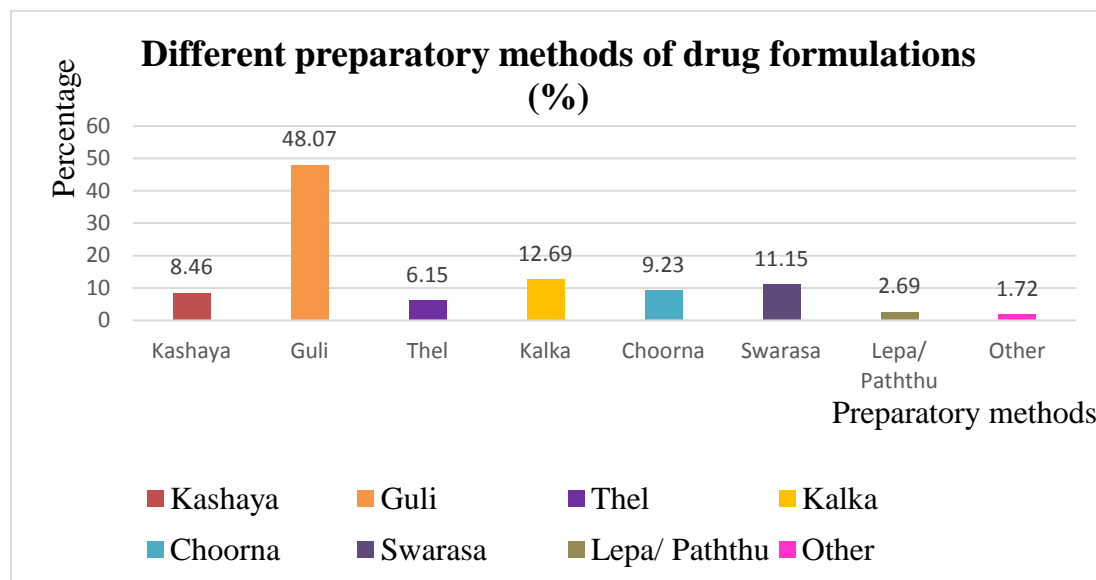| Indication	Formulation
• *Una* (Fever)	*Guli* (Pills) – 1
	Swarasa (Fresh juice) – 1
• *Atheesaara* (Dysentry)	*Guli* (Pills) – 1
	Swarasa (Fresh juice) – 1
	Kalka (Pastes) – 2
• *Aduma* (Asthma)	*Guli* (Pills) – 1
• *Kessa* (Cough)	*Guli* (Pills) – 3
• *Sanni* (A vata roga)	*Guli* (Pills) – 2
	Kalka (Pastes) – 1

Fig. 2. Different preparatory methods of Cannabis containing drug formulations

4. DISCUSSION

"Thalpathe Piliyam" is a rich source of Traditional knowledge which contains about the Traditional drug formulations in different aspects. This book has been written based on the proven efficacious formulae of multiple Traditional physicians in Sri Lanka. Hence reemergence of their importance was also a focus of this study. It has a wide variety of formulations which acts on multiple systems of the human body. The formulations containing in it mainly acts on GIT, nervous system, respiratory system, reproductive system etc. According to the 21 book series, by acting on these systems, the *cannabis* containing drug preparations are capable of giving relief to diseases and signs and symptoms of diseases such as indigestion, worm infestations, piles, diarrhea, cough, asthma, hiccup, catarrh, epilepsy, cardiac ailments, anemia, skin diseases, ulcers, gynecological disorders, subfertility, fever, diabetes, cancer, serpent bites and urinary disorders etc. Drug formulations which contain *cannabis* should be given with a

correct guidance and by using the appropriate dose. Before using in treatment procedures it has to be subjected for purification process otherwise it would give unwanted effects as it is a narcotic drug. Moreover, *cannabis* has an advantageous therapeutic efficacy with small concentrations which enhance the synergetic actions of the drugs. It is clear from the fact that majority of drug formulations contained less than 5% of *cannabis* amount as an ingredient in them. Therefore when using these formulations there is no need of showing any reluctance as it contains a subtle amount of *cannabis* for giving multiple medicinal uses in the medical field.

According to the modern science also these facts regarding *cannabis* usage have been experimentally researched so that the medical use of it is highlighted. *Trentin* et al. [28] have tested the hypothesis that Cannabidiol (CBD) treatment is capable of improving the metabolic dysfunctions in middle-aged diabetic rats. Their findings revealed that CBD could reduce the hyperglycemia while increasing the insulin secretion and as well as it lowered the total cholesterol level by giving out a hepatoprotective effect too. *Michelle* et al. [29] has reported the use of medical marijuana (MM) in the treatment of epilepsy among pediatric population. Their findings demonstrated that there was a significant reduction in seizure behavior.

The extracts of *C. sativa* have been used to assess the cytotoxic effects against human colon cancer cells by *Mangoato* et al. [30] and it was shown that these extracts possess direct selective cytotoxic effect on colon cells. Not only that, it was stated that extracts of *C. sativa* could reverse the drug resistance in colorectal carcinoma cells.

A descriptive study was carried out to identify the cannabis usage in the management of pain by *Lejczak* et al. [31] by means of sending a questionnaire to dronabinol (a pure extract of delta-9-tetrahydrocannabinol) prescribers throughout metropolitan France. *Justin* et al. [32] conducted an experimental study by making use of rats in-vivo and has stated that, therapeutic properties of *cannabis* can be used in the treatment of schizophrenia related psychoses.

A qualitative evaluation study was conducted by *Simon* et al. [33] by utilizing a focus group, semi structured interviews, observed that Cannabis-Derived Medicinal Products (CDMP) are useful in the treatment of acute postoperative pain, nausea and vomiting. The usage of medical marijuana (MM) in the management of End stage renal disease (ESRD) and Chronic kidney disease (CKD) has been described by *Joshua* et al. [34].

An ethno-gynecological survey was performed by *Muhammad* et al. [35] in a tribal region has reported that fifty two medicinal plants including *C. sativa* has been used for the treatment of numerous gynecological disorders such as leucorrhea, uterine infection and amenorrhea. Especially the powder of *cannabis* with water has been used in the treatment of abdominal pain, gonorrhea, pregnancy and female impotency. These modern research findings also emphasize the fact that, the medicinal uses mentioned in the TM are found in *cannabis.*

When considering about these facts, as the amount of *cannabis* percentage in drug formulations is a less value, the social addictions can be minimized by using it in the accurate doses prescribed by the physicians. As this is a narcotic drug, the addictive conditions are comparatively high so that prolong usage has to be minimized. Apart from that, as these drug formulations are capable of curing vast number of diseases, it would be helpful in the economical aspect because rather than using plenty of medicaments, this single drug can acts over many diseases but it should be used accordingly. Some articles have mentioned that, *cannabis* can be made use of wisely in order to achieve social well-being by means of using it for increasing the relaxation, concentration and making enjoyable activities etc. Apart from that, medicinal usage of *cannabis* can be lead to improve the quality of life and preserve the health of individuals [36]. Some researchers have shown that without legalizing the MM, the nation is missing a vast economic benefit by means of several aspects [37]. Therefore it is clear that this drug, *cannabis* has a vast number of uses in the socio economic aspects and it should be used accordingly in order to achieve its above mentioned uses in multiple fields.

5. CONCLUSION

Therefore it can be concluded that, *"Thalpathe Piliyam"* is a rich repository for the valuable Traditional formulae which consist of multiple Traditional formulations with a wide range of Traditional method of preparations and indications. And also it is clear that a small amount of *cannabis* can give a high effectiveness

showing the fact that it can be used in the medical field to cure numerous disease conditions which prevail today and also it is a socio economically valuable drug to be used in the aspect of medical field.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

ACKNOWLEDGEMENTS

We would express our sincere thanks for the library staff of the Institute of Indigenous Medicine for providing us the needed book series of *"Thalpathe Piliyam"* whenever necessary.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Jayaweera DMA, Lilani KS. Medicinal plants (Indigenous and Exotic) used in Ceylon. Part 2. Colombo: The National Science foundation Sri Lanka. 2006;6-7.
2. Robert Bergman. The active ingredients of medical marijuana;2021.
Available:https://www.ilovegrowingmarijuana.com/chemical-composition-of-marijuana/
3. Department of Ayurveda, Ayurveda pharmacopoeia. 1- 111, 2nd edi:77-78
4. Cannabis in Sri Lanka: Laws, use and history;2021.
Available:https://sensiseeds.com/en/blog/countries/cannabis-in-sri-lanka-laws-use-history/
5. Department of Ayurveda, Ayurveda pharmacopoeia. Vol. 1- 11, 2nd edi, Pg. 34
6. Weragoda P.B. The Traditional system on Medicine in Sri Lanka. 1980 Mar; 2(1):71-3.
DOI: 10.1016/0378-8741(80)90033-1
7. Department of Ayurveda. Thalpathe Piliyam. Vol. I
8. Department of Ayurveda. Thalpathe Piliyam. Vol. II
9. Department of Ayurveda. Thalpathe Piliyam. Vol. III
10. Department of Ayurveda. Thalpathe Piliyam. Vol. IV
11. Department of Ayurveda. Thalpathe Piliyam. Vol. V
12. Department of Ayurveda. Thalpathe Piliyam. Vol. VI
13. Department of Ayurveda. Thalpathe Piliyam. Vol. VII
14. Department of Ayurveda. Thalpathe Piliyam. Vol. VIII
15. Department of Ayurveda. Thalpathe Piliyam. Vol. IX
16. Department of Ayurveda. Thalpathe Piliyam. Vol. X
17. Department of Ayurveda. Thalpathe Piliyam. Vol. XI
18. Department of Ayurveda. Thalpathe Piliyam. Vol. XII
19. Department of Ayurveda. Thalpathe Piliyam. Vol. XIII
20. Department of Ayurveda. Thalpathe Piliyam. Vol. XIV
21. Department of Ayurveda. Thalpathe Piliyam. Vol. XV
22. Department of Ayurveda. Thalpathe Piliyam. Vol. XVI
23. Department of Ayurveda. Thalpathe Piliyam. Vol. XVII
24. Department of Ayurveda. Thalpathe Piliyam. Vol. XVIII
25. Department of Ayurveda. Thalpathe Piliyam. Vol. XIX
26. Department of Ayurveda. Thalpathe Piliyam. Vol. XX
27. Department of Ayurveda. Thalpathe Piliyam. Vol. XXI
28. Trentin MR, Amanda Z, Santiago N, Mori MA, Piovan S, Jansen CA, et al. Cannabidiol improves metabolic dysfunction in middle-aged diabetic rats submitted to a chronic cerebral hypoperfusion. Chemico-Biological Interactions. 2019;312.
Available:https://doi.org/10.1016/j.cbi.2019.108819
29. Michelle MBS, Donna RN, Nativio G. Medical Marijuana in the Pediatric Population With Epilepsy-What You Should Know. 2019;33(6):626-632.

DOI:10.1016/j.pedhc.2019.03.002

30. Mangoato C, Puthanapura M, Motlalepula GM. *Cannabis sativa* L. Extracts can reverse drug resistance in colorectal carcinoma cells *in vitro. 9. 2019.*
Available:
https://doi.org/10.1016/j.synres.2019.100056

31. Lejczak S, Rousselot H, Patrizio P, Debouverie M. Dronabinol use in France between 2004 and 2017. Revue Neurologique. 2019;175(5):298 – 304.
Available:
https://doi.org/10.1016/j.neurol.2018.07.011

32. Justine R, Michael L, Laura GR, Jordan Z, Cleusa O, Susanne S, et al. Cannabidiol counteracts Amphetamine-Induced Neuronal and Behavioral Sensitization of the Mesolimbic Dopamine Pathway through a Novel mTOR/p70S6 Kinase Signaling Pathway. 2016;4:36(18):5160-9.
DOI: 10.1523/JNEUROSCI.3387-15.2016

33. Simon E, Mikael HS. A comprehensive patient and public involvement program evaluating perception of cannabis – derived medicinal products in the treatment of acute postoperative pain, nausea and vomiting using a qualitative thematic. 2020;5(1):73-80.
Available: doi: 10.1089/can.2019.0020

34. Joshua LR, Christiana MW. MArjuana and Cannabinoids in ESRD and Earlier stages of CKD. 2018;71(2):267-274.
DOI: 10.1053/j.ajkd.2017.06.020

35. Muhammad AA, Amir HK, Habib U, Muhammad A, Abeer H, Elsayed F. Traditional phytomedicines for gynecological problems used by tribal communities of Mohmand Agency near the Pak-Afghan border area. Revista Brasileira de Farmacognosia. 2018;28(4):03-511.
Available:https://doi.org/10.1016/j.bjp.2018.05.003

36. Why people use Cannabis. Visions Journal.
Available:https://www.heretohelp.bc.ca/why-people-use-cannabis

37. The economic rise of Marijuana.
Available:https://storymaps.arcgis.com/stories/4c839fb0499a453d88be4ab862a96f37

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/70568