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Community Empowerment Through Family Medicinal Plants (TOGA)

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ABSTRACT

Since the outbreak of Covid-19, the popularity of medicinal plants has increased. Strong immunity is believed to prevent yourself from being exposed to the virus outbreak. The community believes that using traditional medicines such as herbal medicine from ginger, turmeric, ginger or kencur can increase the body's immunity. Family medicinal plants (TOGA) are family (home) cultivated plants that have medicinal properties. TOGA planting can be done in pots or on the land around the house, and if the land planted is large enough then some of the crops can be sold and increase family income. Banjarharjo 1 is one of the hamlets in Muntuk Village, Dlingo District, Bantul Regency. Geographically, Muntuk Village is a village located in an area that is in the highlands. Communities in the village area generally still have a large yard of land. The results of field observations show that the current development of TOGA is more on the aspect of cultivation only with utilization that is not optimal and limited to oneself and one's family. Communities who already have knowledge about the efficacy of TOGA and master how to process it can cultivate medicinal plants individually and use them so that the principle of independence in family medicine will be realized. Especially during the Covid-19 pandemic, processing herbal medicine to maintain health with ingredients derived from their own plants will really help maintain economic stability as well. Based on an analysis of the problems faced by partners, several efforts can be made as a solution to empower the people of Banjarharjo 1 Village in increasing the use of TOGA in the Making of Herbal Medicine to Increase Body Immunity as a Prevention of Covid-19. This PKM activity was carried out using the method of observation, counseling, mentoring and demonstration of making herbal medicine from the TOGA plant. The application of technology begins with training partners in terms of introducing TOGA types, cultivation and planting methods, as well as processing/manufacturing TOGA products for CPOTB-based family medicines and herbs. In addition, training was also made on making good and attractive packaging. The partners of the Banjarharjo Village 1 PKK team who collaborated with the proposer provided active participation in the provision of existing places and facilities. The results of the activity showed that residents already had knowledge about how to plant TOGA, knew about the benefits of TOGA for maintaining health, as well as raised awareness among residents to grow medicinal plants around their homes and increased skills in processing herbal medicine from TOGA.

KEYWORDS
TOGA;
immune enhancing herbs;
community empowerment;

1. Introduction

Coronavirus Disease 2019 or COVID-19 is a new disease that can cause respiratory problems and pneumonia. This disease is caused by infection with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Clinical symptoms that appear vary, ranging from symptoms of the common cold (cough, runny nose, sore throat, muscle aches, headaches) to those with severe complications

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(pneumonia or sepsis). Several previous researchers have conducted research on covid treatment. Characteristics, treatment outcomes, and experiences of COVID-19 patients in home-based care in Kapelebyong district in Uganda: a mixed methods study investigated by James [1]. Clinical Characteristics and Treatment Outcome of 293 COVID-19 Patients Admitted to the Intensive Care Unit of a Tertiary Care Hospital in East India was studied by Sahay [2]. Clinical features and results of multidisciplinary treatment of COVID-19 pneumonia: Report of three cases investigated by C. Liu [3]. A five-year review of the prevalence and treatment outcomes of drug-resistant plus adjunctive drug-resistant tuberculosis at the Henan Province Tuberculosis Clinical Treatment Research Center was investigated by Li [4]. Evaluation of Pneumonia Treatment Outcomes in Pre-Vaccination COVID-19 Patients with/without Comorbidities at a General Hospital in Bengkulu, Indonesia was studied by Ramatillah [5]. Assessing the validity of the Australian Treatment Outcome Profile for telephone administration in a drug health care population studied by Deacon [6].

Child sexual abuse survivors: Different outcomes of complex multimodal treatment for pre-COVID and COVID-era cohorts studied by Reeson [7]. Epidemiology, clinical characteristics, and treatment outcomes of patients with COVID-19 at a university-based referral hospital in Thailand was investigated by Sirijatuphat [8]. Treatment outcome and prognostic factors for non-malignancy associated secondary hemophagocytic lymphohistiocytosis in children was studied by Pan [9]. Buprenorphine exposure levels to optimize treatment outcomes in opioid use disorders were studied by Laffont [10]. The role of chest CT quantitative pulmonary inflammation index in the evaluation of the course and treatment outcome of COVID-19 pneumonia was investigated by Peng [11]. Cancer and SARS-CoV-2 Infection: Diagnostic and Therapeutic Challenges studied by Allegra [12]. The Significance of Lung Immune Prognostic Index for Assessment of Reliability of Outcome Clinical Treatment of Advanced Non-Small Cell Lung Cancer in Patients with COVID-19 Infection was studied by Krpina [13]. The effect of response to pandemic coronavirus disease on treatment outcomes in patients with lymphoma and multiple myeloma was studied by Kang [14]. Hydroxychloroquine and chloroquine: potential and controversial treatments for COVID-19 studied by Zou [15].

The impact of the COVID-19 Pandemic on Tuberculosis Case Notifications and Treatment Outcomes in Eswatini was investigated by Masina [16]. Treatment outcomes in patients with laryngotracheal lesions and airway compromise during and before the 2019 coronovirus disease pandemic: tertiary institution experience was investigated by Gombert [17]. Management of Acute Stroke During the COVID-19 Pandemic was studied by Hajdu [18]. Diagnostic and treatment outcomes of patients with pulmonary tuberculosis in the first year of the COVID-19 pandemic was studied by Yakupogullari [19]. Clinical characteristics and treatment outcomes of severe COVID-19 (ICU) patients in Saudi Arabia: A single center study investigated by Alghamdi [20]. The Threat of Novel Coronavirus Disease (COVID-19) for Patients with Cardiovascular Disease and Cancer was studied by Ganatra [21]. Randomized trial to determine the effect of vitamin D and zinc supplementation to improve treatment outcomes among patients with COVID-19 in India: a trial protocol investigated by Sharma [22]. The impact of COVID-19 on Tuberculosis Case Detection and Treatment Outcomes in Sierra Leone was studied by Lakoh [23]. Modification of the Acute QT Interval During Hydroxychloroquine-Azithromycin Treatment in the Context of COVID-19 Infection was studied by Voisin [24].

The Impact of Protocol Adjustments Due to the COVID-19 Pandemic on Outcomes of Infertility Treatment was studied by Vastis [25]. Using implementation interventions and peer recovery support to improve outcomes of opioid treatment in community monitoring: Protocol studied by Martin [26]. Responses by Nguyen et al to a Letter Regarding the article, "Mechanical Thrombectomy in the Era of the COVID-19 Pandemic: Emergency Preparedness for Neuroscience Teams: Guidance Statement from the Society for Vascular and Interventional Neurology" was investigated by Nguyen [27]. Clinical characteristics and treatment outcomes of the SARS-CoV-2 delta variant outbreak, Pingtung, Taiwan, June 2021 was studied by Jang [28]. Epidemiological evaluation, clinical features, prognosis, diagnosis and treatment outcomes of patients with COVID-19 in West Azerbaijan Province was studied by Gharebaghi [29]. The successful use of methylprednisolone to treat severe COVID-19 was studied by J. Liu [30]. Potential Benefits of Antiviral African Medicinal Plants in the Management of Viral Infections: A Systematic Review was investigated by Beressa [31].

Of the covid treatments studied by previous researchers, there were covid treatments using medicinal plants including the Anti-allergic Effects of Fermented Extracts of Medicinal Plants

Andrographis paniculate, Salvia plebeia R. Br., Canavalia gladiate, Eleuthorococcus senticosus, Ulmus davidiana var. japonica, and Clerodendrum trichotomum Thunb. the former Murray was investigated by Choi [32]. The anti-diabetic properties of medicinal plants in Malaysia were studied by Ishak [33]. Screening for high content of Thai medicinal plants revealed Boesenbergia rotunda extract and its component Panduratin A as anti-SARS-CoV-2 agents studied by Kanjanasirirat [34]. In Vitro and In Silico Studies for the Identification of Potent Metabolites of Several High Altitude Medicinal Plants from Nepal Inhibiting the SARS-CoV-2 Spike Protein was investigated by Basnet [35]. Molecular docking and pharmacokinetic study of phytocompounds from Nigerian Medicinal Plants as a promising inhibitory agent against the SARS-CoV-2 methyltransferase (nsp16) was investigated by Saliu [36]. The natural way forward: Molecular dynamics simulation analysis of phytochemicals from Indian medicinal plants as potential inhibitory targets for <scp>SARS-CoV</scp> -2 investigated by Parida [37]. Medicinal plants used for the management of respiratory diseases in Zimbabwe: An overview and perspective on the potential management of COVID-19 was studied by Nyagumbo [38]. The use of medicinal plants to prevent COVID-19 in Nepal was investigated by Khadka [39]. Medicinal Plants as a Source of Active Molecules Against COVID-19 was studied by Benarba [40].

Review Article Therapeutic Potential of Medicinal Plants for Prevention and Treatment of Secondary Infection in COVID-19 Patients was researched by Rathore [41]. The inhibitory effect of anti-HIV compounds extracted from Indian medicinal plants to slow down the process of replication and transcription of SARS-CoV-2: insights from molecular docking studies and MD simulations investigated by Dutta [42]. Structural Basis of Drug Discovery for SARS COV 2 3CL PRO and Anti-COVID-19 from Medicinal Plants - A review researched by Devi [43]. The Efficacy of Traditional Medicinal Plants in Modulating Main Proteases of SARS-CoV-2 and Cytokine Storms was studied by Choe [44]. Phytochemical computational screening of three medicinal plants as inhibitors of transmembrane serine 2 proteases involved in SARS-CoV-2 infection was investigated by Oyedara [45]. South Indian Medicinal Plants Can Fight Deadly Virus Along With COVID-19? - Review researched by Divya [46]. Potential medicinal plants involved in inhibiting 3CLpro activity: A practical alternative approach to combating COVID-19 was investigated by Yang [47]. Ayurvedic Medicinal Plants Against COVID-19: In Silico Analysis investigated by Khuntia [48]. Characterization of the chloroplast genomes of two salvia medicinal plants and gene transfer between their mitochondrial and chloroplast genomes was investigated by Gao [49].

An Ethnobotanical Survey of Medicinal Plants Used in the Treatment of COVID-19 and Associated Respiratory Infections in the Southern and Northern Local Government Areas of Ogbomosho, Oyo State, Nigeria was conducted by Odebunmi [50]. Aspects of Medicinal Plant Mechanisms and Secondary Metabolites Against Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was studied by Malekmohammad [51]. Knowledge of the Effects of Medicinal Plants on COVID-19 Among Dentistry Students - Questionnaire Study researched by K S, Abilasha [52]. An in silico investigation of the phytoconstituents of Cameroonian medicinal plants for the treatment of COVID-19 was investigated by Chtita [53]. Antiviral medicinal plants found in traditional Lanna medicine were investigated by Julsrigival [54]. The prophylactic potential of Indian medicinal plants in the management of influenza-like illnesses especially COVID-19 was investigated by Parikh [55]. Cultural beliefs and medicinal plants in treating COVID 19 patients in West Colombia was investigated by Cordoba-Tovar [56]. Verification of the Excellence of Deep Learning in Identification of Medicinal Plants: Taking Paris polyphylla var. yunnanensis as an example was investigated by Yue [57]. A systematic review of the COVID-19 pandemic with particular emphasis on the curative potential of Nigerian-based medicinal plants was investigated by Oladele [58]. Use of Medicinal Plants in Africa: A Case Study From the Democratic Republic of the Congo (DRC) was investigated by Zinga [59]. Verification of the Excellence of Deep Learning in Identification of Medicinal Plants: Taking Paris polyphylla var. yunnanensis as an example was investigated by Yue [57]. A virtual screening based on the structure and molecular dynamics of phytochemicals derived from Saudi medicinal plants to identify potential therapeutics for COVID-19 was investigated by Alamri [60].

Banjarharjo 1 is one of the hamlets in Muntuk Village, Dlingo District, Bantul Regency. Geographically, Muntuk Village is a village located in an area that is in the highlands. The distance between the District Government Centers is 8.6 Km, the distance between Cities/Capitals is 18 Km, while the distance between Provincial Capitals is 25 Km. So that access, especially in the health sector,

Banjarharjo 1 Hamlet is very difficult. Even so, Hamlet Banjarharjo 1 has a village assistant health center Muntuk and POSYANDU for children under five years (toddlers) and the elderly. Usually done once per month on a regular basis. As well as the availability of land for cultivating medicinal plants is very wide. The problem that occurs when residents of Banjarharjo 1 Hamlet only plant medicinal plants around their yards or in empty fields, without taking advantage of the other potential of these Medicinal Plants. Therefore, the potential of natural resources that have not been maximized, residents must be socialized about counseling and management of Family Medicinal Plants (TOGA). This is done so that medicinal plants can be processed into food such as jelly and instant powder to be sold and become a source of economic income for the residents.

2. Method

The activity plan in order to overcome potential problems that have not been maximized in Hamlet Banjarharjo 1, is explained in Figure 1.

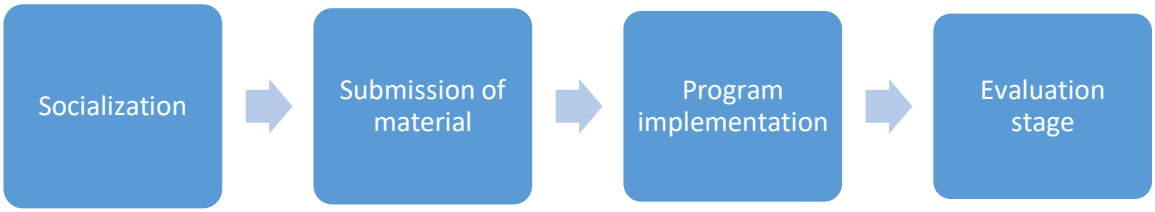

Fig. 1. Toga plant community empowerment activity plan

From the picture it can be seen that there are 4 Community Empowerment Through Family Medicinal Plants (TOGA), namely

- Socialization will be carried out by speakers who are experts in the field of herbal medicine, namely the Islamic Research Pharmacy Club (IRPC)
- Submission of material regarding the benefits of TOGA, types of TOGA, processing methods, efficacy and side effects.
- Implementation of a practical program on August 10 2019, namely the processing of TOGA, where in this practice the main ingredients are ginger which is made into powder and temu lawak which is made into dried jelly.
- The evaluation stage is to assess the constraints and obstacles encountered in each stage so that they can be used as recommendations for planning further programs.

3. Results and Discussion

Furthermore, the socialization activity program for Family Medicinal Plants (TOGA) is specifically targeted at mothers in Banjarherjo 1 hamlet. This is done so that the potential of the Family Medicinal Plants (TOGA) can become an economic resource for residents and the hamlet itself. This can be through the sale of processed TOGA products or other health products. This activity contains the benefits of TOGA, types of TOGA, processing methods, properties and side effects. So that not only the positive impacts of TOGA but also the negative impacts must be conveyed so that people can know which medicinal plants have mild-severe side effects. Like picture 2.

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Fig. 2. Socialization of Family Medicinal Plants (Toga)

Furthermore, the "Delivery of Medicinal Plant Seeds" program is intended so that residents can continue this TOGA program consistently. Like picture 2.

Fig. 3. Delivery of Medicinal Plant Seeds to Mother.

4. Conclusion

Community Empowerment in the Health Sector through TOGA (Family Medicinal Plants). Even though Dusun Banjarharjo 1 already has various types of medicinal plants, the public's awareness does not yet know how to process these plants into products that can be sold so that they can improve the community's economy. In addition to seeds, we also provided a booklet which contains information on how to process various types of plants, so that people are able to make products by reading the booklet provided.

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Author Contribution

The activity plan in order to implement the solutions offered that there are five series of activities, namely coordination, logo design, socialization of covid, marketing, and marketing education.

Funding

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Conflict of Interest

The authors declare no conflict of interest.

References

[1] E. James et al., "Characteristics, treatment outcomes and experiences of COVID-19 patients under home-based care in Kapelebyong district in Uganda: a mixed-methods study," Trop. Med. Health, vol. 50, no. 1, p. 93, Dec. 2022.

[2] N. Sahay, D. K. Rai, and P. Lohani, "Clinical Characteristics and Treatment Outcomes of 293 COVID-19 Patients Admitted to the Intensive Care Unit of a Tertiary Care Hospital of Eastern India," Indian J. Crit. Care Med., vol. 25, no. 12, pp. 1395–1401, Dec. 2021.

[3] C. Liu et al., "Clinical features and multidisciplinary treatment outcome of COVID-19 pneumonia: A report of three cases," J. Formos. Med. Assoc., vol. 119, no. 11, pp. 1702–1709, Nov. 2020.

[4] Z. Li et al., "A five-year review of prevalence and treatment outcomes of pre-extensively drug-resistant plus additional drug-resistant tuberculosis in the Henan Provincial Tuberculosis Clinical Medicine Research Centre," J. Glob. Antimicrob. Resist., vol. 31, pp. 328–336, Dec. 2022.

[5] D. L. Ramatillah et al., "Evaluation of Treatment Outcome for Pneumonia among Pre-Vaccinated COVID-19 Patients with/without Comorbidity in a Public Hospital in Bengkulu, Indonesia," Vaccines, vol. 9, no. 12, p. 1411, Nov. 2021.

[6] R. M. Deacon et al., "Assessing the validity of the Australian Treatment Outcomes Profile for telephone administration in drug health treatment populations," Drug Alcohol Rev., vol. 39, no. 5, pp. 441–446, Jul. 2020.

[7] M. Reeson et al., "Child sexual abuse survivors: Differential complex multimodal treatment outcomes for pre-COVID and COVID era cohorts," Child Abuse Negl., vol. 134, p. 105926, Dec. 2022.

[8] R. Sirijatuphat et al., "Epidemiology, clinical characteristics, and treatment outcomes of patients with COVID-19 at Thailand's university-based referral hospital," BMC Infect. Dis., vol. 21, no. 1, p. 382, Dec. 2021.

[9] H. Pan et al., "Treatment outcomes and prognostic factors for non- malignancy associated secondary hemophagocytic lymphohistiocytosis in children," BMC Pediatr., vol. 20, no. 1, p. 288, Dec. 2020.

[10] C. M. Laffont et al., "Buprenorphine exposure levels to optimize treatment outcomes in opioid use disorder," Front. Pharmacol., vol. 13, Nov. 2022.

[11] S. Peng et al., "The role of chest CT quantitative pulmonary inflammatory index in the evaluation of the course and treatment outcome of COVID-19 pneumonia," Sci. Rep., vol. 11, no. 1, p. 7752, Apr. 2021.

[12] A. Allegra, G. Pioggia, A. Tonacci, C. Musolino, and S. Gangemi, "Cancer and SARS-CoV-2 Infection: Diagnostic and Therapeutic Challenges," Cancers (Basel)., vol. 12, no. 6, p. 1581, Jun. 2020.

[13] K. Krpina, M. Mavrinac, M. Samarzija, E. Tolic, D. Darapi, and L. Baticic, "Significance of the Lung Immune Prognostic Index for Assessment of the Reliability of the Clinical Treatment Outcome for Advanced Non-Small-Cell Lung Cancer in Patients with COVID-19 Infection," J. Clin. Med., vol. 11, no. 22, p. 6695, Nov. 2022.

[14] K.-W. Kang et al., "The effect of the response to the coronavirus disease pandemic on treatment outcomes in patients with lymphoma and multiple myeloma," Korean J. Intern. Med., vol. 36, no. 6, pp. 1459–1470, Nov. 2021.

[15] L. Zou, L. Dai, X. Zhang, Z. Zhang, and Z. Zhang, "Hydroxychloroquine and chloroquine: a potential and controversial treatment for COVID-19," Arch. Pharm. Res., vol. 43, no. 8, pp. 765–772, Aug. 2020.

[16] H. V. Masina, I.-F. Lin, and L.-Y. Chien, "The Impact of the COVID-19 Pandemic on Tuberculosis Case Notification and Treatment Outcomes in Eswatini," Int. J. Public Health, vol. 67, Oct. 2022.

[17] E. Gombert et al., "Treatment outcomes in patients with laryngotracheal lesions and compromised airway during and prior to the coronovirus disease 2019 pandemic: a tertiary institution's experience," J. Laryngol. Otol., vol. 135, no. 10, pp. 897–903, Oct. 2021.

[18] S. D. Hajdu et al., "Acute Stroke Management During the COVID-19 Pandemic," Stroke, vol. 51, no. 8, pp. 2593–2596, Aug. 2020.

[19] Y. Yakupogullari et al., "Diagnostic and treatment outcomes of patients with pulmonary tuberculosis in the first year of COVID-19 pandemic," East. Mediterr. Heal. J., vol. 28, no. 9, pp. 682–689, Sep. 2022.

[20] S. Alghamdi, "Clinical characteristics and treatment outcomes of severe (ICU) COVID-19 patients in Saudi Arabia: A single centre study," Saudi Pharm. J., vol. 29, no. 10, pp. 1096–1101, Oct. 2021.

[21] S. Ganatra, S. P. Hammond, and A. Nohria, "The Novel Coronavirus Disease (COVID-19) Threat for Patients With Cardiovascular Disease and Cancer," JACC CardioOncology, vol. 2, no. 2, pp. 350–355, Jun. 2020.

[22] K. K. Sharma et al., "Randomised trial to determine the effect of vitamin D and zinc supplementation for improving treatment outcomes among patients with COVID-19 in India: trial protocol," BMJ Open, vol. 12, no. 8, p. e061301, Aug. 2022.

[23] S. Lakoh et al., "Impact of COVID-19 on Tuberculosis Case Detection and Treatment Outcomes in Sierra Leone," Trop. Med. Infect. Dis., vol. 6, no. 3, p. 154, Aug. 2021.

[24] O. Voisin et al., "Acute QT Interval Modifications During Hydroxychloroquine-Azithromycin Treatment in the Context of COVID-19 Infection," Mayo Clin. Proc., vol. 95, no. 8, pp. 1696–1700, Aug. 2020.

[25] V. Vastis et al., "Impact of Protocol Adjustments Due to the COVID-19 Pandemic on Infertility Treatment Outcomes," J. Obstet. Gynaecol. Canada, vol. 44, no. 9, pp. 1006–1010, Sep. 2022.

[26] R. A. Martin et al., "Using implementation interventions and peer recovery support to improve opioid treatment outcomes in community supervision: Protocol," J. Subst. Abuse Treat., vol. 128, p. 108364, Sep. 2021.

[27] T. N. Nguyen, R. G. Nogueira, and T. G. Jovin, "Response by Nguyen et al to Letter Regarding Article, 'Mechanical Thrombectomy in the Era of the COVID-19 Pandemic: Emergency Preparedness for Neuroscience Teams: A Guidance Statement From the Society of Vascular and Interventional Neurology,'" Stroke, vol. 51, no. 8, Aug. 2020.

[28] T.-Y. Jang et al., "Clinical characteristics and treatment outcomes of SARS-CoV-2 delta variant outbreak, Pingtung, Taiwan, June 2021," J. Formos. Med. Assoc., vol. 121, no. 9, pp. 1767–1772, Sep. 2022.

[29] N. Gharebaghi et al., "Evaluation of epidemiology, clinical features, prognosis, diagnosis and treatment outcomes of patients with COVID-19 in West Azerbaijan Province," Int. J. Clin. Pract., vol. 75, no. 6, Jun. 2021.

[30] J. Liu, X. Zheng, Y. Huang, H. Shan, and J. Huang, "Successful use of methylprednisolone for treating severe COVID-19," J. Allergy Clin. Immunol., vol. 146, no. 2, pp. 325–327, Aug. 2020.

[31] T. B. Beressa et al., "Potential Benefits of Antiviral African Medicinal Plants in the Management of Viral Infections: Systematic Review," Front. Pharmacol., vol. 12, Dec. 2021.

[32] M. J. Choi and Y. R. Kim, "Anti-Allergic Effect of Fermented Extracts of Medicinal Plants Andrographis paniculate , Salvia plebeia R. Br., Canavalia gladiate , Eleuthorococcus senticosus , Ulmus davidiana var. japonica , and Clerodendrum trichotomum Thunb. ex Murray," Microbiol. Biotechnol. Lett., vol. 50, no. 4, pp. 512–521, Dec. 2022.

[33] N. A. ISHAK, M. HAMID, and N. A. Z, "ANTIDIABETIC PROPERTY OF MEDICINAL PLANTS IN MALAYSIA," J. Sustain. Sci. Manag., vol. 16, no. 8, pp. 307–322, Dec. 2021.

[34] P. Kanjanasirirat et al., "High-content screening of Thai medicinal plants reveals Boesenbergia rotunda extract and its component Panduratin A as anti-SARS-CoV-2 agents," Sci. Rep., vol. 10, no. 1, p. 19963, Nov. 2020.

[35] S. Basnet et al., "In Vitro and In Silico Studies for the Identification of Potent Metabolites of Some High-Altitude Medicinal Plants from Nepal Inhibiting SARS-CoV-2 Spike Protein," Molecules, vol. 27, no. 24, p. 8957, Dec. 2022.

[36] T. P. Saliu, H. I. Umar, O. J. Ogunsile, M. O. Okpara, N. Yanaka, and O. O. Elekofehinti, "Molecular docking and pharmacokinetic studies of phytocompounds from Nigerian Medicinal Plants as promising inhibitory agents against SARS-CoV-2 methyltransferase (nsp16)," J. Genet. Eng. Biotechnol., vol. 19, no. 1, p. 172, Dec. 2021.

[37] P. K. Parida, D. Paul, and D. Chakravorty, "The natural way forward: Molecular dynamics simulation analysis of phytochemicals from Indian medicinal plants as potential inhibitors of <scp>SARS-CoV</scp> -2 targets," Phyther. Res., vol. 34, no. 12, pp. 3420–3433, Dec. 2020.

[38] E. Nyagumbo et al., "Medicinal plants used for the management of respiratory diseases in Zimbabwe: Review and perspectives potential management of COVID-19," Phys. Chem. Earth, Parts A/B/C, vol. 128, p. 103232, Dec. 2022.

[39] D. Khadka et al., "The use of medicinal plants to prevent COVID-19 in Nepal," J. Ethnobiol. Ethnomed., vol. 17, no. 1, p. 26, Dec. 2021.

[40] B. Benarba and A. Pandiella, "Medicinal Plants as Sources of Active Molecules Against COVID-19," Front. Pharmacol., vol. 11, Aug. 2020.

[41] S. Rathore, R. T. Tiwari, N. Rai, D. K. Mahapatra, S. Patil, and A. G. Patil, "A Review Article on the Therapeutic Potential of Medicinal Plants for Prevention and Treatment of Secondary Infection in Patients with COVID-19," Curr. Tradit. Med., vol. 8, no. 6, Dec. 2022.

[42] T. Dutta, N. Baildya, A. A. Khan, and N. N. Ghosh, "Inhibitory effect of anti-HIV compounds extracted from Indian medicinal plants to retard the replication and transcription process of SARS-CoV-2: an insight from molecular docking and MD-simulation studies," Netw. Model. Anal. Heal. Informatics Bioinforma., vol. 10, no. 1, p. 32, Dec. 2021.

[43] S. K. Devi, B. M. P., and A. S. S. Girija, "Structural Basis of SARS COV 2 3CL PRO Drug And AntiCOVID-19 Discovery from Medicinal Plants - A Review," Int. J. Curr. Res. Rev., pp. 101–105, 2020.

[44] J. Choe, P. Har Yong, and Z. Xiang Ng, "The Efficacy of Traditional Medicinal Plants in Modulating the Main Protease of SARS-CoV-2 and Cytokine Storm," Chem. Biodivers., vol. 19, no. 11, Nov. 2022.

[45] O. O. Oyedara et al., "Computational screening of phytochemicals from three medicinal plants as inhibitors of transmembrane protease serine 2 implicated in SARS-CoV-2 infection," Phytomedicine Plus, vol. 1, no. 4, p. 100135, Nov. 2021.

[46] M. Divya, S. Vijayakumar, J. Chen, B. Vaseeharan, and E. F. Durán-Lara, "South Indian medicinal plants can combat deadly viruses along with COVID-19? - A review," Microb. Pathog., vol. 148, p. 104277, Nov. 2020.

[47] F. Yang et al., "Potential medicinal plants involved in inhibiting 3CLpro activity: A practical alternate approach to combating COVID-19," J. Integr. Med., vol. 20, no. 6, pp. 488–496, Nov. 2022.

[48] B. K. Khuntia et al., "Ayurvedic Medicinal Plants Against COVID-19: An In Silico Analysis," Nat. Prod. Commun., vol. 16, no. 11, p. 1934578X2110567, Nov. 2021.

[49] C. Gao et al., "Characterization of Chloroplast Genomes From Two Salvia Medicinal Plants and Gene Transfer Among Their Mitochondrial and Chloroplast Genomes," Front. Genet., vol. 11, Oct. 2020.

[50] C. A. Odebunmi et al., "Ethnobotanical Survey of Medicinal Plants Used in the Treatment of COVID-19 and Related Respiratory Infections in Ogbomosho South and North Local Government Areas, Oyo State, Nigeria," Plants, vol. 11, no. 19, p. 2667, Oct. 2022.

[51] K. Malekmohammad and M. Rafieian-Kopaei, "Mechanistic Aspects of Medicinal Plants and Secondary Metabolites against Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)," Curr. Pharm. Des., vol. 27, no. 38, pp. 3996–4007, Oct. 2021.

[52] V. K S, Abilasha, and K. S, "Knowledge About the Effects of Medicinal Plants Against COVID-19 Among Dental Students - A Questionnaire Study," Int. J. Curr. Res. Rev., vol. 12, no. 19, pp. 97–108, 2020.

[53] S. Chtita et al., "In silico investigation of phytoconstituents from Cameroonian medicinal plants towards COVID-19 treatment," Struct. Chem., vol. 33, no. 5, pp. 1799–1813, Oct. 2022.

[54] J. Julsrigival, P. Sirisa-ard, S. Julsrigival, and N. Akarchariya, "Antiviral medicinal plants found in Lanna traditional medicine," Chinese Herb. Med., vol. 13, no. 4, pp. 494–501, Oct. 2021.

[55] P. Parikh et al., "Prophylactic potential of Indian medicinal plants in the management of influenza like illness especially COVID-19," Med. Plants - Int. J. Phytomedicines Relat. Ind., vol. 12, no. 3, p. 323, 2020.

[56] L. Cordoba-Tovar et al., "Cultural belief and medicinal plants in treating COVID 19 patients of Western Colombia," Acta Ecol. Sin., vol. 42, no. 5, pp. 476–484, Oct. 2022.

[57] J. Yue, W. Li, and Y. Wang, "Superiority Verification of Deep Learning in the Identification of Medicinal Plants: Taking Paris polyphylla var. yunnanensis as an Example," Front. Plant Sci., vol. 12, Sep. 2021.

[58] J. O. Oladele et al., "A systematic review on COVID-19 pandemic with special emphasis on curative potentials of Nigeria based medicinal plants," Heliyon, vol. 6, no. 9, p. e04897, Sep. 2020.

[59] C. Zinga et al., "Use of Medicinal Plants in Africa: A Case Study From the Democratic Republic of Congo (DRC)," Semin. Nephrol., vol. 42, no. 5, p. 151319, Sep. 2022.

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[60] M. A. Alamri, A. Altharawi, A. B. Alabbas, M. A. Alossaimi, and S. M. Alqahtani, "Structure-based virtual screening and molecular dynamics of phytochemicals derived from Saudi medicinal plants to identify potential COVID-19 therapeutics," Arab. J. Chem., vol. 13, no. 9, pp. 7224–7234, Sep. 2020.