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Safety of Herbal Medicines in Children

Sevinç Polat and Ayşe Gürol

Abstract

Herbal medicine is used by individuals of all ages, including children. Herbal medicine includes herbs, herbal materials and preparations, and finished herbal products. Herbal medicine or herbal products' use for all ages have increased in recent years. Based on the data of the World Health Organization, almost 80% of the population in developing countries trust herbal medicines to meet their health needs. Herbal medicines use unconsciously as though these products are harmless. The use of herbal products in children is a concern because little information is available concerning the benefits and risks of these products in the pediatric population. This creates a serious problem in the treatment of children, and reveals a serious and under-recognized hazard in clinical care. The safety of most herbal medicinal products is absent since lack of suitable quality controls and not available of appropriate patient information. Owing to the possibility of serious health complications arising from the use of herbal products, it is mandatory to understand their use in the general population in order for appropriate measures to be put into place.

Keywords: children, herbal medicine, nursing, use of herbs, toxicity

1. Introduction

Herbal medicine is the use of only plants for medicinal and therapeutic purpose to treat the diseases and to improve human health [1–4]. Herbal medicine is the most commonly used complementary and alternative medicine (CAM) [5]. World Health Organization (WHO) has defined herbal medicines as last labeled medicinal product that contain an active ingredient, aerial, or underground parts of the plant or other plant material or combinations [4, 6]. Herbal medicine is classified into three groups: 1) herbal drugs have proven efficacies and known active compounds and doses, 2) have expected efficacies, active compound needs to be standardized, and 3) uncertain efficacies [4, 6].

Herbal medicine includes herbs, herbal materials, and last herbal products. In some countries, herbal medicine may contain natural organic or inorganic active ingredients [7]. The number of medicinal plants as medicine is around 20.000 and they are also used for adding taste, odor and color to food since the ancient times [8].

In the 21st century, herbal medicine has been considered as a promising future medicine for people health [4]. During long time before the modern medicine, herbs had been the mainstream remedies for nearly all illness [1, 4]. People had commonly diagnosed illnesses themselves, prepared and prescribed their own herbal medicines for thousand years ago [1]. Herbal remedies, nowadays, it still

plays an important role in the health care and most of people rely on herbal medicine for their primary health care [9, 10].

Herbal plants for medicine are easily obtainable without prescription or prescribed by herbal practitioners. Due to drug resistance and difficulties in finding accessible and reliable drugs, herbal medicines have become an alternative option in our healthcare system [11].

Herbal medicines have been used either alone or in combination with conventional medicines [11]. But even though herbal products are frequently used and regarded as 'natural', they can also cause adverse drug reactions [9, 12, 13] as well as adverse interactions with other medicines [9, 14, 15].

Herbal remedies are generally considered as safe, though their efficacies are unclear and their adverse effects may vary from human to human [2]. Despite of increasing popularity of herbal medicine, their safety and effectiveness have not been scientifically proven [1]. According to their wide use, many herbal products used frequently have not undergone complex scientific analyses via clinical experiments [9]. Though its reported that some of these plants have medicinal properties in the literature it has also been showed that other plants could be not safe for consumption as being toxic and adverse effects in the human body [4, 16]. Therefore, the aim of this review is to understand the current status of the herbal medicine used on the children and adolescents.

2. Prevalence of herbal medicinal product use

The use of herbal remedies has increased in recent years. It is predicted that this rate will be greater for the COVID-19 pandemic process. WHO has been reported nearly ~80% of the world's population uses and trust herbal products for treatment [17–20].

About 2.9 million American children and teenagers have used herbs or their supplements [21]. In China, the use of herbal medicine is about changing from 30–50% of the total drug consumption. It is estimated that in other developed countries, more than 50% of the population use herbal products at least once in their life. The herbal medicines account for 60% of treatment at home in developing countries [4, 22]. In the children with a chronic illness or among inpatients and outpatients are higher use of the herbal medicine [9, 23].

The using herbal drugs among children are 85.5% in Germany [23]. Children with neuropsychiatric diseases use herbal medicine about 35.4% [24]. The elementary school-age children in South Korea have epileptic problems ~17.2% and they use herbal medicine at high range varying from 65.2% to 67.8% [25]. In Turkey, the prevalence of pediatric use of herbal drugs was 58.6% [26]. Bülbül et al. [27] reported that 27% of parents, who used herbal products for their children within 1 year, used them without a doctor's recommendation [27].

3. Areas of herbal medicinal product use

The use of at least one herbal or food product has been commonplace during episodes of acute illness among African American communities [28]. Families with children who have chronic medical conditions, such as autism, cystic fibrosis, rheumatoid arthritis, respiratory tract infections or asthma use to herbal remedies as part of their treatment [1, 10, 29–31]. The majority of herbal remedies are used to treat coughs, colds, and intestinal disorders [9].

The herbal medicine use in children with respiratory illnesses was 59.3% [32]. Parents of children with asthma reported using a range of herbal products (12.8%) for self-care [33]. The most common used herbal medicine for pediatric asthmatic patients were linden (21.6%) and ginger (21.2%) [34]. Herbal medicine has traditionally been used in the treatment of symptoms for nocturnal enuresis or urinary incontinence [35–37].

The ginger, chamomile, mint, cardamom, garlic and onion were used to prevent and treat nausea caused by chemotherapy [38]. It has been reported some herbal products are effective in the management of ear pain in Otitis Media [2]. Children with Attention Deficit Hyperactivity Disorder and Anxiety of Depression take herbal products a part of their treatments. The use of CAM in children with medical comorbidities, excessive sleep problems or insomnia is 1.8 times higher than children without such difficulties [39]. It is reported that herbs significantly decreasing body temperature, cough and breathing difficulties, and improving absorption of pulmonary infiltration and quality of life on the severe acute respiratory syndrome (SARS) [40]. The herbal formula (Ma Xin Shi Gan Tang) was claimed to antiviral effect on which inhibits the entry of influenza virus and have potential in managing seasonal pandemics of influenza infection [41].

4. Toxicity of herbs

Herbal products were used mainly because of hearsay recommendation, dissatisfaction with conventional medicine, and fear of adverse-effects of drugs [30]. It is important to understand that mothers consider herbs to be ‘natural and safe’ and are therefore more willing to try herbal remedies such as herbs, olive oil, and food for their babies’ health. This is no different to any other country, where the local ‘health food shop’ and vitamin bars in pharmacies are well frequented by concerned parents. For some participants, decisions regarding use of traditional practices are usually made by an extended family member or through advice from virtual support groups and social media [42].

The herbal medicines have been obtainable without prescription and professional advices. This practice could lead to harm in children. Because of the variability in herbal product ingredients, the actual dose of active ingredients being consumed is often variable and unknown. When compared with adults, since children have smaller sizes and their immature systems they may be particularly susceptible to the effects of such dosage variations [29]. For this reason, before the administration of any therapeutic agents into children’s body, the mothers must be taken into attention to consider the anatomy and physiology of them. The development level of organs such as brain, liver, and kidney affect rate of the absorption, distribution, metabolism and excretion of drugs. The inappropriate doses could lead to the accumulation of drugs in the body and finally cause the toxic effects. The unstandardized preparation of herbal medicines by manufacturer and contaminants (metals, chemical drugs, etc.) create a risk for children’s health [29, 43]. Herbal products are widespread usages in children; professionals should be aware of this and be alert for possible side-effects/interactions [30].

Herbal medicines have some drawbacks such as contamination with chemicals. One of the most contaminants is pesticide on the herbal products [44]. The wide spread use of pesticides in agriculture has caused severe environmental pollution and possible health hazards including severe acute and chronic poisonings. WHO estimates that the incidence of pesticide poisonings in developing countries has doubled during the past decade [45, 46].

Herbal products can also produce adverse side effects that range from mild one to fatal ones. For example; herbs believed to have an effect on blood-clotting abilities may cause serious side effects for patients with certain blood-related conditions such as hemophilia. Some herbs may increase the effects of anticoagulant medications, and then it may be creating the risk of bleeding [1].

5. Advice to parents

Health care practitioners might be considered some practical points, when parents come to counsel about herbal medicine. Parents should realize that all herbal medicine is not safe [30]. Parents have to be informed about the potential risk or adverse effects of the long-term use of herbal products [47]. When parents are informed about herbal products it maybe prevents the negative interactions [30, 48]. Parents have to be understood that natural is not equal to safe [29].

Unless parents must have the essential knowledge on herbal products, they do not give the herbal remedies to their children [18, 43]. It is important for clinicians to ask the question to find out the beliefs and alternative therapies of the parents, and it is necessity to understand whether they give the herbal remedies in their children [29]. Lack of information about taken herbal remedies by child can prolong a hospital stay or hamper the clinician's approach to diagnosis and management [29].

6. Herbal medicine for the treatment COVID-19

On these days, herbal medicine plays a major role in the prevention and treatment of many diseases also as the novel coronavirus. Chinese medicine is the pioneer of herbal medicine among all of the countries [49]. There was wide usage of traditional Chinese medicine through the last SARS-COV outbreak. The five most famous applied herbs were Astragali Radix (Huangqi), Saposhnikoviae Radix (Fangfeng), Glycyrrhizae Radix Et Rhizoma (Gancio), Atractylodis Macrocephalae Rhizoma (Baizhu), and Lonicerae Japonicae Flo [50].

Du et al. [51] have summarized the theoretical foundation, potential effect of Chinese herbs on COVID-19 patients, and Yang et al. compared the evidence of current applications of traditional Chinese's herbs in the treatment of COVID-19 patients [52]. Today, many guidelines related to herbal medicine have been issued for the prevention and treatment of COVID-19 [50, 53]. The herbs were commonly recommended in some symptoms, like fatigue, fever, chills, heavy limbs, and gastrointestinal symptoms in these guidelines [54]. Recent clinical evidence have also showed the therapeutic effectiveness of traditional medicine in treating different stages of COVID-19 [55–59]. Wang et al. [60] investigated effect of traditional Chinese medicine on hospitalized patients with COVID-19. They suggested that patients should receive Kaletra early and should be treated by a combination of Western and Chinese medicines [60]. Li et al. [61] were reported that Lianhua Qingwen had antiviral and anti-inflammatory activity against SARS-CoV-2 in their experimental study. Traditional Chinese Medicine has suggested to prescribe the herbs that are likely to be effective in the diagnosis and treatment plan of COVID-19 [62]. Notably, the usage frequency of Armeniacae Semen was highest among the herbal formulae recommended for the treatment of pediatric COVID-19 [63]. The herbal products' diversity for the recommended treatment of pediatric COVID-19 is lower compared to the adults. This might be due to the difference in the spectrum of diseases between the children and the adults [64].

7. Nurses's role

Overall, the type of herbal products changes all of the worlds. Besides it can be changes in the different societies at one country. Their usage is high prevalence among most traditional society [42]. In Taiwan, about 60% of participants reported that use folk remedies during their child's hospitalization, and the 72% of them would not inform healthcare providers about usage of folk remedies to their children [65]. This illustrates that it is important health practitioners, including nurses, are aware of the use of folk remedies within the community, and investigate about the use of folk remedies or traditional healing practices in a non-judgemental manner [42].

The growing trend of herbal products' uses is a major challenge to health system, children and families. To ensure the quality and safety of nursing interventions to child and mothers, it is important to learn the mothers' knowledge on beliefs and barriers to health care in their living. In addition, nurses need to be open to listening to patients and admitting their practice of traditional remedies while evaluating risks to create a nursing care plan [66]. The nurses have regular contact with parents within the healthcare centers or family health services [67]. Nurses are required to be have sufficient understanding and knowledge about CAM therapies [68]. Therefore, nurses can be credible sources for parents who need the accurate and trust information on herbal medicinal products. Nurses have to ask to parents what methods they used to understand if the parents have any qualms or difficulty obtaining prescription medications for their child [69].

8. Conclusion

The usage of herbal medicines increases day by day. People usually choose the herbal products instead of medical drugs [46]. The use of medical plant species in the treatment of children diseases is a part of traditional knowledge that is handed down by hearsay advices [20].

Herbal medicine can be unconsciously used as though these products are harmless [70, 71]. The use of herbal products in children is a concern, because a few information is available on their benefits and risks at these population [72, 73]. This creates a serious problem in the treatment of children, and it can be occurred a serious hazard in clinical care [74]. Since herbal products are available not only in pharmacies, but also in food stores and supermarkets there is a serious risk to users and remains a major concern about the herbal drug safety issue [18].

As the global use of herbal products continues to increase and many more new products are introduced into the market the risk will be greater for public health day by day [75]. The risk increases because of compromised by lack of suitable quality controls, inadequate labeling, and the absence of appropriate patient information [76].

Most herbal medicines have not been subjected to rigorous clinical trials As a result, it still continues the lack of evidence-based information about the efficacy and safety of herbal products in children [1, 77]. Despite of the high prevalence of herbal remedies' uses, there is a communication problem between CAM users and healthcare professionals. Healthcare professions both have to ask about herbal remedies' uses and inform to their patients or their parents about herbal medicine. Also, parents have to inform to their physicians on herbal remedies' uses to their children during conventional treatment [78]. Health professionals must recommend to parents the correct use of herbal medicine in children, assist in herbal

therapeutic decisions, and monitor for adverse effects and interactions [1, 77]. Finally, herbal products or folk remedies may be inherently unsafe. Owing to the possibility of serious health complications arising from the use of herbal products, it is mandatory to understand their use in the general population in order for appropriate measures to be put into place [32].

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References

- [1] Lucas, G. N. (2010). Herbal medicine and children. *Sri Lanka Journal of Child Health*, 39, 76-78.
- [2] Marom, T., Marchisio, P., Tamir, S. O., Torretta, S., Gavriel, H., & Esposito, S. (2016). Complementary and alternative medicine treatment options for otitis media: a systematic review. *Medicine*, 95(6): e2695.
- [3] Güleç, M., Tan, N., Canverdi, Ö., & Tan, E. (2017). The usage of the most frequently preferred herbal products in Turkey in nursing mothers, newborns, infants and children. *Istanbul J Pharm* 47 (3), 84-96.
- [4] Khan, M. S. A., & Ahmad, I. (2019). Herbal medicine: current trends and future prospects. In *New Look to Phytomedicine* (pp. 3-13). Academic Press. DOI: <https://doi.org/10.1016/B978-0-12-814619-4.00001-X> © 2019
- [5] Alwhaibi, M., Goyat, R., & Kelly, K. M. (2017). The use of herbal remedies among mothers of young children living in the central Appalachian region. *Evidence-Based Complementary and Alternative Medicine*, Article ID 1739740, <https://doi.org/10.1155/2017/1739740>
- [6] Parveen, A., Parveen, B., Parveen, R., & Ahmad, S. (2015). Challenges and guidelines for clinical trial of herbal drugs. *Journal of pharmacy & bioallied sciences*, 7(4), 329.
- [7] Bent, S., & Ko, R. (2004). Commonly used herbal medicines in the United States: A review. *Am J Med*, 116, 478-485.
- [8] WHO Global Report on Traditional and Complementary Medicine 2019, Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO. ISBN: 978-92-4-15 1543-6
- [9] Du, Y., Wolf, I. K., Zhuang, W., Bodemann, S., Knöss, W., & Knopf, H. (2014). Use of herbal medicinal products among children and adolescents in Germany. *BMC complementary and alternative medicine*, 14(1), 218-230.
- [10] Elnageeb, M.M., Mohmmmed, S.A., Alhadi, L.E., & Mohammed, A.S. (2018). Awareness and attitude of mothers about herbal medicine used to treat children aged under 5 years in Shendi City, Sudan. *Shendi University Journal of Applied Science*, 2, 37-40.
- [11] Nwaiwu, O., & Oyelade, O. B. (2016). Traditional herbal medicines used in neonates and infants less than six months old in Lagos Nigeria. *Nigerian Journal of Paediatrics*, 43(1), 40-45.
- [12] Licata, A., Macaluso, F. S., & Craxì, A. (2013). Herbal hepatotoxicity: a hidden epidemic. *Internal and emergency medicine*, 8(1), 13-22.
- [13] Hawkes, N. (2012). Herbal medicine might be responsible for high incidence of urinary tract cancer. *BMJ*, 344, e2644.
- [14] Izzo, A. A., & Ernst, E. (2009). Interactions between herbal medicines and prescribed drugs. *Drugs*, 69(13), 1777-1798.
- [15] Lim, A., Cranswick, N., & South, M. (2011). Adverse events associated with the use of complementary and alternative medicine in children. *Archives of disease in childhood*, 96(3), 297-300.
- [16] Wink, M. (2010). Introduction: Biochemistry, Physiology and Ecological Functions of Secondary Metabolites. 10.1002/9781444320503.ch1.
- [17] WHO. (2011). The World Traditional Medicines Situation, in

Traditional medicines: Global Situation, Issues and Challenges. World Health Organization, Geneva, 3:1-14.

[18] Ekor, M. (2014). The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. *Frontiers in pharmacology*, 4, 177.

[19] Nazari, M., Taghizadeh, A., Bazzaz, M. M., Rakhshandeh, H., & Shokri, S. (2017). Effect of persian medicine remedy on chemotherapy induced nausea and vomiting in breast cancer: a double blind, randomized, crossover clinical trial. *Electronic physician*, 9(1), 3535.

[20] Tugume, P., & Nyakoojo, C. (2019). Ethno-pharmacological survey of herbal remedies used in the treatment of paediatric diseases in Buhunga parish, Rukungiri District, Uganda. *BMC Complementary and Alternative Medicine*, 19(1), 353.

[21] Wu, C. H., Wang, C. C., & Kennedy, J. (2013). The prevalence of herb and dietary supplement use among children and adolescents in the United States: results from the 2007 National Health Interview Survey. *Complementary therapies in medicine*, 21(4), 358-363.

[22] Gunjan, M., Naing, T.W., Saini, R.S., Ahmad, A., Naidu, J.R., & Kumar, I., (2015). Marketing trends and future prospects of herbal medicine in the treatment of various disease. *World J. Pharm. Res.* 4 (9), 132-155.

[23] Hümer, M., Scheller, G., Kapellen, T., Gebauer, C., Schmidt, H., & Kiess, W. (2010). Use of herbal medicine in German children-prevalence, indications and motivation. *Deutsche medizinische Wochenschrift* (1946), 135(19), 959-964.

[24] Jeong, M. J., Lim, J. H., HwangBo, M., Kim, K. B., & Yun, Y. J. (2012). A study on the utilization of Korean

medicine & other parallel treatments for neurological disease children & adolescents treated with western medicine. *The Journal of Pediatrics of Korean Medicine*, 26(2), 72-84.

[25] Lee, H. Y., Yun, Y. J., Yu, S. A., Park, Y. H., Park, B. W., Kim, B. Y., & Hwang, M. S. (2018). A cross-sectional survey of clinical factors that influence the use of traditional Korean medicine among children with cerebral palsy. *Integrative medicine research*, 7(4), 333-340.

[26] Araz, N., & Bulbul, S. (2011). Use of complementary and alternative medicine in a pediatric population in southern Turkey. *Clin Invest Med.* 34, 21-9.

[27] Bülbül, S.H., Turgut, M., & Köylüoğlu, S. (2009). Parents' views about alternative practices in children. *Cocuk Sagligi ve Hastaliklari Dergisi.* 52. 195-202.

[28] Smitherman, L., Janisse, J., & Mathur, A. (2005) The use of folk remedies among children in an urban black community: remedies for fever, colic, and teething. *Pediatrics*, 115 (3), 297-304.

[29] Woolf, A.D. (2003). Herbal Remedies and Children: Do They Work? Are They Harmful? *Pediatrics*, 112, 240-6.

[30] Abd El-Mawla, A. M., Albarrag, A. R., & Abdallah, M. A. K. (2013). Herbal medicine use in a group Taif children, Saudi Arabia. *Spatula DD*, 3(2), 41-44.

[31] Huang, T. P., Liu, P. H., Lien, A. S. Y., Yang, S. L., Chang, H. H., & Yen, H. R. (2014). A nationwide population-based study of traditional Chinese medicine usage in children in Taiwan. *Complementary therapies in medicine*, 22(3), 500-510.

[32] Alharbi, N. S., Alenizi, A. S., Al-Olayan, A. M., Alobaidi, N. A.,

- Algrainy, A. M., Bahadhailah, A. O., ... & Alrohaimi, Y. A. (2018). Herbs use in Saudi children with acute respiratory illnesses. *Sudanese journal of paediatrics*, 18(2), 20.
- [33] Shen, J., & Oraka, E. (2012). Complementary and alternative medicine (CAM) use among children with current asthma. *Preventive Medicine*, 54, 27-31.
- [34] Hocaoglu-Babayigit, A. (2015). High usage of complementary and alternative medicine among Turkish asthmatic children. *Iranian Journal of Allergy, Asthma and Immunology*, 14(4), 410-415.
- [35] Helmer, R. (2007). Treating Paediatric Bed-wetting with Chinese Medicine. *J Chinese Med*, 83, 25-9.
- [36] Huang, T., Shu, X., Huang, Y. S., & Cheuk, D. K. (2011). Complementary and miscellaneous interventions for nocturnal enuresis in children. *Cochrane database of systematic reviews*, (12), Cd005230.
- [37] Schloss, J., Ryan, K., Reid, R., & Steel, A. (2019). A randomised, double-blind, placebo-controlled clinical trial assessing the efficacy of bedtime buddy® for the treatment of nocturnal enuresis in children. *BMC pediatrics*, 19(1), 421.
- [38] Bahrani, S.S., Varkaneh, Z.K., Sabziani, Z., Bagheri, Z., Mohamadi, M.A., & Azami, H. (2020). A Systematic Review of the Role of Medicinal Plants in the Treatment of Chemotherapy Induced Nausea and Vomiting. *International Journal of Psychosocial Rehabilitation*, 24(4), 7888-7896.
- [39] Wang, C., Preisser, J., Chung, Y., & Li, K. (2018). Complementary and alternative medicine use among children with mental health issues: results from the National Health Interview Survey. *BMC complementary and alternative medicine*, 18(1), 241.
- [40] Liu, X., Zhang, M., He, L., & Li, Y. (2012). Chinese herbs combined with Western medicine for severe acute respiratory syndrome (SARS). *Cochrane Database of Systematic Reviews*, (10), CD004882.
- [41] Hsieh, C. F., Lo, C. W., Liu, C. H., Lin, S., Yen, H. R., Lin, T. Y., & Horng, J. T. (2012). Mechanism by which ma-xing-shi-gan-tang inhibits the entry of influenza virus. *Journal of ethnopharmacology*, 143(1), 57-67.
- [42] Rabiati, D.H., Whitehead, L., Al Jabery, M., Towell-Barnard, A., Shields, L., & Abu Sabah, E. (2019) Traditional methods for managing illness in newborns and infants in an Arab society. *International Nursing Review* 66, 329-337.
- [43] Suryawati, S., & Suardi, H. N. (2015). The use of herbal medicine in children. In *Proceedings of The Annual International Conference, Syiah Kuala University-Life Sciences & Engineering Chapter* (Vol. 5, No. 2).
- [44] Kosalec, I., Cvek, J., & Tomić, S. (2009). Contaminants of medicinal herbs and herbal products. *Archives of Industrial Hygiene and Toxicology*, 60(4), 485-501.
- [45] Shah, M. D., & Iqbal, M. (2010). Diazinon-induced oxidative stress and renal dysfunction in rats. *Food and chemical toxicology*, 48(12), 3345-3353.
- [46] Mosaddegh, M. H., Emami, F., & Asghari, G. (2014). Evaluation of residual diazinon and chlorpyrifos in children herbal medicines by headspace-spme and GC-FID. *Iranian journal of pharmaceutical research: IJPR*, 13(2), 541-49.
- [47] Lo, P. C., Lin, S. K., & Lai, J. N. (2020). Long-term use of Chinese

herbal medicine therapy reduced the risk of asthma hospitalization in school-age children: A nationwide population-based cohort study in Taiwan. *Journal of traditional and complementary medicine*, 10(2), 141-149.

[48] Gilmour, J., Harrison, C., Asadi, L., Cohen, M. H., & Vohra, S. (2011). Natural health product–drug interactions: evolving responsibilities to take complementary and alternative medicine into account. *Pediatrics*, 128(Supplement 4), S155-S160.

[49] Jin, Y. H., Cai, L., Cheng, Z. S., Cheng, H., Deng, T., Fan, Y. P., ... & Han, Y. (2020). A rapid advice guideline for the diagnosis and treatment of 2019 novel coronavirus (2019-nCoV) infected pneumonia (standard version). *Military Medical Research*, 7(1), 4.

[50] Luo, H., Tang, Q. L., Shang, Y. X., Liang, S. B., Yang, M., Robinson, N., & Liu, J. P. (2020). Can Chinese medicine be used for prevention of corona virus disease 2019 (COVID-19)? A review of historical classics, research evidence and current prevention programs. *Chinese journal of integrative medicine*, 26, 243-50.

[51] Hong-Zhi, D. U., Xiao-Ying, H. O. U., Yu-Huan, M. I. A. O., Huang, B. S., & Da-Hui, L. I. U. (2020). Traditional Chinese Medicine: an effective treatment for 2019 novel coronavirus pneumonia (NCP). *Chinese Journal of Natural Medicines*, 18(3), 206-210.

[52] Yang, Y., Islam, M. S., Wang, J., Li, Y., & Chen, X. (2020). Traditional Chinese medicine in the treatment of patients infected with 2019-new coronavirus (SARS-CoV-2): a review and perspective. *International journal of biological sciences*, 16(10), 1708.

[53] Ang, L., Lee, H. W., Choi, J. Y., Zhang, J., & Lee, M. S. (2020). Herbal medicine and pattern identification for treating COVID-19: a rapid review

of guidelines. *Integrative Medicine Research*, 100407.

[54] Ang, L., Lee, H.W., Kim, A., & Lee M.S. (2020). Herbal medicine for the management of COVID-19 during the medical observation period: a review of guidelines. *Integr Med Res.*, 100465.

[55] Chan, K. W., Wong, V. T., & Tang, S. C. W. (2020). COVID-19: An update on the epidemiological, clinical, preventive and therapeutic evidence and guidelines of integrative Chinese–Western medicine for the management of 2019 novel coronavirus disease. *The American journal of Chinese medicine*, 48(03), 737-762.

[56] Wu, Y. X., Zou, L., Yu, X., Sun, D., Li, S. B., Tang, L., ... & Fang, H. (2020). Clinical effects of integrated traditional Chinese and western medicine on COVID-19: a systematic review. *Shanghai Journal of Traditional Chinese Medicine*, 54, 29-39.

[57] Yang, Y., Islam, M. S., Wang, J., Li, Y., & Chen, X. (2020). Traditional Chinese medicine in the treatment of patients infected with 2019-new coronavirus (SARS-CoV-2): a review and perspective. *International journal of biological sciences*, 16(10), 1708-17.

[58] Wang, C., Sun, S., & Ding, X. (2020). The therapeutic effects of traditional chinese medicine on COVID-19: a narrative review. *International journal of clinical pharmacy*, 1-11. <https://doi.org/10.1007/s11096-020-01153-7>.

[59] Duan, C., Xia, W.G., Zheng, C.J., Sun, G.B., Li, Z.L., Li, Q.L., ... & Qingquan, L. (2020). Clinical observation of Jinhua Qinggan granule to treat COVID-19. *J Tradit Chin Med*, 61, 1-5.

[60] Wang, C., Sun, S., & Ding, X. (2020). The therapeutic effects of traditional chinese medicine

on COVID-19: a narrative review. *International journal of clinical pharmacy*, 1-11. <https://doi.org/10.1007/s11096-020-01153-7>.

[61] Runfeng, L., Yunlong, H., Jicheng, H., Weiqi, P., Qin Hai, M., Yongxia, S., ... & Kui, Z. (2020). Lianhuaqingwen exerts anti-viral and anti-inflammatory activity against novel coronavirus (SARS-CoV-2). *Pharmacological research*, 156, 104761.

[62] Ren, J. L., Zhang, A. H., & Wang, X. J. (2020). Traditional Chinese medicine for COVID-19 treatment. *Pharmacological research*, 155, 104743.

[63] Huang, T. P., Liu, P. H., Lien, A. Y., Yang, S. L., Chang, H. H., & Yen, H. R. (2013). Characteristics of traditional Chinese medicine use in children with asthma: a nationwide population-based study. *Allergy*, 68(12), 1610-1613.

[64] Ang, L., Lee, H. W., Kim, A., Lee, J. A., Zhang, J., & Lee, M. S. (2020). Herbal medicine for treatment of children diagnosed with COVID-19: A review of guidelines. *Complementary Therapies in Clinical Practice*, 39, 101174. <https://doi.org/10.1016/j.ctcp.2020.101174>.

[65] Chen, L. L., Huang, L. C., Lin, S. C., Smith, M., & Liu, S. J. (2009). Use of folk remedies among families of children hospitalised in Taiwan. *Journal of clinical nursing*, 18(15), 2162-2170.

[66] Arabiat, D. H., Whitehead, L., AL Jabery, M. A., Darawad, M., Geraghty, S., & Halasa, S. (2019). Newborn care practices of mothers in arab societies: implication for infant welfare. *Journal of Transcultural Nursing*, 30(3), 260-267.

[67] Bjerså, K., Forsberg, A., & Olsén, M. F. (2011). Perceptions of complementary therapies among Swedish registered professions in surgical care. *Complementary therapies in clinical practice*, 17(1), 44-49.

[68] Gyasi, R. M., Abass, K., Adu-Gyamfi, S., & Accam, B. T. (2017). Nurses' knowledge, clinical practice and attitude towards unconventional medicine: Implications for intercultural healthcare. *Complementary therapies in clinical practice*, 29, 1-8.

[69] Lack, S., & Kinser, P. A. (2020). The modification of three vulnerability theories to assist nursing practice for school-age children with severe asthma. *Journal for Specialists in Pediatric Nursing*, 25(2), e12280.

[70] Gürol, A., Taplak, A. Ş., & Polat, S. (2019). Herbal supplement products used by mothers to cope with the common health problems in childhood. *Complementary therapies in medicine*, 47, 102214.

[71] Wegener, T. (2013). Herbal medicinal products in the paediatric population-status quo and perspectives. *Wiener Medizinische Wochenschrift*, 163(3-4), 46-51.

[72] Snodgrass, W. R. (2001). Herbal products: risks and benefits of use in children. *Current therapeutic research*, 62(10), 724-737.

[73] Çiftçi, S., & Samur, F.G. (2017). Use of Botanical Dietary Supplements in Infants and Children and Their Effects on Health. *H.Ü. Faculty of Health Sciences Journal*, 4(2), 30-44.

[74] Tachjian, A., Maria, V., & Jahangir, A. (2010). Use of herbal products and potential interactions in patients with cardiovascular diseases. *Journal of the American College of Cardiology*, 55(6), 515-525.

[75] World Health Organization (2013). *WHO Traditional Medicine Strategy 2002-2005*. 2002, World Health Organization, Geneva. <https://www.who.int/medicines/publications/traditionalpolicy/en/>

[76] Raynor, D. K., Dickinson, R., Knapp, P., Long, A. F., & Nicolson, D. J. (2011). Buyer beware? Does the information provided with herbal products available over the counter enable safe use?. *BMC medicine*, 9(1), 94.

[77] Tomassoni, A. J., & Simone, K. (2001). Herbal medicines for children: an illusion of safety?. *Current opinion in pediatrics*, 13(2), 162-169.

[78] Zuzak, T. J., Boňková, J., Careddu, D., Garami, M., Hadjipanayis, A., Jazbec, J., ... & Petrova, G. (2013). Use of complementary and alternative medicine by children in Europe: published data and expert perspectives. *Complementary therapies in medicine*, 21, S34-S47.