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The insidious threat of jamu and unregulated traditional medicines in the COVID-19 era



Dear Editor,

In developing countries, a small but significant portion of the population regularly consumes traditional medicines. During the Coronavirus Disease 2019 (COVID-19) outbreak, this trend has increased, leading to an imbalance in the supply and demand for these concoctions. Jamu, a well-known traditional Indonesian medicine, which is considered to boost immunity and cure illnesses, has become one of the most sought-after treatment alternatives during this pandemic [1]. Jamu, derived from ancient Javanese word “jampi” (magic potion), is commonly consumed to relieve pain and inflammation or treat chronic illnesses, such as rheumatic disease and cancer [2]. In Indonesia, hundreds of ethnic groups have developed their own specific traditional prescriptions, most of which come from medicinal plants. These plant-based medications contain either a single ingredient or a blend of several constituents. Plants in the family *Zingiberaceae* (ginger), including *Curcuma*, *Kaempferia*, *Zingiber*, *Alpinia*, *Elattaria*, and *Costus*, have been a mainstay element in jamu, along with other plant-based ingredients [3].

Currently, there are no solid evidences that the core ingredients of jamu itself is beneficial or harmful. Similar to other traditional remedies, jamu may contain unusually high amounts of analgesics and anti-inflammatory drugs, including corticosteroids and non-steroidal anti-inflammatory drugs (NSAIDs) [2,4]. Drugs like paracetamol, dexamethasone, prednisone, ibuprofen, antalgin, and mefenamic acid might be added by some irresponsible merchants, without labeling ingredients, to potentiate the analgesic and anti-inflammatory effects of jamu, which consequently enhance sales in the community [2]. For example, “Jamu Pegal Linu” contains toxic levels of phenylbutazone and dipyrone, and has been reported to cause necrotizing fasciitis [5]. Therefore, strict monitoring for the manufacture and distribution of jamu and other traditional medicines are required.

Continuous consumption of jamu and other adulterated traditional medicines has the potential to cause their consumers to become steroid-dependent. Some people consider these drugs as supplements rather than medicines and often consume them even when they do not have any underlying conditions. These unhealthy assumptions and habits have long been adopted by individuals in developing countries, especially those living in remote areas. During the COVID-19 pandemic, production shortages and limited supplies have resulted in a scarcity of these medications and an elevation in their prices. This issue is compounded by the closure of shops, stalls, and businesses and the implementation of a lockdown by the government. In steroid-dependent individuals,

sudden cessation of these unregulated drugs may lead to adrenal insufficiency and eventually adrenal crisis, a life-threatening condition [6,7].

Patients with comorbidities, including hypertension, diabetes, cardiovascular and cerebrovascular diseases, and chronic obstructive pulmonary disease, often develop more severe COVID-19 and it is possible that these patients also may consume unregulated traditional medicines in addition to their routine prescriptions [8–16]. Such circumstances can cause complications and further exacerbate the outcomes of COVID-19 patients with underlying comorbidities [13,17]. Glucocorticoids may cause lymphopenia, which is associated with poor outcome [18,19]. Therefore, obtaining a comprehensive history, including consumption of jamu and other unregulated traditional medicines, is crucial for the early identification of steroid dependence. Since unknown substances may be present in these drugs, an impending adrenal crisis is indeed a possibility that requires prompt diagnosis and careful management.

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M.A.L. and R.P. confirm being the only contributors of this work and have approved it for publication.

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Declaration of competing interest

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References

- [1] Wijaya SH, Batubara I, Nishioka T, Altaf-UI-Amin M, Kanaya S. Metabolomic studies of Indonesian jamu medicines: prediction of jamu efficacy and identification of important metabolites. *Mol Inform* 2017;36:1700050. <https://doi.org/10.1002/minf.201700050>.
- [2] Mustarichie R, Ramdhani D, Indriyati W. Analysis of forbidden pharmaceutical compounds in antirheumatic jamu. *Asian J Pharmaceut Clin Res* 2017;10. <https://doi.org/10.22159/ajpcr.2017.v10i4.16101>.
- [3] Widyowati R, Agil M. Chemical constituents and bioactivities of several Indonesian plants typically used in jamu. *Chem Pharm Bull* 2018;66:506–18.

- <https://doi.org/10.1248/cpb.c17-00983>.
- [4] Chong Y, Ching C, Ng S, Mak TW. Corticosteroid adulteration in proprietary Chinese medicines: a recurring problem. *Hong Kong Med J* 2015;21:411–6. <https://doi.org/10.12809/hkmj154542>.
- [5] Doshi HK, Thambiah J, Chan CL, Nga ME, Tambyah PA. Necrotising fasciitis caused by adulterated traditional asian medicine: a case report. *J Orthop Surg* 2009;17:223–6. <https://doi.org/10.1177/230949900901700222>.
- [6] White KG. A retrospective analysis of adrenal crisis in steroid-dependent patients: causes, frequency and outcomes. *BMC Endocr Disord* 2019;19:129. <https://doi.org/10.1186/s12902-019-0459-z>.
- [7] Dineen R, Thompson CJ, Sherlock M. Adrenal crisis: prevention and management in adult patients. *Ther Adv Endocrinol Metab* 2019;10:2042018819848218. <https://doi.org/10.1177/2042018819848218>.
- [8] Huang I, Lim MA, Pranata R. Diabetes mellitus is associated with increased mortality and severity of disease in COVID-19 pneumonia – a systematic review, meta-analysis, and meta-regression: diabetes and COVID-19. *Diabetes Metab Syndr Clin Res Rev* 2020;14:395–403. <https://doi.org/10.1016/j.dsx.2020.04.018>.
- [9] Pranata R, Lim MA, Huang I, Raharjo SB, Lukito AA. Hypertension is associated with increased mortality and severity of disease in COVID-19 pneumonia: a systematic review, meta-analysis and meta-regression. *JRAAS - J Renin-Angiotensin-Aldosterone Syst* 2020;1–11. <https://doi.org/10.1177/14703203209268>.
- [10] Pranata R, Huang I, Lim MA, Wahjoepramono PEJ, July J. Impact of cerebrovascular and cardiovascular diseases on mortality and severity of COVID-19 – systematic review, meta-analysis, and meta-regression. *J Stroke Cerebrovasc Dis* 2020. <https://doi.org/10.1016/j.jstrokecerebrovasdis.2020.104949>.
- [11] Pranata R, Soeroto AY, Huang I, Lim MA, Santoso P. Effect of chronic obstructive pulmonary disease and smoking on the outcome of COVID-19. *Int J Tuberc Lung Dis* 2020. <https://doi.org/10.5588/ijtld.20.0278>.
- [12] Gupta R, Hussain A, Misra A. Diabetes and COVID-19: evidence, current status and unanswered research questions. *Eur J Clin Nutr* 2020. <https://doi.org/10.1038/s41430-020-0652-1>.
- [13] Gupta R, Ghosh A, Singh AK, Misra A. Clinical considerations for patients with diabetes in times of COVID-19 epidemic. *Diabetes Metab Syndr* 2020;14:211–2. <https://doi.org/10.1016/j.dsx.2020.03.002>.
- [14] Singh AK, Gupta R, Ghosh A, Misra A. Diabetes in COVID-19: prevalence, pathophysiology, prognosis and practical considerations. *Diabetes Metab Syndr Clin Res Rev* 2020;14:303–10. <https://doi.org/10.1016/j.dsx.2020.04.004>.
- [15] Singh AK, Gupta R, Misra A. Comorbidities in COVID-19: outcomes in hypertensive cohort and controversies with renin angiotensin system blockers. *Diabetes Metab Syndr Clin Res Rev* 2020;14:283–7. <https://doi.org/10.1016/j.dsx.2020.03.016>.
- [16] Pranata R, Huang I, Lukito AA, Raharjo SB. Elevated N-terminal pro-brain natriuretic peptide is associated with increased mortality in patients with COVID-19: systematic review and meta-analysis. *Postgrad Med J* 2020. <https://doi.org/10.1136/postgradmedj-2020-137884>. [postgradmedj-2020-137884](https://doi.org/10.1136/postgradmedj-2020-137884).
- [17] Gupta R, Misra A. Contentious issues and evolving concepts in the clinical presentation and management of patients with COVID-19 infection with reference to use of therapeutic and other drugs used in Co-morbid diseases (Hypertension, diabetes etc). *Diabetes Metab Syndr* 2020;14:251–4. <https://doi.org/10.1016/j.dsx.2020.03.012>.
- [18] Panesar NS. What caused lymphopenia in SARS and how reliable is the lymphokine status in glucocorticoid-treated patients? *Med Hypotheses* 2008;71:298–301. <https://doi.org/10.1016/j.mehy.2008.03.019>.
- [19] Huang I, Pranata R. Lymphopenia in severe coronavirus disease-2019 (COVID-19): systematic review and meta-analysis. *J Intensive Care* 2020;8:36. <https://doi.org/10.1186/s40560-020-00453-4>.

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