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Cover story

Neeramulliya

Botanical name: ***Hygrophila auriculata***
Family: ACANTHACEAE
Vernacular names: Sinhala: *Neeramulliya, Katu ikiriya, Ikiriya;* **Sanskrit:** *Gokantha, Kokilaksha;* **English:** *Marsh barbel;* **Tamil:** *Vayalchulli, Neermulli;* **Hindi:** *Bhankari*

Hygrophila auriculata is a spiny herbaceous shrub that grows in marshes and on the edges of water bodies; it has numerous medicinal uses, the leaves can be eaten as a vegetable, and the flowers produce nectar that attracts bees and butterflies[1].

This is a perennial aquatic herb native to Sri Lanka and tropical Asia. Erect stem, 1.25m high, armed with axillary spines to 2-4 cm long. Leaves in whorls of six, elliptic lanceolate, acute at apex, entire margines, hispid above. Flowers 6-8 in a whorl, bracts lanceolate, corolla purple[2]. The plant is used in cancer and tubercular fistula. Root and seeds used as tonic, for asthma and dysentery. The leaf, root and seed of this plant are traditionally used for the treatment of inflammation, jaundice, hepatic obstruction, urinary infection, oedema, gout, diabetes, bacterial infection etc.[3]

Phytochemically, the whole plant contains phytosterols, tannins, carbohydrates, flavonoids, terpenoids, and sterols. Phalnikar *et al.*, Analyzed the oil from the seeds and reported the presence of uronic, palmitic, stearic, oleic, and linoleic acids. Apigenin-7-O-glucuronide and apigenin7-oglucoside were isolated from the flowers and lupeol, betulin, and stigmasterol were isolated from the plant. Alkaloids, steroids, tannins, proteins, flavonoids, carbohydrates, fats, and oils were isolated from the roots. Moreover, the leaves show the presence of alkaloids, carbohydrates, proteins, steroids, glycosides, flavonoids, tannins, phenolic compounds, fats, and oils[3].

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A comparative study of prepared *Bhasma* using different marine-originated animal materials

Nallaperuma D.M.*, Herapathdeniya S.K.M.K. and Senaviratne A.M.N.D.

Abstract

Rasa shastra is a main pharmaceutical branch in Ayurveda and Mercury is the main material in *Rasa shastra*. Other than mercury, different animal resources, minerals, gems, marine originated materials and some toxic plants are also described under *Rasa shastra*. *Shankha*, *Shukthi* and *Kaparda* are some of the commonly used marine originated animal materials. These materials contain Calcium and categorized under *Sudha varga*. The objective of this study is to prepare *Shankha*, *Shukthi* and *Kaparda bhashmas* according to *Rasa shastra* and to comparatively analyze the physico-chemical parameters and to determine the Calcium content of these *Bhashmas*. Boiling and steaming method was used for the purification, and incineration was done by using the muffle furnace at 550°C. *Bhashma* standardization parameters in *Rasa Shastra*; *Rekha purnatva, Varitharathva, Uththama, Gatha rasathva, Avami, Anjana sadrusha sukshma* and *Dantagra na kacha kacha* were performed for all these *bhashmas*. Calcium percentage in each *bhashma* was determined by titrating with 0.1M NaOH solution using phenolphthalein as the indicator. Results revealed that all the *Bhashmas* were within the standard parameters according to classical texts. According to modern physico-chemical analysis, moisture contents of all the samples were relatively low (0.40%, 1.30%, 0.95%). Total ash contents were 99.20%, 98.50% and 98% respectively. Acid insoluble ash values (52%, 77.80%, 57%) were higher than water soluble ash values (3.80%, 2.60%, 1.65%). All the samples were having an alkaline pH value (8.2, 8.0, 8.7). The highest calcium percentage was reported from *Shukthi bhashma* (99.30%) and lowest from *Kaparda bhashma* (78.40%). It can be concluded that all the *Bhashmas* were having the standard quality according to Ayurveda as well as modern physico-chemical parameters. Due to the high calcium content, *Shukthi bhashma* can be highly recommended as a nutritional supplement for Calcium deficiencies among these *Bhashmas*.

Keywords: *Bhashma*, *Kaparda*, Marine originated, *Shanka*, *Shukthi*

Introduction

Ayurveda is considered as a natural healing system and one of the oldest traditional medicine systems not only in ancient India but also in the world. Ayurveda has two main objectives as prevention of diseases and curing of diseases[1]. According to Ayurveda authentic texts, there are four pillars needed to achieve these two objectives. They are called as *Vaidyadi chathushpadaya*, which consists of physician, patient, attendant and drugs[2]. Drugs play a key role among these four pillars. Drugs from the three natural sources of herbal, mineral, metal and animal origin have been described in Ayurveda.

Rasa shastra is a branch of Ayurveda that developed along with *Bhaisajya Kalpana*[3,4]. *Rasa shastra* started as a separate science, but it slowly merged with Ayurveda. Mercury is the main material in *Rasa shastra*[5]. Other than mercury different animal materials, minerals, gems, marine originated materials and some toxic plants are also described under *Rasa shastra*[6]. The preparations which are prepared with these materials are called as

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Rasaushadies and there is many processing techniques applied for the preparation of those *Rasaushadies*. They are *Shodana*, *Jarana*, *Marana* and *Amruthikarana*. *Rasa shastra* texts have mentioned the superiority of these preparations[7]. When comparing with herbal preparations, *Rasaushadies* are considered as the superior preparation due to the ability of administering a lower dose, tastelessness and high potency. Also, they can be absorbed and assimilated in the body quickly[8]. Due to these special features of *Rasaushadies*, patients can get quick relief.

Marine which is called as the 'mother of origin of life' is also one of the richest natural sources of minerals like Calcium (Ca), Phosphorus (P) and Iron (Fe). There are many marine originated animal parts extensively used in *Rasa shastra*[9]. Conchs (*Shankha*), oyster's shell (*Shukthi*), and cowrie shells (*Kaparda*) are some of the commonly used marine originated animal materials[10]. These materials which contain calcium are categorized under the *Sudha varga* in *Rasa Shastra* authentic texts. *Shankha* or conch (*Terbinella pyrum*) which belongs to the class Mollusca of family Turbinellidae is enclosed in a very hard, dense and calcareous shell[11]. It is a large sea snail with a long spiral shell. There are two types of *Shankha* as *Vamavartha*, *Dakshinawartha.* It has properties like cooling, detoxifying, complexion enhancing and strengthening[12]. It has an acid neutralizing capacity and anti-acid action and prolonged buffering action. *Shankha* is the drug of choice for gastritis, flatulence, abdominal pain, vomiting, diarrhoea and belching[13]. *Shukthi* or oyster's shell (*Pinctada margaritifera*) belongs to the family Ostreidae. There are two varieties as *Mukthashukthi* and *Jalashukthi*. It has a cooling effect and indicated for gastritis, gastric ulcers and duodenal ulcers[14]. It can be converted into two forms as *Bhashma* and *Pishti*. *Kaparda* or cowerie (*Cyprae moneta*) which belongs to the family Cypraidae is a yellow colour shell having weight of 3 to 5 grams. It is used as a powerful antacid for many stomach ailments [15].

All of these materials can be subjected to different special procedures mentioned in *Rasa shastra* texts and finally converted into a fine ash like preparation which is called as *Bhashma*[16]. These *Bhashmas* can be introduced to the human body for different ailments, in single or as compound formulations. Especially, these *Bhashmas* can be used as a medicine in Calcium deficiencies, without getting any unwanted effects. The main objective of this study is to compare the physico-chemical parameters of *Bhashmas* prepared using different common animal originated materials such as *Shankha*, *Shukthi* and *Kaparda* and to comparatively study the calcium content of these *Bhashmas*.

Materials and Methods

Collection of the raw material

The *Shanka* (Figure 1) was collected from Jaffna beach and *Shukthi* (Figure 2) and *Kaparda* (Figure 3) were collected from Panadura beach, Sri Lanka. All the raw materials were authenticated from the Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka.

Fig.1: ***Shankha*** **(Conch shell)**

Fig.2: *Shukthi* **(Oyster's shells)**

Fig.3: *Kaparda* **(Cowrie shells)**

Preparation of Shankha, Shukthi and Kaparda bhashma[17]

Shodhana of Shankha, Shukthi and Kaparda

Shanka, *Shukthi* and *Kaparda* were taken and crushed into small pieces separately. Then the crushed parts were washed with hot water separately. Each sample was kept in a piece of a clean cotton cloth separately and prepared them as pouches (Figure 4) and put into the *Dola yantra* containing *Kanji* (vinegar) (Figure5). Then each sample was boiled in the *Dola yantra* for one *Yama* (3 hours). After 3 hours the materials contained in the cloth pouches were allowed to cool. Then they were again washed with luke warm water and dried properly. Finally, the purified *Shankha*, *Shukthi* and *Kaparda* were obtained and subjected to *Marana* process.

Fig.4: Pouches of the samples

Fig.5: Boiling in the *Dola yantra*

Marana* of *Shankha

The sample of purified *Shankha* was placed in a *Sharava* (earthen crucible) and covered it with another *Sharava* having the same size, to prepare the *Sharava Samputa yanthra.* The joint between the two *Sharavas* was sealed with a mud cotton cloth layer. The *Sharava samputa yantra* was subjected to a temperature of 550˚C for one hour in the muffle furnace. It was taken out and let to be self-cooled. Then the pieces were powdered in a *Kalva yantra* (mortar and pestle) and grinded it with fresh *Kumari swarasa* (aloevera juice). Then the *Chakrikas* (pellets) were prepared and dried. These pellets were kept in the

Sharava samputa yanthra (Figure 6) and again subjected to a temperature of 550˚C for one hour in the muffle furnace. Then let to be self-cooled. Finally, the sample of *Sankha bhashma* was obtained and subjected to further analysis.

Fig.6: *Sharava samputa yanthra*

Marana of Shukthi and Kaparda

The sample of purified *Shukthi* was placed in a *Sharava* (earthen crucible) and covered it with another *Sharava* having the same size, to prepare the *Sharava samputa yanthra*. The joint between the two *Sharavas* was sealed with a mud cotton cloth layer. The *Sharava samputa yantra* was subjected to a temperature of 550˚C for one hour in the muffle furnace. It was taken out and let to be self-cooled. Then the pieces were powdered in a *Kalva yantra*. Finally, the sample of *Shukthi* (Figure 7) and *Kaparda bhashmas* (Figure 8), and *Shankha bhashma* (Figure 9) were obtained and subjected to further analysis.

Fig.7: *Shukthi bhashma*

Fig.8: *Kaparda bhashma*

Fig.9: *Shankha bhashma*

Organoleptic analysis

Color, odor, taste and texture were assed under organoleptic parameters. All three samples were examined under diffuse daylight to observe the color. A small portion of samples were placed on a dish and slowly and repeatedly inhaled the air of material to sense the odor. Samples were chewed and tasted for taste sensation. Samples were touched to detect the texture.

Physico- chemical analysis[18]

Moisture content, total ash value, acid insoluble ash and water soluble ash values and pH were determined under physico-chemical analysis. All the procedures were repeated in triplicate.

Determination of moisture content

Accurately weighed 2g of each *Bhashma* was taken in a previously measured moisture dish. The sample was heated in a hot air oven at 105^0C till constant weight was obtained. The percentage moisture content of the sample was calculated with reference to the air-dried sample.

Determination of total ash value

Accurately weighed 2g of each *Bhashma* was taken in a previously measured silica crucible. The sample was evenly spread and ignited in a muffle furnace at 550^0C for 5-6 hours till carbon free white ash was obtained. The total ash value was calculated with reference to the air-dried sample.

Determination of acid insoluble ash value

To the crucible containing the total ash, 25ml of 7% HCl was added. Then the crucible was covered with a lid and boiled gently for 5 minutes. Then the lid was rinsed with hot water and this liquid was added to the crucible. Then the solution in the crucible was filtered. Insoluble matter in the crucible was collected to an ashless filter paper (whatmann no. 42) and washed it with hot water until the filtrate became neutral. The filter paper containing the insoluble matter was transferred to the original crucible, and ignited in a muffle furnace at 450˚C to a constant weight. Residue was cooled in a desiccate for 30 minutes and weighed. Acid insoluble ash value was calculated with reference to the air-dried sample.

Determination of water-soluble ash value

The above procedure was repeated with 25ml of distilled water and the weight of water insoluble ash was calculated. The weight of the insoluble matter was subtracted from the total ash to obtain the weight of water-soluble ash. Water insoluble ash value was calculated with reference to the air-dried sample.

Determination of pH value

One part of each *Bhashma* was mixed with 5 parts of distilled water and then the pH was measured using a calibrated pH meter.

Determination of Calcium content

Accurately 1.30g from *Shankha bhashma* was measured. This mass was dissolved in 50ml of 1M HCl solution in a 250 ml beaker. The contents were transferred to a 250ml volumetric flask and diluted up to the 250ml mark. Then 25ml of the above solution was taken out using a pipette and transferred to a 250ml conical flask containing 2-3 drops of phenolphthalein indicator. The burette was filled up from 0.1M NaOH solution. Finally, the 25ml of acid solution in conical flask was titrated against the NaOH solution (Figure 10) till light pink end point comes (Figure 11). The titration was repeated for 3 times and taken the average volume of NaoH that was spent. The above procedure was repeated with *Shukthi* and *Kaparda bhashmas*.[19]

Fig.10: Titrating against NaOH

Fig.11: Light pink end point

Results

Results of Ayurveda parameters used for *Bhashma pariksha* is mentioned in Table 1.

Table 1: Results of Ayurveda parameters used for *Bhashma pariksha*

Bhashma pariksha	***Shankha bhashma***	***Shukthi bhashma***	***Kaparda bhashma***
Rekha purnatva	Completed	Completed	Completed
Varitharathva	Completed	Completed	Completed
Uththama	Completed	Completed	Completed
Gatha rasatva	Completed	Completed	Completed
Avami	Completed	Completed	Completed
Anjana sadrusha sukshma	Completed	Completed	Completed
Danta grana kacha kacha	Completed	Completed	Completed

Results of organoleptic analysis is mentioned in Table 2.

Table 2: Results of organoleptic analysis

	Shankha bhashma	***Shukthi bhashma***	***Kaparda bhashma***
Colour	off- white	dark white	white
Odor	odorless	odorless	odorless
Taste	characteristic	characteristic	characteristic
Texture	powder form	powder form	powder form

Results of physico-chemical analysis mentioned in Table 3.

Table 3: Results of physico-chemical parameters

Results of determination of calcium percentage is shown in Table 4.

	Shankha bhashma **M±SD**	***Shukthi bhashma*** **M±SD**	***Kaparda bhashma*** **M±SD**
Moisture content	0.40±0.10 %	1.30±0.10 %	0.95±0.10 %
Total ash	99.20±0.20 %	98.50±0.20 %	98±0.20 %
Acid insoluble ash value	52±0.30 %	77.80±0.30 %	57±0.30 %
Water insoluble ash value	3.80±0.30 %	2.60±0.30 %	1.65±0.30 %
pH	8.2±0.2	8.0±0.2	8.7±0.2

Table 4: Results of determination of calcium percentage

	Shankha bhashma **M±SD**	***Shukthi bhashma*** **M±SD**	***Kaparda bhashma*** **M±SD**
Calcium%	86.60±0.25 %	99.30±0.25 %	78.40±0.25 %

Discussion

Shankha, Shukthi and *Kaparda* are categorized under *Sudha varga* in *Rasa shastra*. *Bhashmas* of these materials were prepared according to authentic Ayurveda *Rasa shastra* texts. Final *Bhashmas* were tested by using different conventional *Bhashma pariksha* methods. They are *Rekha purnatva*, *Varitharathva, Uththama, Gatha rasathva, Avami, Anjana sadrusha sukshma* and *Dantagra na kacha kacha.*

In this study ash values of *Shankha, Shukthi* and *Kaparda* were 99.20±0.20%, 98.50±0.20% and 98±0.20% respectively. Ash value is a physical method which is used in drug standardization and it gives the percentage of inorganic constituents of the sample. It can be used to determine whether the *Bhashma* preparations have undergone the proper manufacturing procedure. According to the standard, *Bhashmas* should have an ash value near to 100% because ash itself is entirely composed of inorganic materials. Acid insoluble ash value of a standard *Bhashma* preparation should be more than the water soluble ash values. In this study, all three ashes are fulfilling this standard. Moisture content can detect the percentage of water content in a sample. It reflects the shelf life of a sample. The least moisture content, the better will be the shelf life of a drug. Higher moisture content is responsible for deterioration and contamination of a drug. In this study, all the three *Bhashmas* were having very low moisture content. pH values of the three *Bhashmas* are alkaline in nature. To minimize the gastric irritation due to the alkaline nature of these *Bhashmas*, authentic texts recommended grinding these materials by using aloevera juice before incineration (*Marana*)[20]. The highest calcium percentage was founded in *Shukthi bhashma* (99.30±0.25%) and the lowest in *Kaparda bhashma* (78.40±0.25%).

Conclusion

All the 3 *Bhashma* preparations were according to the Ayurveda standards mentioned in authentic *Rasa shastra* textual references. Modern physico-chemical analysis proves that all the *Bhashmas* are having standard quality and purity. The results of the study concludes that maximum Calcium percentage was in *Shukthi bhashma* while least one in *Kaparda bhashma.* Therefore, in Calcium deficiencies *Shukthi bhashma* can be highly recommended as a nutritional supplement.

Conflicts of Interest

Not declared.

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Identifying the type of impairments among children with disabilities: An observational study of the Divulapitiya Divisional Secretariat Area

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Abstract

Children with disabilities include those who have long-term physical, mental, intellectual, or sensory impairments which, in combination with various barriers, may hinder their full and effective participation in society on an equal basis, according to the Convention on the Rights of Persons with Disabilities. The demographics of children with impairments are quite different. They include children who were born with an inheritable condition that impacts their physical, mental, or social development; those who had an infection, serious injury, or nutritional shortfall that had long-term functional effects; and those who were exposed to environmental toxins that caused learning disabilities or developmental delays. Children with impairments might also be individuals whose difficult life situations cause them to experience anxiety or sadness. There are about 240 million children worldwide who struggle with disabilities. In Sri Lanka, 1.67% of children aged 5-14 were identified as disabled in 2012. An observational study was conducted in the Divulaptiya divisional Secretariat area to understand the type of impairments among children with disability. The study found that 46% of the 72 children had brain function disorders (*Manodaurbalya*), 33% had nervous system disorders, 1.4% had muscular dystrophies, 1.4% had visual disorders, 1.4% had mutism disorders, and 2.7% had growth deformities. The study highlights the need for more community knowledge, better resource allocation, and focused interventions to identify and manage these children. The findings emphasize the need for research conducted in all divisional secretariats to increase awareness and support children with disabilities nationwide.

Keywords: Children, Disabilities, Observational study

Introduction

Children with disabilities are a varied population that requires specialized solutions due to their many sorts of disabilities. To understand the unique requirements and problems of these youngsters in various locations in Sri Lanka, local studies are essential. This study aims to identify the various types of impairments among children with disabilities in the Divulapitiya Divisional Secretariat area and examine their impact on the community, healthcare, and educational services. The research will explore physical, sensory, intellectual, developmental, psychological, and demographic factors, as well as the challenges these children face in accessing community support, healthcare, and education. The national disability data offer a broad picture, but localized research that can guide focused treatments and policy is extremely limited. Concerning these services, the study intends to determine the most prevalent forms of developmental, psychological, intellectual, physical, sensory, and demographic challenges that these children encounter.

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Children with disabilities require continuous attention and assistance beyond the expected amount for their age group. The Convention on the Rights of Persons with Disabilities (CRPD) defines children with disabilities as those who have difficulties with chronic physical, mental, intellectual, or sensory impairments that may impede their full and effective involvement in society[1]. The World Health Organization defines disability in three distinct instances: impairment affecting a person's physical structure or abilities, or their mental state; loss of limbs, eyesight loss, or memory loss are a few instances of impairments. Activity constraints include trouble walking, hearing, seeing, or solving problems[2]. To adequately address the needs of children with disabilities and eliminate current inequities, the Sustainable Development Goals (SDGs) place a significant focus on policy interventions[3]. These children frequently experience challenges within their families as well as their communities. Further, they share disproportionately and fall behind normal children in terms of education, health care, and social protection[4].

As estimated by UNICEF, approximately 10% of children aged 0–19 years globally necessitate assistance to meet their specific health and social demands[5]. As evidenced by the Census of Population and Housing in Sri Lanka, 1.67% of children aged 5-14 were categorized as disabled in Sri Lanka[6]. This emphasizes the significance of addressing children with disabilities both locally and globally.

International Classification of Functioning of Disability and Health (ICF) of WHO and the Washington Group on Disability Statistics offer key frameworks for regulating disability evaluation[7]. Additionally, the CRPD emphasizes the obstacles that children with disabilities experience in society through implementing the definition of those children in the same year[8]. Additionally, the worldwide estimated number of children with disabilities has increased from 150 million in 2001 to 240 million in 2024[9], necessitating immediate global and local discussions and interventions.

The Brazilian typology of care divides Children with disabilities into development, technology, health, modified standards, and mixed demands. The development needs include children with a neuromuscular impairment who need social and psychomotor rehabilitation[10]. Technology dependence exists within the desire for technology. There are drug-dependent individuals in the medical sector. Children in modified standard demand depend on adjustments to their regular care routine. The mixed category includes one or more criteria together. This categorization emphasizes the varied nature and complexities of children with disabilities[11].

Children with disabilities show dependent behavior to fulfill their needs, and this behavior may lead to stress for families and more specifically parents of children with disabilities[12]. In considering this, the growth of Children in modified standard demand depends on adjustments to their regular care routine. The mixed category includes one or more criteria together. This categorization emphasizes the varied nature and complexities of children with disabilities[11] could be associated with parental stress. The burden of providing this care can have an impact on both the quality of life of parents of children with disabilities and the children themselves[13].

Sri Lanka has made great legislative strides in the area of disability rights with the enactment of the 1996 Act for the Protection of Rights of Persons with Disabilities and constitutional protections[14]. Due to societal challenges, such as persistent stigmas and negative attitudes about impairments, there are significant barriers to the effective execution of these rights. In addition, delivering services to a significant proportion of disabled people becomes a challenge when resources are limited, particularly in middle-income and low-income countries like Sri Lanka[15].

Research done in Turkey, it has found that countries such as the United States, England, Australia, the Netherlands, Canada, Italy, Taiwan, Spain, and China, have become prominent contributors in the field of research on children with disabilities. Further, it illustrates that there is a relationship between the h-index of countries and the quantity of research they produce on children with

disabilities, which shows an interesting pattern. Furthermore, data indicates that there is a positive correlation between the (Gross Domestic Product) GDP per capita of a country and its h-index[16]. However, countries such as Sri Lanka are falling behind as it has been recorded fewer research projects related to children with disabilities. Despite having few resources in countries like Sri Lanka, it makes a substantial contribution to the field of children with disabilities. This emphasizes the need to promote and expand research that benefits children with disabilities.

The purpose of this observational study is to examine the distribution and prevalence of impairments among children with disabilities aged 5 to 19 years in the Divisional Secretariat of Divulapitiya, Sri Lanka. Additionally, find out more about the approaches taken to manage them and address the health problems associated with them in this specific area.

The Divulapitiya Divisional Secretariat area is comprised of 123 Grama Niladhari divisions, within which special centers serve children with disabilities. Three of these centers are attached to schools and the other one functions by volunteers. This study was focused on four distinct centers. Those centers were The Ananda Vidyalaya Center for children with disabilities in Maradagahamula, Kudagammana Maha Vidyalaya, the Center for children with disabilities, Ullalapola Kanishta Vidyala Center for children with disabilities and Halpe's Footpath Center.

These centers are essential to the education of children between the ages of 5 to 19. The Maradagahamula Center also functions as an institution for vocational training. In addition to offering educational programs, these play an important part in the community by supporting children with disabilities who are under five years old and have been referred to Ayurveda medical clinics at the secretariat division.

This study focuses on children with disabilities and focuses on their background for the first time in the Divulapitiya Divisional Secretariat area as well as in Sri Lanka. The growing number of children with disabilities locally as well as globally highlights the necessity of thorough discussions and research to develop interventions and policies such as Advancement and Protection of Rights of Persons with Disabilities, that address the unique requirements of these children. These interventions should especially focus on the health and well-being of the children. It is also crucial to assess the effects on families of children with disabilities, and this illustrates the need for additional study in similar settings.

Methodology

Study design

This study was planned as an observational study to investigate the prevalence and distribution of children with disabilities under different age categories in the Divulapitiya Divisional Secretariat area, Sri Lanka.

Study population

The study population comprised 72 children between the ages of 5 and 19 years. All are identified as children with disabilities who live within the Divulapitiya Divisional Secretariat area.

Data collection

The data were obtained from clinical observation records compiled during a special clinic conducted by Ayurvedic Community Medical Officers. The observations focused on a range of impairments, such as muscular dystrophies, visual disorders, mutism disorders, growth deformities, Down syndrome, ASD (autism spectrum disorder), ADHD (attention deficit hyperactivity disorder), nervous system disorders, including cerebral palsy (global developmental delay and mental development delay) and Meningomyelocele.

Data analysis

The MS Excel 2010 software was used for statistical analysis. The collected data were systematically arranged in an MS Excel spreadsheet. Averages and percentages were calculated to provide a comprehensive understanding of the prevalence of different impairments among the children with

disabilities in the study population. After the statistical analysis, the data were interpreted to draw meaningful conclusions. The study aimed to identify patterns, trends, and associations among the various impairments observed in children with disabilities within the Divulapitiya Divisional Secretariat area.

Results and Discussion

Among the 72 children with disabilities included in this study, males made up the majority (59.72%). The research sample was then split up into age groups to investigate the characteristics and variables relevant to every developmental stage in Divulapitiya Divisional Secretariat area. Table 1 illustrates the gender distribution of the children with disabilities in the study sample. The study population showed a higher proportion of males compared to females, as reflected in the demographic distribution table.

Table 1: Gender-wise Classification of children with disabilities in the Study Population

Gender	Male	Female
Amount	43	29
Percentage	59.72%	40.27%

Table 2 illustrates the distribution of children with disabilities across different age groups, categorized by gender. The age grouping used in this study follows the classification set by the World Health Organization in 2013[17].

The age-wise distribution indicates that most children with disabilities in the study fall within the 5-9 age group. The greater percentage of males, especially in the youngest age range, possibly suggests a need for targeted interventions and support services that address the specific challenges faced by young males with disabilities in the Divulapitiya Divisional Secretariat area.

Table 2: Age-wise Distribution of children with disabilities by Gender

Age groups	Gender			
	Males	Percentage	Females	Percentage
5-9 years	21	29.16%	11	15.27%
10-14 years	09	12.5%	09	12.5%
15-19 years	13	18.05%	09	12.5 %
Total	43	59.72%	29	40.27%

Table 3 presents the distribution of children with disabilities in Divulapitiya based on disease type. Out of 72 children who attended the medical clinic conducted by the Ayurveda community medical officers it could classify the children based on six different types of diseases. The count in each category represents the number of individuals identified with the respective conditions.

Table 3: Distribution of children with disabilities by Type of Disease

Type of Disease	Name of Disease	Amount	Percentage
Brain function disorders (33) (*Mano daurbalya*)	Down syndrome	13	18%
	ASD	05	6.94 %
	ADHD	15	20.83%
Diseases related to the Nervous System (24)	Cerebral palsy	Mental development delay -08	11.11%
		Global development delay- 12	16.66%
	Meningo myelocele	04	5.55%
Learning Disability		10	13.8%
Muscular Dystrophies	DMD	01	1.38%
Visual Defects		01	1.38%
Spinal cord-related disorders	Scoliosis	01	1.38%
Mutism		01	1.38%
Growth deformities	Dwarfism	02	2.70%

It is evident from the above table that a considerable portion of the children with disabilities in Divulapitiya have brain function disorders, with Down syndrome, ASD, and ADHD. It can be further observed that out of the three diseases; the prevalence of ADHD is significant.

The conducted study has significantly contributed to understanding the relationship between ADHD and ASD through the observed case record forms. The findings provide a clear comorbidity between ADHD and ASD, as evidenced by the presence of ADHD features among individuals with ASD in the study population. This observation aligns with existing literature, which reports a prevalence of ADHD in people with ASD ranging from 50% to 70%. (18). The study indicated a high frequency of nervous system-related problems, which constitutes the third highest category of diseases. This category includes mostly health conditions like meningomyelocele and cerebral palsy. The study highlights an important comparison between mental development delay and global development delay within the subgroup of cerebral palsy. The results indicate that there is a greater incidence of global developmental delay than mental developmental delay, which aligns with the perspective expressed by the American Academy of Neurology[19]. Further, these results highlight the multifaceted nature of health problems among children with disabilities in Divulapitiya.

Table 4 shows the prevalence of children with disabilities associated with nutrient deficiency in Divulapitiya across various age groups. Nutritional deficiencies, which are a major health concern, were examined under three age brackets, providing insights into the distribution of malnutrition in the study population.

The obtained results show that malnutrition was most prevalent among disabled children aged 5–9, and least common in those aged 15–19.

Table 4: Prevalence of children with disabilities associated with nutrient deficiency as per age groups

Name of Disease	Age group (Years)	Amount	Prevalence
Nutritional deficiency	5-9	12	46.15%
	10-14	08	30.76%
	15-19	06	23.07%
Total		26	100%

Table 5 presents the distribution of parental occupation among children with disabilities in the desired study location. This data can be used to understand how parental occupation may affect the well-being of children. The graph shows that parents come from a diverse range of occupational backgrounds, including self-employment, government service, private sector work, and unemployment. The relevant columns provide the number of parents, and the prevalence is shown in brackets.

The predominant occupation among fathers of children with disabilities in Divulapitiya is self-employment. The majority of these self-employed fathers are mainly engaged in farming and business and minority being unemployed. There is a marginal change in the prevalence of fathers in government and private sectors. Conversely, among mothers, a considerable majority are unemployed, while a minority are engaged in government work. The variations in parental occupations across different disease conditions suggest potential impacts on the well-being of children with disabilities.

However, further studies are needed to study the potential relationship between parental employment and the type of disability. Additionally, should focus on determining whether parents of children with disabilities had to give up their jobs to care for them, as well as the way family economies affect the general well-being and the quality of life of both the parents and the children with disabilities.

Table 6 elaborates on the educational background of parents of children with disabilities in Divulapitiya, categorized by disease type. In this tabulation, the educational levels of both fathers and mothers are

outlined, ranging from those who have not attained formal education to those with higher education qualifications. In each column, it mentioned the amount as well as prevalence are mentioned based on the total number of cases.

The table shows that the majority of parents were educated and had finished their schooling up to ALs. It also shows that parents came from a variety of educational backgrounds. It is also further observed that, regardless of parental education, dietary deficits are common throughout a range of educational levels. Overall results encourage more research to be carried carried out to find out if there is any connection between the type of disease, parental education, and its effect on the well-being of children with disabilities. This study provides the framework for further research and specially designed interventions based on the particular requirements connected to each type of disease.

The data in Table 7 describe the prevalence of family history among children with disabilities with different health conditions in Divulapitiya. It indicates the number of cases where family history is present or absent for each specific condition.

The majority of cases across various diseases exhibit the absence of a family history, indicating that these conditions are not primarily hereditary. ADHD and ASD reflect that there is a relationship more toward family history.

Table 5: Distribution of parental occupation by disease type in children with disabilities

Disease Type	Parental Occupation							
	Father				Mother			
	Govern-ment	Private sector	Self-employed	No occupation	Govern-ment	Private sector	Self-employed	No occupation
Down Syndrome	03 (4.16%)	04 (5.55%)	05 (6.94%)	01 (1.38%)	03 (4.16%)	04 (5.55%)	02 (2.77%)	04 (5.55%)
ASD	02 (4.16%)	02 (4.16%)	01 (1.38%)	-	01 (1.38%)	03 (4.16%)	01 (1.38%)	-
ADHD*	04 (5.55%)	04 (5.55%)	06 (4.16%)	-*	04 (5.55%)	03 (4.16%)	02 (4.16%)	06 (8.33%)
Cerebral palsy (Mental Development Delay)	01 (1.38%)	02 (4.16%)	04 (5.55%)	01 (1.38%)	-	01 (1.38%)	02 (4.16%)	05 (6.94%)
Cerebral palsy (Global Development Delay)	05 (6.94%)	02 (4.16%)	04 (5.55%)	01 (1.38%)	01 (1.38%)	02 (4.16%)	03 (4.16%)	06 (4.16%)
Meningomyelocele	01 (1.38%)	01 (1.38%)	02 (4.16%)	-	-	01 (1.38%)	01 (1.38%)	02 (4.16%)
DMD	01 (1.38%)	-	-	-	-	-	-	01 (1.38%)
Scoliosis	01 (1.38%)	-	-	-	-	-	-	01 (1.38%)
Dwarfism	-	01 (1.38%)	01 (1.38%)	-	01 (1.38%)	-	-	01 (1.38%)
Visual disorders	-	01 (1.38%)	-	-	-	-	01 (1.38%)	-
Mutism disorders*	-	-	-	-*	-	-	01 (1.38%)	-

* Indicates cases where the father has passed away

Table 6: Distribution of parental education of children with disabilities by disease type

Disease Type	Parental education									
	Father					Mother				
	Not attain to school	Up to grade 5	Up to O/L	Up to A/L	Higher education	Not attain to school	Up to grade 5	Up to O/L	Up to A/L	Higher education
Down Syndrome	-	-	05 (6.94%)	07 (9.72%)	01 (1.38%)	-	-	07 (9.72%)	05 (6.94%)	01 (1.38%)
ASD	-	-	01 (1.38%)	03 (4.16%)	01 (1.38%)		-	02 (2.77%)	03 (4.16%)	-
ADHD*	-	-	03 (4.16%)	11 (15.27%)	01 (1.38%)			03 (4.16%)	10	02 (2.77%)
Cerebral palsy (Mental Development Delay)	-	01 (1.38%)	03 (4.16%)	01 (1.38%)	-	-	-	05	03 (4.16%)	-
Cerebral palsy (Global Development Delay)	-	01 (1.38%)	04 (5.55%)	06 (8.33%)	01 (1.38%)	-	-	06 (8.33%)	06 (8.33%)	-
Meningo myelocele	-	-	02 (2.77%)	02 (2.77%)	-	-	-	01 (1.38%)	03 (4.16%)	-
DMD	-	-	-	01 (1.38%)	-	-	-	-	01 (1.38%)	-
Scoliosis	-	-	-	01 (1.38%)	-	-	-	-	01 (1.38%)	-
Dwarfism	-	-	-	02 (2.77%)	-	-	-	-	02 (2.77%)	-
Visual disorders	-	-	-	01 (1.38%)	-	-	-	-	01 (1.38%)	-
Mutism disorders*	-	-	-	01 (1.38%)	-	-	-	01 (1.38%)	-	-

* Indicates cases where the father has passed away.

Table 7: Family history of children with disabilities by disease type

Name of Disease	Family History present	Family History absent
Down syndrome	06 (44.15%)	07 (53.84%)
ASD	03 (60%)	02 (40%)
ADHD	08 (53.33%)	07 (46.66%)
Cerebral palsy (Mental Development Delay)	03 (37.5%)	05 (62.5%)
Cerebral palsy (Global Development Delay)	4 (33.33%)	08 (66.66%)
Meningomyelocele	-	04 (100%)
DMD	-	01(100%)
Scoliosis	-	01 (100%)
Dwarfism	-	02 (100%)
Visual disorders	01 (100%)	-
Mutism disorders	01 (100%)	-

The majority of cases do not have a family history, highlighting the impact of environmental and nutritional factors in this category. Further genetic studies and detailed family histories can contribute to a deeper understanding of the aetiology of these conditions, guiding more effective interventions and support strategies.

Table 8 provides an overview of the age at which children with disabilities in Divulapitiya were first diagnosed and categorized by different health conditions. All cases of Down syndrome were diagnosed at birth, emphasizing the congenital nature of Down Syndrome.

Table 8: Age at first diagnosis for children with disabilities by disease type

Name of Disease	At birth	At the age of 1 year	At the age of 2 years	Less than 5 years	More than 5 years
Down syndrome	13 (100%)	-	-	-	-
ASD	-	-	02 (40%)	03 (60%)	-
ADHD	-	-	01 (6.67%)	10 (66.7%)	04 (26.7%)
Cerebral palsy (Mental Development Delay)	-	08 (100%)	-	-	-
Cerebral palsy (Global Development Delay)	-	12 (100%)	-	-	-
Meningomyelocele	04 (100%)				
DMD	-	-	-	01 (100%)	-
Scoliosis	-	-	-	01 (100%)	01 (100%)
Dwarfism	-	01 (50%)	01 (50%)	-	-
Visual disorders	-	-	-	01 (100%)	-
Mutism disorders	-	-	01 (100%)	-	-

Table 9: Parental awareness of children with disabilities by disease type

Name of Disease	Awareness present	Awareness absent
Down syndrome	07 (53.8%)	06 (46.1%)
ASD	03 (60%)	02 (40%)
ADHD	09 (60%)	06 (40%)
Cerebral palsy (Mental Development Delay)	06 (75%)	02 (25%)
Cerebral palsy (Global Development Delay)	11 (91.7%)	01(8.3%)
Meningomyelocele	04 (100%)	-
DMD	01 (50%)	01(50%)
Scoliosis	01 (100%)	-
Dwarfism	02 (100%)	-
Visual disorders	01 (100%)	-
Mutism disorders	01 (100%)	-

Table 10: Focus on continuous treatments for children with disabilities by disease type

Name of Disease	Focus on continuous treatments	Not focused on continuous treatments
Down syndrome	-	13 (100%)
ASD	01 (20%)	04 (80%)
ADHD	02 (11.8%)	15 (88.2%)
Cerebral palsy (Mental Development Delay)	05 (62.5%)	03 (37.5%)
Cerebral palsy (Global Development Delay)	09 (75%)	03 (25%)
Meningomyelocele	04 (100%)	-
DMD	01 (100%)	-
Scoliosis	-	01(100%)
Dwarfism	-	02 (100%)
Visual disorders	01(100%)	-
Mutism disorders	-	01(100%)

Table 11: Further management of children with treatments by disease type

Name of disease	Can be managed by Community Medical Officers	Directed to the National Ayurveda Teaching Hospital for further treatments
Down syndrome	06 (40%)	07 (60%)
ASD	-	05 (100%)
ADHD	-	15 (100%)
Cerebral palsy (Mental Development Delay)	-	08 (100%)
Cerebral palsy (Global Development Delay)	-	12 (100%)
Meningomyelocele	-	04 (100%)
DMD	-	01 (100%)
Scoliosis	-	01 (100%)
Dwarfism	02 (100%)	-
Visual disorders	-	01 (100%)
Mutism disorders	01 (100%)	-

The majority of ASD cases were diagnosed between the ages of 2 and 5 years, indicating that symptoms may become more noticeable as children reach certain developmental milestones. ADHD diagnoses occurred across various age groups, with the majority being identified before the age of 5, highlighting the early onset of symptoms. Cerebral Palsy with (Mental /Global Development Delays), both types were diagnosed by the age of 1 year, underlining the early recognition of developmental delays. Meningomyelocele, DMD, Dwarfism, Visual Disorders, and Mutism Disorders were predominantly diagnosed at birth or within the first year of life, indicating early detection.

Table 9 illustrates the level of awareness among parents regarding the condition of their children with disabilities. This information has been taken from a section of the case record form, assessing whether parents possess an understanding of their child's condition and are aware of the appropriate ways to interact and behave with them.

Parents of children with various disabilities, including Down syndrome, ASD, ADHD, and developmental delays, showed a reasonable level of awareness and understanding, and higher awareness was reported for conditions like meningomyelocele, scoliosis, dwarfism, visual disorders, and mutism.

Table 10 presents information about the extent to which parents or caregivers focus on providing continuous treatment for children with disabilities since the identification of the child's condition

Children with Meningomyelocele, DMD, and Visual Disorders receive consistent treatment, reflecting a strong commitment to their well-being. However, children with Down Syndrome, Scoliosis, Dwarfism, and mutism often lack continuous treatment. For children with ASD, ADHD, and various forms of Cerebral Palsy, maintaining consistent treatment presents challenges, indicating areas where support and intervention are needed to ensure continuous care.

Table 11 provides information on the recommended approach for managing children with disabilities following treatment. It depicts the percentage of cases for each disease type that can be managed by Ayurvedic Community Medical Officers and those directed to the National Ayurveda Teaching Hospital for further treatment.

Down Syndrome, Autism, ADHD, Cerebral Palsy (Mental Development Delay / Global Development Delay), Meningomyelocele, DMD, Scoliosis, Visual Disorders, and Mutism Disorders cases, show a significant percentage have been directed to the National Ayurveda Teaching Hospital for further treatment. For Dwarfism, a notable percentage can be managed by Ayurvedic Community Medical Officers, suggesting that ongoing care and treatments can be provided at the community level.

Conclusion

This observational study in the Divulapitiya Divisional Secretariat area of Sri Lanka provides valuable insights into the distribution and prevalence of impairments among children with disabilities aged 5 to 19. The study highlights varying parental awareness and challenges related to continuous treatment for different conditions. Notably, conditions like ADHD and nervous system disorders were more prevalent. The findings emphasize the need for targeted interventions and further research with a larger, more diverse sample to better understand the challenges and improve support services for children with disabilities in Sri Lanka.

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Management of *Thusta viranam* (Chronic diabetes mellitus associated venous leg ulcer) by using Traditional treatment regimen: A case study

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Abstract

Chronic wounds, such as venous leg ulcers, are common and often persist for weeks or months. One type, *Thusta viranam*, described in Traditional and Siddha literature, is characterized by deep, purulent, foul-smelling wounds with severe pain, swelling, and itching. Traditional and Siddha medicine recommends various topical and oral treatments to promote healing. *Punsudar thailam*, mentioned in *Anuboga Vaithiya Navaneedha Thirattu*, is used for wound healing and contains purified Sulphur (*Ganthagam*) and castor oil. This case study investigates the efficacy of *Punsudar thailam* in treating a *Thusta viranam* (Chronic diabetes mellitus associated venous leg ulcer). A 52-year-old female with a three months history of a painful, swollen, foul-smelling wound due to varicose veins, located above the lateral malleolus of her left leg, was admitted to the Siddha Teaching Hospital in Kaithady. The patient also had a history of diabetes, hypertension, dyslipidaemia, and fatty liver disease. She was diagnosed as *Thusta viranam* (chronic diabetes mellitus associated venous leg ulcer) and treated with wound cleaning using *Panjathuvarpi* decoction (*Kudineer)*, followed by *Punsudar thailam* application and oral internal medicines such as *Neermulli* decoction (*Kudineer), Pattolathy peerkku* decoction (*Kudineer), Sudarsana chooranam, Chandraprabha vati,* and *Vallarai chooranam.* The treatment was evaluated weekly through wound measurements and photographs using the Photographic Wound Assessment Tool (PWAT). Over a period of 29 days, weekly evaluations showed a reduction in wound size from 5cm x 5cm to 3cm x 3.5cm with near complete closure (<0.1 cm). The PWAT score decreased from 17 to 07, indicating partial wound closure. These results suggest that *Punsudar thailam*, combined with internal medicines, effectively aids in healing *Thusta viranam* (chronic diabetes mellitus associated venous leg ulcer).

Keywords: Diabetes mellitus, *Panjathuvarpi kudineer, Punsudar thailam*, Traditional medicine, *Thusta viranam*

Introduction

Venous leg ulcers are, the most prevalent type of chronic lower leg ulcer worldwide[1]. In Sri Lanka Chronic ulcers commonly arise from diabetes, nerve damage (neuropathy) associated with conditions such as leprosy, prolonged pressure on the skin (pressure ulcers), burns, poor venous circulation (venous ulcers), and inadequate arterial blood supply (arterial ulcers)[2]. A chronic wound is defined as one that fails to heal in a timely manner, often persisting for weeks or months. Such wounds typically do not progress through the normal Stages of healing and can be caused by various factors[3]. According to the research finding the latest data on the subject have shown that the global prevalence of chronic wounds lies at 1.67 per 1000 population[4]. Most chronic wounds refer to chronic leg ulcers, and their computed worldwide prevalence is 1.51 per 1000 of these, the most reported ethology is venous disease[5]. Numerous types of wounds (*Viranam*) are described in Siddha and

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traditional literature. The Tamil English Dictionary by T.V. *Sambasivampillai* lists 22 types[6]. *Siddhar Aruvai Maruthuvam* describes 16 types,[7] while *Sarabenthira Vaithiya Muraigal* text describes 2 types[8]. *Thusta viranam* is one of the types of wounds, characterized by deep, purulent smell wound with severe pain, swelling and itching[8]. *Punsudar thailam* is a prepared medicine for *Pilavai* (Carbuncle), *Pounthiram* (Fistula), *Pu*n (Wound), *Katti* (Abscess), and *Vitpuruthy* (Tumour), as mentioned in *Anuboga vaithiya navaneedha thirattu*. Its ingredients are purified Sulphur (*Ganthagam*) and castor oil[9]. we attempted to use the same medicine for chronic wound to assess its wound healing potential.

Case Details

A 52 years old female patient was admitted to the IPD at Siddha Teaching Hospital, Kaithady, working as a Teacher from Tholpuram, Jaffna District. The patient had complaints with gradual onset, an oval-shaped wound due to varicose vein above the lateral malleolus of her left leg for three months associated with painful, swollen, foul-smelling, itchy, and weeping wound. She has a medical history of diabetes mellitus, hypertension, dyslipidaemia and fatty liver for 15 years. In 2002, She suffered by cellulitis in left lower leg and acute pyelonephritis.

Physical examinations revealed a single, oval shaped wound with irregular and rough margins. The wound base was covered with erythematous tissues in the central part few amounts of slough covers in margin areas and a small amount of foul-smelling discharge observed. The wound, measurement was 5cm x 5cm x 1cm, located above the lateral malleolus of the left leg, with surrounding hyperpigmentation, swelling, heat, and tenderness.

Procedure of Treatment

Internal procedure

The patient was treated according to the Traditional medicine line of treatment. On the first day, *Virechana poopathy* with a dosage of three tablets along with 10ml hot water was administrated on an empty stomach for purgation. On the second day, the patient underwent an oil bath using 30ml of gingelly oil applied mainly to the head, chest, lower abdomen, and limbs, after 20 minutes got warm water bath. From the third day onwards, internal medicines were administrated. For first five days' management given for blood purification (Table 1). Second set of medicine (Table 2) given for twenty-four days for wound healing purpose. Diet was restricted with hospital food for diabetic management.

Table 1: Treatment procedure (Internal) for first five days

Name of the drug	Dose and duration	*Anupanam*
Neermulli kudineer	60ml twice in a day before food for 5 days	
Sudarsana chooranam	2g twice in a day after food for 5 days	With normal water
Chadraprabha vatti	2 pills twice in a day after food for 5 days	With normal water

Table 2: Treatment procedure (Internal) for next twenty-four days

Name of drug	Dose and duration	*Anupanam*
Paddolathi peerkku kudineer	60ml twice a day before food for 24 days	
Sudarsana chooranam	02g twice a day after food for 24 days	With normal water
Chandraprabha vati	02 pills twice a day after food for 24 days	With normal water
Vallarai chooranam	01g early morning empty Stomach for 24 days	With normal water

External procedure

The patient's left lower leg was immersed in *Panjathuvarpi kudineer*, followed by wound cleansing using the same decoction. *Punsudar thailam* was applied topically, and the wound dressing was done daily. Weekly wound measurements and photographic assessments were

carried out to monitor healing progress. The outcome was assessed by reduction of size by using the PWAT Scale (Photographic Wound Assessment Tool). Wound measurement method for length and width measurement, placed the ruler over the wound, aligning it with the longest side. For depth measurement Placed a sterile cotton swap into the deepest part of the wound bed. Grasped the applicator where it meets the wound margin and places it against the ruler. wound that open but appear to have no depth, record depth as "<0.1 cm.

Results

Table 3 illustrations the weekly wound size measurements and Table 4 shows the PWAT score of before and after management of wound.

Table 3: Weekly wound size measurements

Date	Length	Width	Depth
26.08.2024 (1st day)	5cm	5cm	1cm
02.09.2024 (8th day)	4.5cm	4.5cm	0.2cm
09.09.2024 (15th day)	4cm	4.5cm	0.1cm
16.09.2024 (22th day)	3.5cm	4cm	<0.1cm
23.09.2024 (29th day)	3cm	3.5cm	<0.1cm

Table 4: PWAT score of before and after management of wound

Item	Before	After
Size	4	3
Depth	1	0
Necrotic tissue type	1	0
Total amount of necrotic tissue	1	0
Granulation tissue type	2	1
Total amount of granulation tissue	3	1
Edges (directly touching and within 0.5cm of wound edge)	2	0
Peri ulcer skin viability	3	2
Total	17	7

Figure 1 to Figure 4 shows the weekly progression of the wound.

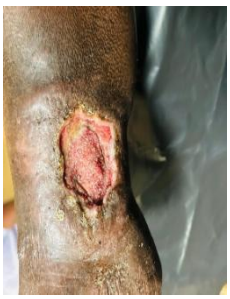

Fig.1: Wound at 26.08.2024

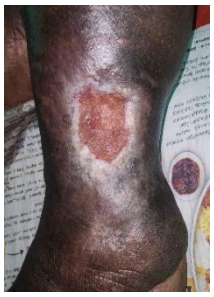

Fig2: Wound at 02.09.2024

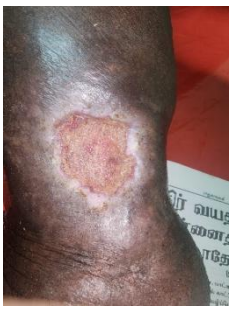

Fig.3: Wound at 09.09.2024

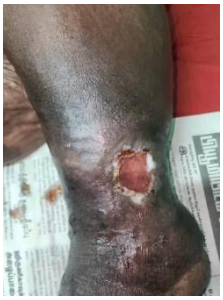

Fig.4: Wound at 23.09.2024

Figures of 5 and 6 shows the wound images on follow up period

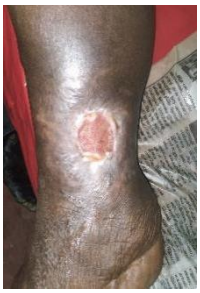

Fig.5: Wound at 30.12.2024

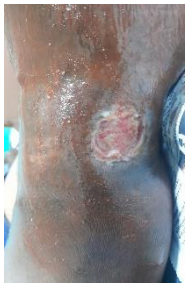

Fig.6: Wound at 24.03.2025

Discussion

The ingredients of polyherbal formulation *Neermulli kudineer* possessed predominantly diuretic, antimicrobial, anti-inflammatory, antioxidant activities, moderately immunomodulatory and minimally antidiabetic. Ingredients of *Neermulli kudineer* are *Hygrophila auriculata (Neermulli), Aerva lanata (Thengaipoo keerai), Cuminum cyminum (Sinna seeraham), Asparagus racemoses*

*(Saathavaari), Terminalia chebula (Kadukkaai) Emblica officinalis (Nellikkaai), Terminalia bellirica (Thaantrikaai) Santalum album (Vensanthanam)*and *Cymbopogan jwarancusa* (*Vilaamichai*)[10].

The raw materials of *Paddolathi peerkku kudineer* are *Terminalia chebula (Kadukkai), Terminalia bellirica (Thaandrikai), Emblica officinalis (Nelli), Asparagus racemosus (Saaththavari), Trichosanthes cucumerina (Peipudol), Tinospora cordifolia (Seenthil) Picrorhiza kurrooa (Kaduhurohini). Trichosanthes cucumerina* is one of the main ingredients in *Paddolathi peerkku kudineer* and it has anti-bacterial, anti-inflammatory, antioxidant activities and immunomodulatory activity[11].

Vallarai chooranam is a single herbal *chooranam*, its ingredient is *Vallarai* (*Centella asiatica*). The main chemical components of *C. asiatica* are important for wound healing. One of key compound, asiaticoside, helps produce type 1 collagen, which is important for skin health and prevents skin ageing. It also helps with the wound healing process by speeding up the movement of skin cells, encouraging cell growth, improving skin cell attachment and increasing the number of healthy skin cells[12].

Chandraprabha vati is an effective Ayurvedic remedy for managing diabetic complications. It contains a blend of medicinal herbs known for their potent anti-diabetic properties. This formulation helps regulate blood sugar levels and promotes vascular health, preventing the progression of foot ulcers[13,14,16]. Additionally, *Chandraprabha vati* has anti-inflammatory effects[15], offering relief from pain and swelling around open wounds. Its ingredients are *Cinnamomum camphora* (Katpoora), *Acorus calamus* (*Vasampu*), *Cyperus rotundus* (*Korai*), *Swertia chirata* (Nilavembu), *Tinospora cordifolia* (*Seenthil*), *Cedrus deodara* (*Devatharu*), *Curcuma longa (Manjal)*, *Aconitum heterophyllum* (*Athividayam*), *Berberis aristata (Maramanjal*), *Piper longum* (*Thippili*), *Plumbago zeylanica* (*Siththiramoolam*), *Coriandrum sativum* (*Koththtamalli*), *Terminalia chebula* (*Kadukkai*), *Terminalia bellirica* (*Thandri*), *Emblica officinalis* (*Nelli*), *Piper chaba* (*Aanithippili*), *Embelia ribes* (*Vaividangam*), *Zingiber officinale (Inji*), *Piper nigrum* (*Milaku*), *Piper longum* (*Thippali*), *Operculina terpethum* (*Sivathai*), *Baliospermum montanum* (*Neeradi muththtu*), *Cinnamomum tamala* (*Thalisapathiri*), *Cinnamomum zeylanicum* (*Karuva*), *Elettaria cardamomum* (*Ealam*), *Bambusa arundinaceae* (Moongil), *Commiphora mukul* (*Gugul*), Copper pyrite, Potassium carbonate, Sodium bicarbonate, Rock salt, Black salt, Ammonium chloride, Ferrum, Sugar and Aspelt mineral pitch[16].

Sutharsana chooranam possesses several pharmacological activities, including antipyretic[17], antimicrobial[18,19,20], antimalarial[20,21], antiviral[21,22], and antidiabetic[23] effects. The raw materials used in the preparation of *Sutharsana chooranam* include, *Swertia chirata (Nilavembu), Trichosanthes dioica (Kombupudal), Ureria picta (Sittirapaladai) ,Jateorrhiza palmate (Maramanjal), Curcuma longa (Manjal), Cedrus deodar (Devatharu), Acorus calamus (Vasambu), Desmodium trifiorum (Sirupulladi), Terminalia chebula (Kadukkai), Alhagi pseudalhagi (Kanjori), Rhus succedonia (Karkadakasingi), Solanum xanthocarpum (Kandankaththari), Zingiber officinale (Inji), Legenaria siceraria (Suraikkai), Naregamala alata (Nilanarakam), Azadiracta indica (Vembu), Piper longum (Thippili), Pavonia odorata (Peramatti), Hedychium spicatum (Poolankilangu), Inula racemose (Puskaramoolam), Terminalia bellirica (Thandrikai), Marsdemia tenacissima (Perunkurinjan), Embilica officinale (Nelli), Tinospora cordifolia (Seenthi)l, Picrorrhiza kurrora (Kadukurogini), Plumbago zeylanica (Venkodiveli), Moringa oleifecalam (Murungai), Asparagus racemosus (Saaththavari), Berberis aristata (Maramanjal), Didymocarpus pedicellata (Kalpaasi), Nelumbeum speciosum (Thamarai), Pinus roxburghil (Seemaithevathaaru), Andropogon muricatus (Vettiver), Cinnamon cassia (Karuva), Cinnamomum inners (Elavangam), Desmodium gangaticum (Sirupulladi), Ptychotis coptica (Asamothakam), Aconytum heterophullum (Athividayam), Aegle marmelos (Vilvai), Piper nigrum (Milaku), Holarrhena antidysentrica (Kudasappala)* and *Glycyrrhiza glabra (Athimathuram)*[17].

The raw materials of *Panchathuvarpi kudineer* are *Ficus bengalensis (Aal), Ficus recemosa (Aththi), Syzygium jambolanum (Naaval), Ficus religiosa (Arasu)* and *Thespesia populnea (Poovarasu)*. It possesses pharmacological antimicrobial activity[15]. This review explains the potential of these formulations, providing strong evidence for their effectiveness in wound management.

52-year-old female with diabetes mellitus and bilateral varicose vein presented with a 3-month-old chronic wound above the left lateral malleolus. Initial assessment showed a 5 cm x 5 cm x 1 cm wound. After 29 days of treatment, the wound size reduced to 3 cm x 3.5 cm x <0.1 cm, and the PWAT score decreased from 17 to 7, indicating partial wound closure. This improvement was attributed to appropriate wound dressing and internal medicine management.

Conclusion

The results suggested that *Punsudar thailam* with internal medicine is effective in the management of *Thusta viranam* (Chronic diabetes mellitus associated venous leg ulcer) and further clinical studies will be conducted in future.

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