



CROSS-SECTIONAL INVESTIGATION ON PRESCRIPTION PATTERN AND THERAPEUTIC APPROACH UTILIZED BY THE SIDDHA PHYSICIANS FOR CLINICAL MANAGEMENT OF KABAYONI ROGAM (VULVOVAGINAL CANDIDIASIS)

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ABSTRACT

Vulvovaginal candidiasis (VVC) is a widespread vaginal infection primarily caused by *Candida albicans*. VVC affects up to 75% of women of childbearing age once in their life, and up to 9% of women in different populations experience more than three episodes per year, which is defined as recurrent vulvovaginal candidiasis. Conventional anti-fungal therapies impose increased resistance to pathogenic fungus such as *Candida albicans* which may further lead to increased colonization. Hence exploration of alternate system of medicine from siddha origin become need of the hour. The primary objective of this observational study is to investigate the prescription patterns, treatment approaches, and techniques utilised by siddha doctors in the clinical care of Vulvovaginal candidiasis. Cross sectional observation study comprises of 50 siddha physician (25 private and 25 government) subjected to critical analysis on prescription practice towards clinical management of vulvovaginal candidiasis. It was concluded from the data's of current cross sectional study is that siddha physicians utilised versatile formulations which includes Chooranam, Parpam, Legiyam and other medicines for managing symptoms associated with vulvovaginal candidiasis. Additionally, it was revealed that Siddha therapy had clinical effectiveness with a decreased occurrence of side events, while also being cost-effective and requiring less time. Therefore, the use of siddha medications has been proven to be effective in managing the symptoms associated with vulvovaginal candidiasis.

KEY WORDS: *Siddha, Vulvovaginal candidiasis, Herbs, Siddha physicians, Prescription pattern, Formulations, Therapy*

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1. Introduction

Vulvovaginal candidiasis is considered to be the second most prevalent aetiology of vaginitis, behind bacterial vaginosis. *Candida albicans* is responsible for around 85% to 90% of reported cases [1]. Risk factors encompass several conditions such as pregnancy, instances involving elevated levels of oestrogen, diabetes mellitus, immunosuppression, and the administration of systemic antibiotics. The available data indicates that there is a prevalence of recurrent vulvovaginal candidiasis in around 6% to 10% of women [2].

Vulvovaginal candidiasis condition can be influenced or triggered by a range of causes, encompassing host factors, local defence systems, gene polymorphisms, allergens, blood glucose levels, antibiotics, psychological stress, oestrogens, and sexual activity. Nevertheless, the majority of episodes lack a distinct and identifiable trigger [3]. *Candida* species (spp.) colonise the vagina that has been exposed to oestrogen in around 20% of pregnant women and 30% of those with weakened immune systems, as determined by culture-based examination. When employing non-culture techniques, it has been observed that fungi are present in more than 60% of instances [4]. The primary species observed is *Candida albicans*, with non-*albicans* species, infections generated by non-*albicans* species are frequently associated with less severe symptoms compared to vaginitis resulting from *C. albicans*. Non-*albicans* vaginitis has a higher likelihood of occurrence in pregnant women, those who have undergone antibiotic medication, or women with elevated levels of oestrogen, such as those undergoing hormone replacement therapy or using oral contraceptives [5]. There are many therapy approaches that demonstrate comparable therapeutic efficacy for women experiencing acute vulvovaginal candidiasis (VVC).

The management of fungal infections is contingent upon the clinical presentations, the severity of the disease, and the specific yeast/*Candida* species responsible. In recent reports, it has been shown that a certain subset of susceptible isolates has developed tolerance to the primary antifungal drug fluconazole [6]. This tolerance has been found to

potentially facilitate colonisation, leading to elevated rates of treatment failure and death. Therefore, the global significance of utilising traditional medicinal treatments becomes increasingly prominent [7]. The primary objective of this observational study is to investigate the prescription patterns, treatment approaches, and techniques utilised by siddha doctors in the clinical care of Vulvovaginal candidiasis.

2. Materials and Methods

2.1. Study design

Cross sectional observation study comprises of 50 siddha physician (25 private and 25 government) subjected to critical analysis on prescription practice towards clinical management of Kabayoni Rogam (Vulvovaginal candidiasis). Study conducted with the prior approval from the concerned authority. Physicians were also explained about the objective of the study and purpose of the questionnaires. Data were dealt with the high level of anonymity and confidentiality.

2.2. Questioner Pattern

The questionnaire was divided accordingly to cover the entire purpose of the study such as pre-treatment procedures, drugs of choice, external therapy, add on therapy, treatment duration and details on adverse drug reactions if any.

2.3. Ethical approval and Data collection

Ethical approval for this study was obtained from the Institutional Ethical committee. A prior appointment was obtained from the Physicians. Data was being collected by requesting the physicians by giving a questionnaire. A self-administered questionnaire was used to collect data from the study population. The questionnaire was filled with paper and pen method. The questionnaire consists of open ended questions (from 1-8) to obtain their personal information which are kept confidential and questions from 9-13 to obtain their detailed prescription methods. Question no 14 is a contingency type closed ended question to obtain information about external therapies / add on therapy given to the patients. Question number 16-19 deals with the diet restrictions, adverse reactions and minimum

expenditure for the treatment by which a complete detailed line of treatment followed by the practitioners can be obtained.

3. Results

3.1. Existence of pre-treatment procedure

It was observed from the study that 38 physicians (76%) were giving pre-treatment procedure. As shown in Figure 1.

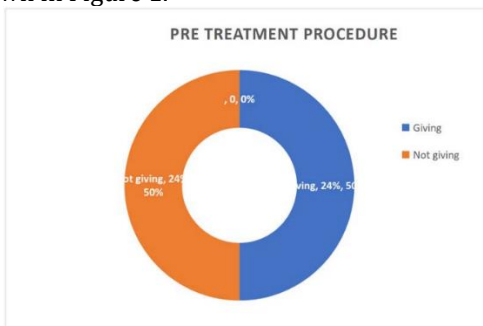


Figure 1: Existence of pretreatment procedure

3.1.1. Percentage preference on pre-treatment - Purgation

From the results of the present investigation it was observed that According to the study 8(16%) physicians had given Vellai Ennai, 2(4%)physicians- Agasthiyar Kulambu, 2(4%)physicians -Siddhathi Ennai 38(76%) Physicians not given purgation. As shown in figure 2.

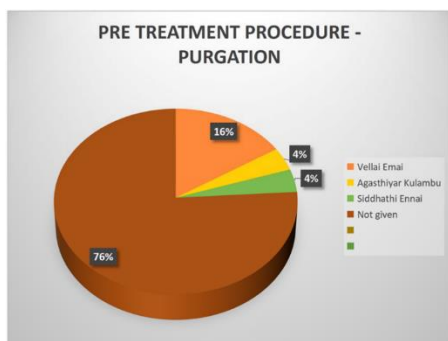


Figure 2: Percentage preference towards Purgation

3.2. Physicians therapeutic preference towards Chooranam based preparations

It was observed from the study that 39 (78%) physicians given Parangi pattai chooranam 3(6%) physicians Tripala chooranam 2(4%) Physicians Amukkra Chooranam 2(4%) physicians Elathy chooranam 4(8%) physicians Ashoka Pattai chooranam to the patients kabayoni rogam (VVC).As shown in Figure 3.

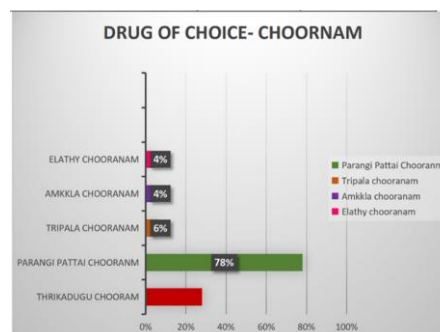


Figure 3: Percentage preference towards Chooranam

3.3. Therapeutic preference towards drug of choice on parpam based preparations

It was observed from the result of the present analysis out of 50 Physicians, according to the study, out of 50 physicians 21 (54%) patients treated with kukil parpam, 13 (26%) Physicians prescribed silasathu parpam, 3 (6%) physicians prescribed padigara Parpam and 2 (4%) physicians prescribed sangu parpam, 3(6%) Physicians prescribed Palagarai parpam to the patients Kabayoni Rogam. As shown in Figure 4.

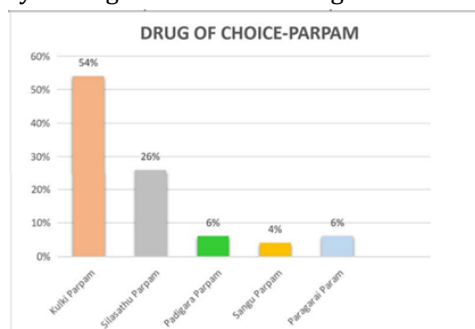


Figure 4: Percentage preference towards Parpam

3.4. Therapeutic preference towards Legiyam based preparations

According to the study out of 50 Physicians, out of 50 Physicians 6(12%) Physicians treated with Thanervittan legiyam, 12 Physicians (24%) treated with sathaveri legiyam, 24(48%) Physicians with venpoosanai legiyam to the patients and 8 (16%) physicians treat Kumari legiyam to the patients in Kabayoni Rogam (VVC).As shown in Figure 5.

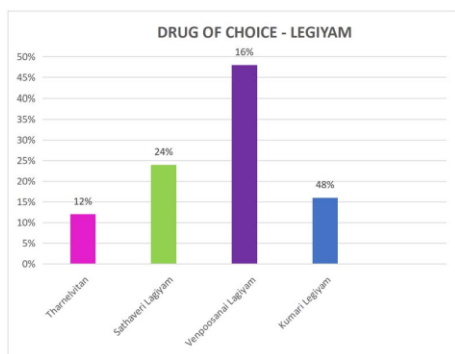


Figure 5: Percentage preference towards Legiyam based preparations

3.5. Therapeutic preference towards other medicines

According to the study out of 50 Thaneervitan Nei 5 Physicians (10%) had given Rasa Gandhi Melugu 23 Physicians (46%) had given Madhulai Melugu and 7 Physicians (14%), Gandhaga Rasayanam 6 Physicians (12%) Meganadha Kuligai, Physicians 6 (12) had not given 6 (10) to the patients. As shown in Figure 6.

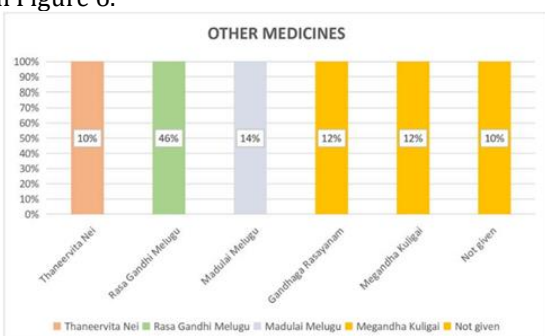


Figure 6: Percentage preference towards other medicines

3.6. Therapeutic preference towards External therapy

According to the study, the external therapies Tripala chooranam is given for External wash by 35 (70%) physicians, Oil bath prescribed by 8 Physicians (16%) and Thokkanam by 7 (14%) physicians. As shown in Figure 7.

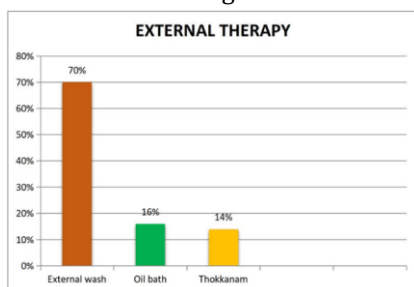


Figure 7: Percentage preference towards External therapy

3.7. Therapeutic preference towards oil bath (External)

According to the study out of 50 physicians 18 (36%) physicians prescribed chukku thailam, 7 (14%) karisalai madakku thailam. As shown in Figure 8.

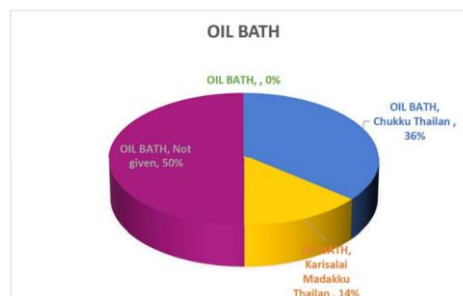


Figure 8: Percentage preference towards oil bath (External)

3.8. Therapeutic preference towards add on therapy (External)

According to the study, out of 50 physicians, 18 (36%) physicians stated that, the patients treatment by them had taken add on therapy during the treatment. As shown in Figure 9.

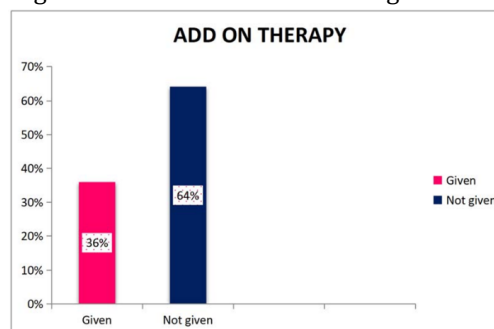


Figure 9: Percentage preference towards add on therapy (External)

3.9. Result analysis on duration of therapy

According to the study, the duration of the treatment given by the 50 physicians to the patients in Kabayoni Rogam follows: 4 physicians - 7 days, 6 physicians - 15 days, 18 physicians - 45 days, 14 physicians - 1 month, 8 physicians - 1-2 months depending upon acute and chronic conditions. As shown in Figure 10.

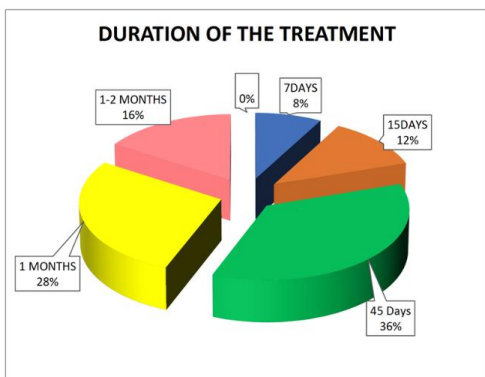


Figure 10: Result analysis on duration of therapy

3.10. Inference on adverse reaction

As per study conducted among out of 50 physicians, 6(12%) physicians had observed adverse reactions, 44 (88%) physicians, had not observed adverse reaction during the treatment in Kabayoni Rogam. As shown in Figure 11.

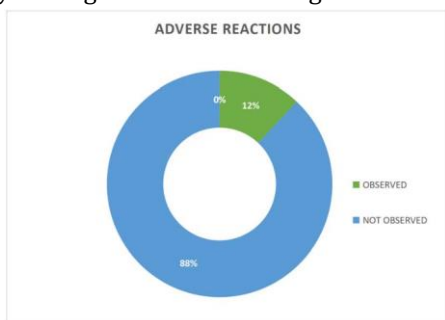


Figure 11: Result analysis on inference of adverse reaction

3.11. Result analysis on cost estimation towards therapy

As per the study conducted among 50 Physicians, the minimum expenditure for the treatment of kabayoni rogam are as follows – 8 Physicians obtained ≤ 500 Rupees and 18(36%) Physicians charged between 500 – 800 rupees and 18(36%) Physicians charged between 800-1000 Rupees and 6(12%) Physicians charged between (1000-1500). As shown in Figure 12.

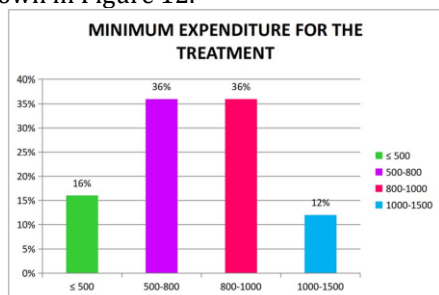


Figure 12: Result analysis on cost estimation towards therapy

4. Discussion

Vulvovaginal candidiasis is a matter of worldwide significance owing to its correlation with economic implications, sexually transmitted illnesses, and the potential for ascending infection inside the genital system. Approximately 5-10 million women worldwide seek gynaecological consultation for vaginitis annually [8]. Numerous research has documented that a significant proportion, namely three quarters (75%), of women would encounter an occurrence of vulvovaginal candidiasis at some point throughout their lifespans [9,10]. An significant determinant that might contribute to treatment ineffectiveness is the development of antifungal medication resistance in the infecting *Candida* species. An instance of extended use of fungistatic azole medications, such as fluconazole, might potentially induce resistance in pathogenic yeasts, hence diminishing the drug's efficacy. Fluconazole is widely employed as the predominant azole agent for both prophylactic and therapeutic purposes in the management of *Candida* infections [11]. Nevertheless, a number of *Candida* species have developed resistance to azoles, leading to a growing concern over treatment efficacy.

Three distinct mechanisms of azole resistance have been elucidated for *Candida* species. One modification observed is in the target enzyme, 14 α -demethylase. The enzyme is effectively inhibited by azoles, resulting in the buildup of C14 methylated sterols, which is highly likely to disturb the structure of the membrane [12]. Certain resistant organisms exhibit an upregulation of the 14 α -demethylase gene and/or a reduced susceptibility of the enzyme to azole inhibition [13]. The second mechanism involves a reduction in drug accumulation, which may be attributed to either a decrease in drug absorption or an increase in drug efflux [14]. The third mechanism contributing to resistance involves the existence of a deficit in C5 [15] desaturase. Organisms that exhibit a deficiency in this particular enzyme are capable of producing 14-methylfecosterol and maintaining their viability even in the presence of suppressed 14 α -demethylase activity [16]. *Candida* species have established themselves as a major source of nosocomial infections. Increased expression of secreted aspartyl proteinases (SAP5) plays a crucial role in the pathogenesis of *Candida* species. Alternate mean of therapeutics continue to serve as a viable resource for discovering novel antifungal agents [17,18].

Purgation is considered a prominent therapeutic modality within the Siddha school of medicine. Purgation refers to the medical process of inducing the expulsion of faeces in order to alleviate an excessive and imbalanced state of Dosha [19]. Although purgation is utilised in contemporary medical practise, its primary application is limited to gastrointestinal disorders. However, under the Siddha system, purgation is commonly employed as a first therapeutic approach for several ailments. From the results of the present investigation it was observed that According to the study 8(16%) physicians had given Vellai Ennai, 2(4%)physicians- Agasthiyar Kulambu, 2(4%)physicians -Siddhathi Ennai 38(76%) Physicians not given purgation.

The siddha system of medicine provides significant relief in the management of vulvovaginal candidiasis, since its therapeutic approach focuses on reducing colonization and controlling the reoccurrence of vaginal candidiasis. Based on the findings acquired from the current analysis, it is suggested that siddha physicians employ a range of formulations, such as Chooranam, Parpam, Legiyam and other formulation in the management of symptoms related to vulvovaginal candidiasis. Duration of therapy and cost incurring on the same remains the major determinant factors for the patients adhere to the treatment protocol. According to our study, the duration of the treatment given by the 50 physicians to the patients in Kabayoni Rogam follows: 4 physicians - 7 days, 6 physicians -15 days, 18 physicians -45 days, 14 physicians- 1 month, 8 physicians 1-2 months depending upon acute and chronic conditions. As per our study among 50 Physicians, the minimum expenditure for the treatment of kabayoni rogam are as follows – 8 Physicians obtained ≤ 500 Rupees and 18(36%) Physicians charged between 500 – 800 rupees and 18 (36%) Physicians charged between 800-1000 Rupees and 6(12%) Physicians charged between (1000-1500).

5. Conclusion

Vulvovaginal candidiasis is a prevalent infection mostly linked to the proliferation of the fungus species *Candida albicans*. At now, there is a lack of medicines approved by the US Food and Drug Administration for the management of recurrent vulvovaginal candidiasis. Nevertheless, there are ongoing efforts to create a number of potential medications that show promise in addressing this condition. It was concluded from the data's of

current cross sectional study is that siddha physicians utilised versatile formulations which includes Chooranam, Parpam, Legiyam and other formulations for managing symptoms associated with Kabayoni Rogam (Vulvovaginal candidiasis). Further it was also observed that siddha therapy found clinically effective with lower incidence of adverse event in economical mean and at lesser time.

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6. References

1. Martin Lopez J. E. (2015). Candidiasis (vulvovaginal). *BMJ clinical evidence*, 2015, 0815.
2. Foxman B, Muraglia R, Dietz JP, Sobel JD, Wagner J. Prevalence of recurrent vulvovaginal candidiasis in 5 European countries and the United States: Results from an internet panel survey. *J Low Genit Tract Dis* 2013;17:340.
3. Denning DW, Kneale M, Sobel JD, Rautema-Richardson R. Global burden of recurrent vulvovaginal candidiasis: a systematic review. *Lancet Infect Dis*. 2018;18(11):e339-e347.
4. Yano J, Sobel JD, Nyirjesy P, et al. Current patient perspectives of vulvovaginal candidiasis: incidence, symptoms, management and post-treatment outcomes. *BMC Womens Health*. 2019;19(1):48.
5. Nyman GSA, Tang M, Inerot A, Osmancevic A, Malmberg P, Hagvall L. Contact allergy to beeswax and propolis among patients with cheilitis or facial dermatitis. *Contact Dermatitis*. 2019;81(2):110-116.
6. Lee, Y., Puumala, E., Robbins, N., & Cowen, L. E. (2021). Antifungal Drug Resistance: Molecular Mechanisms in *Candida albicans* and Beyond. *Chemical reviews*, 121(6), 3390–3411. <https://doi.org/10.1021/acs.chemrev.0c00199>
7. Badiie, P., & Alborzi, A. (2011). Susceptibility of clinical *Candida* species isolates to antifungal agents by E-test, Southern Iran: A

- five year study. Iranian journal of microbiology, 3(4), 183–188.
8. Ahmad A, Khan AU. Prevalence of Candida species and potential risk factors for vulvovaginal candidiasis in Aligarh, India. Eur J Obstet Gynecol Reprod Biol. 2009;144:68–71. doi: 10.1016/j.ejogrb.2008.12.020.
 9. CDC Sexually transmitted diseases treatment guidelines, 2010. MMWR. 2010;59(RR12):1–110.
 10. Bitew, A., & Abebaw, Y. (2018). Vulvovaginal candidiasis: species distribution of Candida and their antifungal susceptibility pattern. BMC women's health, 18(1), 94. <https://doi.org/10.1186/s12905-018-0607-z>
 11. Sanglard D., Coste A.T., Ferrari S. Antifungal drug resistance mechanisms in fungal pathogens from the perspective of transcriptional gene regulation. FEMS Yeast Res. 2009;9:1029–1050. doi: 10.1111/j.1567-1364.2009.00578.x.
 12. Hitchcock C A. Resistance of Candida albicans to azole antifungal agents. Biochem Soc Trans. 1993;21:1039–1047.
 13. Lamb D C, Kelly D E, Schunck W H, Shyadehi A Z, Akhtar M, Lowe D J, Baldwin B C, Kelly S L. The mutation T315A in Candida albicans sterol 14 α -demethylase causes reduced enzyme activity and fluconazole resistance through reduced affinity. J Biol Chem. 1997;272:5682–5688.
 14. Parkinson T, Falconer D J, Hitchcock C A. Fluconazole resistance due to energy-dependent drug efflux in Candida glabrata. Antimicrob Agents Chemother. 1995;39:1696–1699.
 15. Ghannoum M A, Janini G, Khamis L, Radwan S S. Dimorphism-associated variations in the lipid composition of Candida albicans. J Gen Microbiol. 1986;132:2367–2375.
 16. Geber A, Hitchcock C A, Swartz J E, Pullen F S, Marsden K E, Kwon-Chung K J, Bennett J E. Deletion of the Candida glabrata ERG3 and ERG11 genes: effect on cell viability, cell growth, sterol composition, and antifungal susceptibility. Antimicrob Agents Chemother. 1995;39:2708–2717.
 17. Sivaraman Dhanasekaran, Pradeep Pushparaj Selvadoss, Solomon Sundar Manoharan, Srikanth Jeyabalan, Devi Rajeswari Vijayarangan. Revealing Anti-Fungal Potential of Plant-Derived Bioactive Therapeutics in Targeting Secreted Aspartyl Proteinase (SAP) of Candida albicans: A Molecular Dynamics Approach. Journal of Biomolecular Structure and Dynamics 2023. 6,1-15.
 18. Sivaraman Dhanasekaran, Pradeep Pushparaj Selvadoss, Solomon Sundar Manoharan. Anti-Fungal Potential of Structurally Diverse FDA-Approved Therapeutics Targeting Secreted Aspartyl Proteinase (SAP) of Candida albicans: an In Silico Drug Repurposing Approach. Applied Biochemistry and Biotechnology. 2022;195(3):1983-1998. doi: 10.1007/s12010-022-04207-w.
 19. M.Rajeshwari. (2022). Understanding the Concept of Purgation in Siddha Medicine: A Review. International Journal of Ayurveda and Pharma Research, 10(6), 115-122. <https://doi.org/10.47070/ijapr.v10i6.2324>