

# EFFECT OF AYURVEDIC MEDICINES ON COVID-19 AFFECTED PATIENTS

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## ABSTRACT:

Ayurveda is a pseudoscientific system of medicine with historical roots in the Indian subcontinent. Ayurvedic medicines have been proved to be beneficial against viral infection. Ayurveda therapies have varied and evolved over more than two millennia. Therapies are typically based on complex herbal compounds, minerals and metal substances. Ayurveda follows the concept of Dinacharya, which says that natural cycles (waking, sleeping, working, meditation etc.) are important for health. Hygiene, including regular bathing, cleaning of teeth, oil pulling, tongue scraping, skin care, and eye washing, is also a central practice. Plant-based treatments in Ayurveda may be derived from roots, leaves, fruits, bark, or seeds such as cardamom and cinnamon. Products made of Ayurvedic herbs and shrubs play a beneficial role to fight against viral infections.

In the present study, ayurvedic medicines have been perceived to be beneficial against viral infections especially patients affected with COVID-19 by lieu of a literature review. Data was collected and was referred to in brief about the effect of ayurvedic medicines and other alternative medicines. Quality Assessment of various articles was done with context to this present study. Finally it was concluded that ayurvedic medicines were deemed to be potentially effective against patients affected with COVID-19 and other viral infections; though the claim needs to be proven by scientific studies.

**Key words :** COVID-19, Ayurvedic medicines, viral infections, Alternative medicine.

## INTRODUCTION :

A pandemic is an epidemic of a disease that has spread across a large region, for instance multiple continents or worldwide, affecting a substantial number of people. A widespread endemic disease with a stable number of infected people is not a pandemic.[1] Widespread endemic diseases with a stable number of infected people such as recurrences of seasonal influenza are generally excluded as they occur simultaneously in large regions of the globe rather than being spread worldwide. [2] The World Health Organization (WHO) previously applied a six-stage classification to describe the process by which a novel influenza virus moves from the first few infections in humans through to a pandemic.[3] It starts when mostly animals are infected with a virus and a few cases where animals infect people, then moves to the stage where the virus begins to be transmitted directly between people and ends with the stage when infections in humans from the virus have spread worldwide.[4]

So one such pandemic disease or virus is CORONAVIRUS. Coronavirus is an infectious disease caused by a newly discovered coronavirus. Most of the people with COVID-19 virus will experience mild to

moderate respiratory illness and recover without requiring special treatment.[5] Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease and cancer are more likely to develop serious illness.[5]

The best way to prevent and slow down transmission is to be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing hands or using an alcohol based sanitizer. Rub frequently and not touch the face.[6] The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you practice respiratory etiquette (for e.g : by coughing into a flexed elbow).[7]

At this time, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments. WHO will continue to provide updated information as soon as clinical findings become available.[8]

Different treatments were examined such as plasma therapy, hydroxychloroquine drugs etc which are not proven yet, traditional medicinal systems like ayurveda, Siddha and Unani - science of longevity; plays an important role in encountering global health care needs, also uses plants, minerals and animals products for curing human diseases which build immense stimulating and inflammation modulating effects to manage the immune system. [9] Indian medicines widely used for respiratory diseases - AYUSH recommended medicinal plant extracts for treating COVID-19 proactive investments in research and also a source of light to overcome this fatal infection. So it's time for all the citizens to join hands together and fight against coronavirus by practicing self-hygiene.[10]

This study is designed to evaluate the current literature of the effect of ayurvedic medicines to treat COVID-19 or any other viral infections and establish a consensus.

Traditional Chinese herbal Ayurvedic medicines for treating novel CoronaVirus (COVID-19) :

In the prevention and treatment of COVID -19, Traditional Chinese medicines have received broad adoption , especially in treating cases of mild symptoms. Traditional Chinese Medicine (TCM) is one of the oldest healing systems. TCM includes herbal medicine, acupuncture, moxibustion, massage, food therapy, and physical exercise, such as shadow boxing. TCM is a fully institutionalised part of Chinese health care and widely used with western medicine. In 2006, the TCM sector provided care for over 200 million outpatients and some 7 million inpatients, accounting for 10%–20% of healthcare in China. China has been successful in promoting its therapies with more research and science-based approach, while Ayurveda still needs more extensive scientific research and evidence base. Lianhua Qingwen, a chinese patent medicine composed of 13 herbs, has played a positive role in the treatment of SARS - CoV-2. Thus, the traditional chinese medicines carried both the antiviral effect and the symptomatic relief might bring more clinical benefits. Classical TCM prescription for respiratory diseases, LH is the only approved medicine in the treatment of SARS and influenza.[11]

### **Indian transitional ayurvedic system of medicine and nutritional supplementation in treating novel coronavirus :**

Ayurveda means science of healthy living. Kabasura Kudmer is a product of Indian Tradition medicine siddha /ayurveda and has a beneficial effect against COVID-19 infection. Siddha and ayurveda medicines are most commonly practised in treating coronavirus. Ayurveda remains the most comprehensive and practical medical science that receives acceptance and support of the public. Ayurvedic medicines are anti-inflammatory, antipyretic, and anti-bacterial in nature.[12]

Threats and challenges of emerging viral diseases and scope of ayurveda in prevention :

New biomedical research technologies such as genome sequencing, structure based vaccine and drug design have improved our ability to respond against viral threats. Viral infections have a devastating effect towards human society and viral outbreaks steam roll into socio-economic burden.[13]

### **Antiviral potential of selected Indian Medicinal Plants against Herpes Simplex Virus 1 and 2 :**

Herpes Simplex virus 1 and 2 are also known as Herpes viridae. This causes oral herpes lesion and genital lesion. Treatment of herpes infection is thus cause of major concern owing to the difficulty in eliminating it from the ganglion, high cost of treatment, increasing drug resistance, and association with HIV-1. Few plants were selected on the basis of their traditional usage by comparing the disease symptomatology. Plants selected were taxonomically identified and confirmed based on their morphological and anatomical technique. These plants were beneficial in treating herpes.[14]

Antiviral activity of ancient system of ayurvedic medicinal plants *Cissus Quadrangularis* :

*Cissus quadrangularis* L is a medicinal plant belonging to family Vitaceae, the ancient system of medicine such as Ayurveda and used to treat various diseases and disorders. Within the past decade therapeutic options for viral infections have improved significantly, however, the emergence of resistant viruses as well. The further disposal of resistant strains is one reason for therapeutic failure. Based on Ayurvedic and Siddha traditional herbal medicine, several antiviral studies were performed to detect active natural products in higher plants. Partially purified methanolic extract of *Cissus Quadrangularis* has antiviral activity and also phytochemical characterisation. Phytochemical analysis showed the presence of Steroids and Terpenoids. *Cissus Quadrangularis* has anti-inflammatory, anti-viral, anti-bacterial and anti-ulcerogenic properties.[15]

### **Potential of complementary and alternative ayurvedic medicines in prevention of Swine flu:**

The emergence of novel H1N1 has posed a situation that warrants urgent global attention. Though antiviral drugs are available in mainstream medicine for treating symptoms of swine flu, currently there is no preventive medicine available. Herbs exhibit a diverse array of biological activities and can be effectively harnessed for managing pandemic flu. Potentially active herbs can serve as effective anti influenza agents. The role of CAM for managing novel H1N1 flu and the mode of action of these botanicals is presented here in an evidence-based approach that can be followed to establish their potential use in the management of influenza pandemics. Viruses are a serious threat to the health of people in all parts of the world. For most bacterial diseases, several effective drugs are available, however, viral diseases are often difficult to treat primarily because viruses spread and mutate very rapidly. It has become imperative to develop effective medical strategies for the management of common viral diseases like influenza, which can assume pandemic proportions and become a major threat to humanity. Complementary and alternative medicines have been used effectively by humans over several centuries for treating various diseases and can be effectively employed to target the host response during influenza outbreaks. Antiviral drugs are beneficial for the treatment of Swine flu. Complementary and alternative medicines have proved some interesting preventive possibility in patients. The role of CAH is to establish the potential and management of influenza pandemic.[16]

### **Antiviral natural products and herbal medicines :**

Viral infections play an important role in human diseases, and recent outbreaks in the advent of globalization and ease of travel have underscored their prevention as a critical issue in safeguarding public health. Despite the progress made in immunization and drug development, many viruses lack preventive vaccines and efficient antiviral therapies, which are often beset by the generation of viral escape mutants. Herbal medicines and purified natural products provide a rich resource for novel antiviral drug development. Identification of the antiviral mechanisms from these natural agents has shed light on where they interact with the viral life cycle, such as viral entry, replication, assembly, and release, as well as on the targeting of virus–host-specific interactions.[17]

### **Herbal medicines :A potential cure for the global panic ?:**

The novel Coronavirus disease 2019 (COVID-19) is caused by SARS-CoV-2, which is the causative agent of a potentially fatal disease that is of great global public health concern. The outbreak of COVID-19 is wreaking havoc worldwide due to inadequate risk assessment regarding the urgency of the situation. The COVID-19 pandemic has entered a dangerous new phase. When compared with SARS and MERS, COVID-19 has spread more rapidly, due to increased globalization and adaptation of the virus in every environment. COVID-19 is caused due to infections and causative agents. When compared with other diseases, flu spreads more rapidly leading to increased globalization and adaptation of certain viruses. To prevent this, traditional Indian Medicinal plants have approached the development of vaccines and effective drugs which can be proved beneficial against viral infection. Slowing the spread of the COVID-19 cases will significantly reduce the strain on the healthcare system of the country by limiting the number of people who are severely sick by COVID-19 and need hospital care. Hence, the recent outburst of COVID-19 highlights an urgent need for therapeutics targeting SARS-CoV-2. Here, we have discussed the structure of the virus ; varying symptoms among COVID-19, SARS, MERS and common flu; the probable mechanism behind the infection and its immune response. Further, the current treatment options, drugs available, ongoing trials and recent diagnostics for COVID-19 have been discussed. We suggest traditional Indian medicinal plants as possible novel therapeutic approaches, exclusively targeting SARS-CoV-2 and its pathways.[18][19]

#### **MATERIALS AND METHODS :**

Present study is a review based study. Total number of articles collected was 31. Qualitative analysis of these 31 articles was done and the details were represented ( Table 1). Data was collected through sources such as research gate, google scholar, pubmed. The duration of articles publication period was from January 2000 to March 2020.

Number of articles selected were verified, filtered and identified. Five steps in article selection includes - identification of relevant articles, selection and data extraction and charting. Analysis was done and a report was made. Only those articles were included which had specific alternatives and recent advancement in ayurvedic medicines. Articles that did not fit the selection criteria were excluded. Treatment examined in this present study were plasma therapy, hydroxychloroquine drugs, and traditional medicinal systems like ayurveda, siddha, and unani.

#### **DISCUSSION :**

Coronavirus is an infectious disease, newly discovered as COVID-19. Patients infected with corona have mild to moderate respiratory illness. COVID-19 spreads through droplets of saliva, discharge from the nose or from the infected person when he/she sneezes.[20][21] Different treatments examined in this present study were plasma therapy, hydroxychloroquine drugs, and traditional medicinal systems like ayurveda, siddha, and unani. Apart from this it was also observed, Lianhua Qingwen, a chinese patent medicine composed of 13 herbs, has played a positive role in the treatment of SARS - CoV-2. Apart from ayurvedic medicines, yoga and exercise also helps in improving the immune system and also maintains one's fitness.[22] [23]Ayurveda is a term for Traditional science of life. There are many herbs for making ayurvedic medicines such as tulsi, Aloe vera, giloy, etc. These herbs are useful and helpful to prevent swine flu; influenza C and the subtypes of influenza A known as H1N1, H1N2, H3N1, H3N2. Viral infections play an important role in human diseases, preventing critical issues and safeguarding public health.[24][25]

There was great progress made in immunization and also in drug development but there are many viruses that lack preventive vaccines and also efficient antiviral therapies. The novel coronavirus disease (COVID-19) is caused by SARS - CoV2 which is a causative agent for this fatal disease. When compared with SARS and MERS, COVID-19 spreads more rapidly that causes increased globalization and also

adaptation of the virus in every environment. Diagnosis and treatment for COVID-19 are discussed. Traditional medicinal plants are used for the treatment of COVID-19, targeting SARS- CoV-2 and its pathways.[26][27]

The results clearly indicate that Indian medicines are used for respiratory illness. AYUSH has recommended the use of medicinal plant extracts for treating viral infections. They serve as a hope in these dark times when a cure is not found. Apart from this, chinese medicines are also beneficial in curing viral infections. Apart from medicines, yoga and exercise also improves one's immune system and maintains one's fitness as well. Progress can be seen in preparation of vaccines for treating viral infections.[28][29]

**Limitations of this review :** The main limitation of this review is that there exists a paucity of literature providing scientific basis for the herbal, Ayurvedic, Siddha and homeo medicines claimed to be a cure for viral and respiratory illnesses. Vaccines have not been developed for such viral infections, however antiviral drugs are used for the treatment of such viral infections. The ayurvedic medications have to be proved in scientific studies and can prove to be the panacea.[30][31]

**Future Scope :** With this it can be concluded, the evaluation of efficacy of herbal, ayurvedic, Sidha, homeo and other traditional medicines against COVID-19 and also other viral infections opens up a huge research avenue.

#### **CONCLUSION:**

A pandemic is a disease that has spread across large continents and nations, for instance multiple continents or worldwide, affecting a substantial number of people. A widespread endemic disease with a stable number of infected people is not a pandemic.

The aim of this study is to review the current literature about the efficacy of herbal, ayurvedic, Sidha, homeo and other traditional medicines against COVID-19 affected patients. Lot of herbs have been claimed to be beneficial to treat viral infections. Also, progress can be seen in preparation of vaccines to treat viral infections and opens up avenues of research. To prevent ourselves from viral infections, one must practice self- hygiene and also social distancing.

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**Conflict of interests:** None to declare.

#### **REFERENCES:**

- [1] Ferguson NM, Cummings DAT, Fraser C, Cajka JC, Cooley PC, Burke DS. Strategies for mitigating an influenza pandemic. *Nature* 2006;442:448–52.
- [2] Bedford J, Enria D, Giesecke J, Heymann DL, Ihekweazu C, Kobinger G, et al. COVID-19: towards controlling of a pandemic. *The Lancet* 2020;395:1015–8. [https://doi.org/10.1016/s0140-6736\(20\)30673-5](https://doi.org/10.1016/s0140-6736(20)30673-5).
- [3] Mahase E. Covid-19: WHO declares pandemic because of “alarming levels” of spread, severity, and inaction. *BMJ* 2020:m1036. <https://doi.org/10.1136/bmj.m1036>.
- [4] Sarbeen JI, Insira Sarbeen J, Gheena S. Microbial variation in climatic change and its effect on human health. *Research Journal of Pharmacy and Technology* 2016;9:1777. <https://doi.org/10.5958/0974-360x.2016.00359.0>.

- [5] Palati S, Ramani P, Herald. J. Sherlin, Gheena S, Don KR, Jayaraj G, et al. Age Estimation of an Individual Using Olze's Method in Indian Population-A Cross-Sectional Study. *Indian Journal of Forensic Medicine & Toxicology* 2019;13:121. <https://doi.org/10.5958/0973-9130.2019.00179.8>.
- [6] Prasanna GE, Gheena S. A study of empathy across students from 4 health disciplines among 1st years and Final years. *Research Journal of Pharmacy and Technology* 2016;9:1472. <https://doi.org/10.5958/0974-360x.2016.00286.9>.
- [7] Shree KH, Hema Shree K, Ramani P, Herald Sherlin, Sukumaran G, Jeyaraj G, et al. Saliva as a Diagnostic Tool in Oral Squamous Cell Carcinoma – a Systematic Review with Meta Analysis. *Pathology & Oncology Research* 2019;25:447–53. <https://doi.org/10.1007/s12253-019-00588-2>.
- [8] Liu C, Zhou Q, Li Y, Garner LV, Watkins SP, Carter LJ, et al. Research and Development on Therapeutic Agents and Vaccines for COVID-19 and Related Human Coronavirus Diseases. *ACS Cent Sci* 2020;6:315–31.
- [9] Sanders JM, Monogue ML, Jodlowski TZ, Cutrell JB. Pharmacologic Treatments for Coronavirus Disease 2019 (COVID-19). *JAMA* 2020. <https://doi.org/10.1001/jama.2020.6019>.
- [10] Sheriff KAH, Ahmed Hilal Sheriff K, Santhanam A. Knowledge and Awareness towards Oral Biopsy among Students of Saveetha Dental College. *Research Journal of Pharmacy and Technology* 2018;11:543. <https://doi.org/10.5958/0974-360x.2018.00101.4>.
- [11] Ren J-L, Zhang A-H, Wang X-J. Corrigendum to “Traditional Chinese medicine for COVID-19 treatment” [Pharmacol. Res. 155 (2020) 104743]. *Pharmacological Research* 2020;155:104768. <https://doi.org/10.1016/j.phrs.2020.104768>.
- [12] Patel H, Patel F, Jani V, Jha N, Ansari A, Paliwal B, et al. Anti-pathogenic potential of a classical ayurvedic formulation- Triphala. *F1000Research* 2019;8:1126. <https://doi.org/10.12688/f1000research.19787.1>.
- [13] Palati S, Ramani P, Shrelin H, Sukumaran G, Ramasubramanian A, Don KR, et al. Knowledge, Attitude and practice survey on the perspective of oral lesions and dental health in geriatric patients residing in old age homes. *Indian Journal of Dental Research* 2020;31:22. [https://doi.org/10.4103/ijdr.ijdr\\_195\\_18](https://doi.org/10.4103/ijdr.ijdr_195_18).
- [14] Akram M, Tahir IM, Shah SMA, Mahmood Z, Altaf A, Ahmad K, et al. Antiviral potential of medicinal plants against HIV, HSV, influenza, hepatitis, and coxsackievirus: A systematic review. *Phytotherapy Research* 2018;32:811–22. <https://doi.org/10.1002/ptr.6024>.
- [15] Tripathi A, Sinha S, Dwivedi BK. An Attempt to Evaluate Antiviral Activity of Plant Extracts to Combat Infections Caused by Viruses Including SARS COV-2. *SSRN Electronic Journal* n.d. <https://doi.org/10.2139/ssrn.3599444>.
- [16] Gawande AV, Department of Community Medicine, Government Medical College, Nagpur. Knowledge about swine flu (H1N1) among pregnant women attending antenatal care clinic in a tertiary care hospital in central India. *Journal of Medical Science And Clinical Research* 2018;6. <https://doi.org/10.18535/jmscr/v6i2.189>.
- [17] Parvez MK, Arbab AH, Al-Dosari MS, Al-Rehaily AJ. Antiviral Natural Products Against Chronic Hepatitis B: Recent Developments. *Current Pharmaceutical Design* 2015;22:286–93. <https://doi.org/10.2174/1381612822666151112152733>.

- [18] Vellingiri B, Jayaramayya K, Iyer M, Narayanasamy A, Govindasamy V, Giridharan B, et al. COVID-19: A promising cure for the global panic. *Science of The Total Environment* 2020;725:138277. <https://doi.org/10.1016/j.scitotenv.2020.138277>.
- [19] Krishnan RP, Ramani P, Sherlin HJ, Sukumaran G, Ramasubramanian A, Jayaraj G, et al. Surgical Specimen Handover from Operation Theater to Laboratory: A Survey. *Ann Maxillofac Surg* 2018;8:234–8.
- [20] Zu ZY, Di Jiang M, Xu PP, Chen W, Ni QQ, Lu GM, et al. Coronavirus Disease 2019 (COVID-19): A Perspective from China. *Radiology* 2020:200490. <https://doi.org/10.1148/radiol.2020200490>.
- [21] Uma PK, Ramani P, Sherlin H, Gheena S, Ramasubramanian A, Don KR, et al. Diet and exercise among students of a wellreputed dental college in Chennai: A questionnaire-based survey. *International Journal of Orofacial Biology* 2018;2:47. [https://doi.org/10.4103/ijofb.ijofb\\_1\\_19](https://doi.org/10.4103/ijofb.ijofb_1_19).
- [22] Dong L, Hu S, Gao J. Discovering drugs to treat coronavirus disease 2019 (COVID-19). *Drug Discoveries & Therapeutics* 2020;14:58–60. <https://doi.org/10.5582/ddt.2020.01012>.
- [23] Manohar J, Abilasha R. A Study on the Knowledge of Causes and Prevalance of Pigmentation of Gingiva among Dental Students. *Indian Journal of Public Health Research & Development* 2019;10:95. <https://doi.org/10.5958/0976-5506.2019.01859.x>.
- [24] Sharma R, Agarwal M, Gupta M, Somendra S, Saxena SK. Clinical Characteristics and Differential Clinical Diagnosis of Novel Coronavirus Disease 2019 (COVID-19). *Medical Virology: From Pathogenesis to Disease Control* 2020:55–70. [https://doi.org/10.1007/978-981-15-4814-7\\_6](https://doi.org/10.1007/978-981-15-4814-7_6).
- [25] Sukumaran G, Padavala S. Molar incisor hypomineralization and its prevalence. *Contemporary Clinical Dentistry* 2018;9:246. [https://doi.org/10.4103/ccd.ccd\\_161\\_18](https://doi.org/10.4103/ccd.ccd_161_18).
- [26] Ahad M, Gheena S. Awareness, attitude and knowledge about evidence based dentistry among the dental practitioner in Chennai city. *Research Journal of Pharmacy and Technology* 2016;9:1863. <https://doi.org/10.5958/0974-360x.2016.00380.2>.
- [27] Abitha T, Santhanam A. Correlation between bizygomatic and maxillary central incisor width for gender identification. *Brazilian Dental Science* 2019;22:458–66. <https://doi.org/10.14295/bds.2019.v22i4.1775>.
- [28] Cunningham AC, Goh HP, Koh D. Treatment of COVID-19: old tricks for new challenges. *Crit Care* 2020;24:91.
- [29] Hannah R, Ramani P, Herald. J. Sherlin, Ranjith G, Ramasubramanian A, Jayaraj G, et al. Awareness about the use, Ethics and Scope of Dental Photography among Undergraduate Dental Students Dentist Behind the lens. *Research Journal of Pharmacy and Technology* 2018;11:1012. <https://doi.org/10.5958/0974-360x.2018.00189.0>.
- [30] Gunasekaran G, Abilasha R. TOOTH SENSITIVITY AMONG RESIDENTIAL UNIVERSITY STUDENTS IN CHENNAI. *Asian Journal of Pharmaceutical and Clinical Research* 2016:63. <https://doi.org/10.22159/ajpcr.2016.v9s2.13228>.
- [31] Harrita S, Santhanam A. Determination of Physical Height Using Clinical Crown Height of Deciduous Teeth. *Indian Journal of Forensic Medicine & Toxicology* 2019;13:23. <https://doi.org/10.5958/0973-9130.2019.00255.x>.

**List of Tables:**

**Table 1 :**

Quality assessment of various articles used in the review.

<b>AUTHOR</b>	<b>YEAR</b>	<b>QUALITY ASSESSMENT</b>
<b>Ferguson NM</b>	2006	Strong
<b>Bedford. J</b>	2020	Strong
<b>Mahase. E</b>	2020	Moderate
<b>Sarbeen JI</b>	2016	Strong
<b>Palati.S</b>	2019	Strong
<b>Prasanna GE</b>	2016	Strong
<b>Shree KH</b>	2019	Moderate
<b>Liu. C</b>	2020	Moderate
<b>Sanders JM</b>	2019	Strong
<b>Ahmed Hilal Sheriff</b>	2018	Strong
<b>Ren JL</b>	2020	Moderate
<b>Patel. H</b>	2019	Strong
<b>Ramani. P</b>	2020	Strong
<b>Akram. M</b>	2018	Moderate
<b>Tripathi. A</b>	2020	Moderate
<b>Gawande. AV</b>	2018	Strong
<b>Parvez MK</b>	2015	Strong
<b>Vellingiri. B</b>	2020	Moderate
<b>Krishnan RP</b>	2018	Moderate
<b>ZuZy</b>	2019	Moderate
<b>Uma. PK</b>	2018	Strong
<b>Dong. L</b>	2020	Strong
<b>Manohar.J</b>	2019	Strong
<b>Sharma. R</b>	2020	Moderate
<b>Sukumaran. G</b>	2018	Strong
<b>Ahad. M</b>	2016	Moderate
<b>Abitha. T</b>	2019	Strong
<b>Cunningham AC</b>	2020	Moderate
<b>Hannah. R</b>	2018	Moderate
<b>Gunasekaran. G</b>	2016	Strong
<b>Harrita. S</b>	2019	Moderate

Table 1 shows the quality assessment of various articles that were cited in context with the present study