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In This Edition

Editor's Corner

Dear Readers,

We are bringing to your attention Volume 4, Number 1 of EPPAD Bulletin. As in the past issues, the current publication covers various topical areas. A day long EPPAD Annual Conference was held on November 4, 2023, at Holiday Inn in Alexandria, Virginia. The main theme of the conference was mental health and other continuing education (CE) talks were also presented. The conference was concluded with an interactive social mixer.

In EPPAD News and Highlights section, the memory of the Conference was captured in pictures, which show EPPAD Awards recipients, podium speakers and EPPAD Board members. In this section, details of the newly introduced Dr. Tesfaye Biftu Scholarship are also presented. In the Pioneers of Pharmacy Section, the illustrious career of the late Ato Hailu Tegegnework is written by Ato Gabriel Daniel. Ato Hailu used to promote and support the activities of EPPAD in Ethiopia, and his passing is a huge loss to his family, the pharmacy community in Ethiopia and EPPAD. We, EPPAD Bulletin editorial team members, would like to extend our deep condolences to his family and friends. In the article, Ato Daniel also canvases the landscape of pharmacy in Ethiopia, ranging from history to various current aspects of the profession.

In this issue, several articles are included based on the presentations at the Conference. Two abstracts, one by Dr. Lishan (USA) and another by Ato Jemal (Ethiopia) focus on mental health topics. Dr. Beniyam was able to put together an extended version of his talk at the Conference. Dr. Pawlose Ketema has written an excellent article on the serotonin-linezolid dilemma facing clinicians when they make therapeutic decisions.

Professor Bisrat Hailemeskel wrote a timely article on herbal-based cosmetics. He traces back the use of herbals as beautifying agents. In his article, he cites some examples which are gaining currency. This is indeed a burgeoning area that pharmacists can get involved in. In fact, he himself has recently introduced a few cosmetic products into the market.

We hope this issue has covered various aspects of pharmacy practice and timely medical topics. Pharmacists and other health-related practitioners are invited to contribute articles which can potentially enhance the profession of pharmacy and allied fields.

Fekadu Fullas, PhD

Editor-in-Chief,
EPPAD Bulletin

EPPAD News and Highlights

2023 EPPAD Award Recipients

2023 Dr. Tesfaye Biftu Scholarship Recipient

2023 EPPAD Conference Speakers

Pictured Above: EPPAD Board Members

Introducing the Dr. Tesfaye Biftu Scholarship

The Ethiopian Pharmacists and Pharmaceutical Scientists Association in Diaspora (EPPAD) proudly presents the Dr. Tesfaye Biftu Scholarship, established to honor Dr. Tesfaye Biftu's exceptional contributions to pharmaceutical research and development. EPPAD, a registered 501(c) non-profit professional association based in the State of Virginia, USA, is dedicated to uniting pharmaceutical and allied professionals worldwide to advance pharmacy education, practice, service, and scholarship. Our mission extends to fostering collaboration between pharmacy professionals abroad and those in Ethiopia, promoting knowledge exchange, resource mobilization, advocacy for policy reforms, and the advancement of quality and safe medicines.

Dr. Tesfaye Biftu, a distinguished recipient of the 2021 EPPAD Research and Development Excellence Award and esteemed member of the EPPAD advisory board, serves as the inspiration behind this scholarship program. With a background encompassing a PhD in Chemistry from Brandeis University and an MBA in Management from Rutgers University, Dr. Biftu's illustrious career spans pivotal roles at esteemed institutions such as Merck and Co. and CytoMed Inc. His contributions to drug discovery in human and animal health, with over 80 publications and more than 95 US and international patents to his name, have significantly impacted areas including inflammation, cardiovascular diseases, anti-cancer agents, and infectious diseases.

The Dr. Tesfaye Biftu Scholarship embodies EPPAD's commitment to nurturing the future of the pharmaceutical profession by fostering excellence in pharmacy practice and providing assistance to aspiring student pharmaceutical professionals to enhance their leadership skills.
This scholarship program will provide financial support to two deserving student pharmacists/pharmaceutical science students with a stipend of $1,000 each.

Eligibility Criteria:

- Applicants must be of Ethiopian descent and enrolled in a school of pharmacy in the US at the time of application submission.
- Students must maintain good academic standing, with a cumulative grade point average of at least 2.5 on a 4.0 scale.
- Completion of at least one academic year cycle is required.
- While being an EPPAD member is advantageous, it is not mandatory.
- Applicants should demonstrate a willingness to support EPPAD activities.
- Application Requirements:
    - An academic transcript (an unofficial transcript is acceptable)
    - Two letters of recommendation, with at least one from a faculty member
    - An updated resume

To apply, please submit your application to info@eppad.org.

The deadline for student scholarship applications is May 1, 2024, 11:59 pm EST.
Join us in supporting the next generation of pharmaceutical professionals. Apply now for the Dr. Tesfaye Biftu Scholarship.

Pioneers of Ethiopian Pharmacy

Prepared by Gabriel Daniel (aka-Aklile G Giorgis)

In Memory of Mr. Hailu Tegegnework

Hailu Tegnework was a senior pharmacist with long years of quality assurance and health management work with professional experience in regulatory, drug control, hospital pharmacy, manufacturing, drug import/distribution and malaria drug management programs.

He completed his primary education in Jigjiga and secondary education in Harar. Hailu's success in his early academic education was recognized by his award of a gold pen from the hands of the late Emperor Haile Selassie.

Hailu, among the sixth batch of Ethiopian pharmacy graduates, got his Bachelor of Science in Pharmacy degree from the then Haile Selassie I University (HSIU) in 1971. He continued his higher studies in Poland graduating with a Master of Science degree in Toxicology.

Hailu started pharmacy work at the Ministry of Health in Harar making him the first professional pharmacist of the then province of Harar. He continued to work for the Ministry of Health at the pharmacy department in the inspection division in Addis Ababa. It was during his work at the department of pharmacy that he was given a scholarship to study toxicology in Poland. After returning from Poland, he joined the Quality Control Laboratory of the Ministry of Health located at the then Pasteur Institute (now the Ethiopian Public Health Institute complex) at Gulele, Addis Ababa, first as a toxicologist and thereafter as head of the department.

Hailu's private sector involvement started with a position at DKT – a non-government organization funded by USAID to support in social marketing of family planning commodities in Ethiopia. He was a founding member and technical manager of the now defunct Lifeline Solutions SC - an intravenous fluid manufacturer - the largest in this line of production in the country at the time.

In 2007 Hailu joined Management Sciences for Health (MSH) as a head of the Anti-Malaria Drugs Management (AMDM) project funded by the US Government under the Presidents' Malaria Initiative (PMI). The goal of this Initiative was to reduce malaria-related mortality by 50% in Oromia regional state of Ethiopia, the largest region, covering 27 million people, of which 68% are at risk for malaria.

Hailu's involvement in the pharmacy students' association and Ethiopian Pharmacists Association (EPA) is significant. He was one of the founders of the Ethiopian Pharmaceutical Association (EPA) holding the position of a president for two cycles. In addition to participating in different EPA committees, Hailu was also commissioned by EPA to document the five-decade history of EPA whose publication is awaiting. He was also a volunteer of the Ethiopian Pharmacists and Pharmaceutical Scientists' Association in the Diaspora (EPPAD) local support team for projects in Ethiopia.

Mr. Hailu Tegegnework passed away of natural causes in January 2024 at the age of 79.

May His Soul Rest in Peace!

Synopsis of Pharmacy in Ethiopia

Dr. Merab, the personal physician of Emperor Menelik II of Ethiopia, owned the first pharmacy in Addis Ababa

Early Pharmacy: It was some 200 years ago that Ethiopian kings approached European governments to introduce the science of modern pharmacy in the country. According to Dr Richard Pankhurst, a French physician, Charles Jacques Poncet, was the first person who brought a "little chest of chemical medicines" to Ethiopia during the time of Emperor Iyasu I in 1699. It can safely be assumed that early hospitals like the Russian Red Cross Hospital in 1896 and its predecessor Menelik II Hospital must have had a pharmacy to serve their patients. Dr Merab founded the first private pharmacy in Addis Ababa in 1910, followed by Hakim Zhan in the early 1920s. Since then, there were several pharmacies established by Armenians and Greeks.

Pharmacy Education: The first auxiliary medical training in Ethiopia was launched by the then Ministry of Interior in Menelik II hospital in 1943. The first half a dozen Ethiopian pharmacists were trained overseas in Lebanon at the American University of Beirut, Europe, and USA. Training of professional graduate pharmacists in Ethiopia started in 1961 with the establishment of the Department of Pharmacy as a unit in the Faculty of Science of the then University College of Addis Ababa. After four years, the first batch of in-country pharmacists graduated with B.Pharm Degree. Currently, there are more than fifty public and private institutions in Ethiopia which train thousands of students in pharmaceutical education that graduate with diplomas and degrees up to the PhD level.

Regulatory Pharmacy: "The Pharmacists and Druggists Proclamation No 43/1942" of Ethiopia was the first legal instrument used to regulate both pharmaceutical professions and the facilities. The 1964 *"Pharmacy Regulation No. 288 / 1964",* a comprehensive regulation of the pharmaceutical market, formed the legal basis for official establishment of modern drug regulation in the history of Ethiopia. This started in earnest the regulation of the practice of pharmacists, druggists and pharmacy technicians, manufacturing, distribution, and sale of medicines. In June 1999, an independent Drug Administration and Control Authority (DACA) with further mandate of setting standards of competence for licensing institutions/facilities was established. In 2019, the latest iteration of the regulatory transformation in Ethiopia came with the proclamation establishing the Ethiopian Food and Drug Administration (EFDA) with the mission to control foods, drugs, cosmetics, and tobacco products. (www.efda.gov.et)

Supply Chain Pharmacy: The history of the Ethiopian Pharmaceuticals Supply Service (EPSS) begins with the early days of Emperor Haile Selassie with the establishment of the Central Medical Store (CMS) about 75 years ago as a public pharmaceutical import, warehousing, and distribution agency of the Ministry of Health in Addis with a branch in Asmara. EPSS has evolved to where it is today through five iterations under the leadership of eleven general managers. Its first location was in an old warehouse, presumably constructed/used by Italian invaders in the Pasteur Institute compound (now the Ethiopian Public Health Institute – EPHA) in Gulelle in western part of Addis Ababa. Currently, the Ethiopian Pharmaceutical Supply Agency (EPSA) is acting as the epicenter of public pharmaceutical supply affairs in the country. The head office procures and distributes pharmaceuticals, medical supplies, medical equipment, and laboratory reagents from local and international manufacturers to its nineteen hubs/modern modular warehouses that in turn reach over 5,000 medical facilities located in all corners of the country. EPSA procures almost 70% of all the medicines consumed in Ethiopia. EPSA procurement increased from US$ 27 million in 2007 and was projected to reach about $1 billion in 2022. (www.epss.gov.et)

Pharmacy Professional Associations: The Ethiopian Pharmaceutical Association (EPA) is one of the oldest health professionals' associations in Ethiopia established in November 1974. The history of organizing the professionals in the practice of pharmacy dates to 1963 when pharmacy students at the then Haile Selassie University established a Student Pharmaceutical Association. EPA, in its fifty years journey, has shown great progress in developing its capacity to serve the interest of its members as well as in strengthening of the health services of the community through supporting the

promotion of better pharmaceutical services. The number of its members has increased from a few hundred to the current of more than two thousand. It has bought its own office space, organized its office management system and capacity, conducted annual scientific conferences, and continuously published the internationally reputable scientific Journal "The Ethiopian Pharmaceutical Journal (EPJ)". (www.epaethiopia.orgt.et)

The Ethiopian Pharmacists and Pharmaceutical Scientists Association in Diaspora (EPPAD) is a membership association of Ethiopian pharmaceutical professionals in diaspora established in September 2018 and incorporated in the State of Virginia, USA. EPPAD serve as a bridge to connect Ethiopian pharmaceutical professionals working abroad with those working in Ethiopia to promote professional practice, improve access to quality assured, affordable, and effective pharmaceutical products and support appropriate policy and regulatory reforms. EPPAD, using its six interest/working groups, supports different projects in Ethiopia for tackling key challenges in the pharmaceutical sector. These working groups have facilitated knowledge exchange via virtual webinars on multiple pharmacy related topics in collaboration with Ethiopian Pharmaceutical Association (EPA); helped to establish a pharmaceutical company that aims to manufacture safe and quality medicines; and conducted advocacy in policy and policy dialogue with a focus on pharmacy education, traditional medicine, regulatory matters etc. (www.eppad.org)

2023 EPPAD Conference Abstracts

Jemal Teshome Belachew

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Abstract (EPPAD Conference, Nov 4, 2023, USA)

Title: - Trends and Challenges in the Explanation and Strengthening of Health Service for mental, neurological and substance use disorders in Ethiopia

Background: In a predominantly rural area, mental disorders are estimated to be responsible for 11% of the total disease burden, with schizophrenia and depression among the top ten most burdensome conditions. The prevalence of priority mental disorders are schizophrenia (lifetime) 0.5%, bipolar disorder (lifetime) 0.63%, alcohol dependence (12 months) 1.89%, *khat* 5% and drug 0.5%. Substance Use Disorder (SUD), 7.4%, depression (12 months) 6.8%. and childhood mental illnesses (12 months) 12–25% (average 18.5%).

Methods: The data was taken from the five-year report of District Health Information System 2 (DHIS2), regional annual report of 2014 & 2015 Ethiopian Fiscal Years and supportive supervision data.

To address such needs of the population, the country developed Health Sector Transformation Plan II (HSTP2) and marked MNS disorder as one of the priorities of public health importance and developed National Mental Health Services (NMHS) 2021-2025. The revised health indicators and added two more indicators for priority of Mental, Neurologic & Substance Use (MNS) disorders. The Ministry of Health revised the disease registration to include more than 100 MNS disorders in the DHIS2 disease registration. Despite all these actions and increasing possible risk factors (natural and man-made disasters), MNS service users' coverage is declining for the last two Fiscal Years of Ethiopia. Some of the challenges which affect the expansion and strengthening of the MNS services are lack of commitment or attention of governance and leadership, lack of neuropsychiatric medications, inadequate resources allocation, both human and financial, poor data quality and structural problem. In order to address these challenges, advocacy and awareness creation need to work a lot on governance and leadership at different levels of the health structure, so that what appears on paper is realized in reality.

Limitations: It is compiled data designed for a workshop and needs systemic analysis. This is an expert's view based on the raw data so it might not be generalized to apply widely to the Ministry of Health of Ethiopia.

The Impact of Covid-19 in the Diaspora Community

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Abstract:

COVID-19 has emerged as the leading cause of an unprecedented rise in mental health problems and substance abuse among immigrant youth and adolescents. The underserved segments of the population were disproportionately affected, highlighting the existing disparities in access and utilization of health care. The emergence of social psychological factors labeled as "storms of problems" including social isolation, prolonged screening time, lack of physical activity, loss of school support, exposure to COVID-19 information, and parenting stress, provided the breeding ground for mental health problems such as anxiety, depression, sleep disorders, traumatic and stress-related disorders, and suicidal behavior. Addiction had also seen an unparalleled upsurge, with greater rates of alcohol, cannabis, opioids, e-cigarette use, and behavioral addiction among other things. The problem requires a multifactorial approach, and pharmacists remain at the center, with tasks ranging from early detection to timely referral, medication reconciliation and adherence tracking.

Leveraging Community Leaders and Organizations for Community Engagement and Awareness of Mental Health

Benyam G Tegene, MD, FAPA
Adult, Child, and Adolescent Psychiatrist

This is an excerpt from a presentation at given at the Ethiopian Pharmacists and Pharmaceutical Scientists' Association in the Diaspora (EPPAD) Conference in Arlington, VA on Nov. 4th, 2023.

The goal of this article is to:

- Outline the prevalence of mental illness and stigma.
- Describe the importance of collaborative care.
- Explain how to increase awareness about mental illness.
- Describe the role of pharmacists in increasing awareness of mental health.

For the sake of transparency, I have no conflict of interest to disclose.

Prevalence of mental illness

According to the 2023 statistics from the World Health Organization (WHO), 3.8% of the world population, 5% of adults (4% men, 6% women) are afflicted by depression. In adults over the age of 60, the prevalence of depression is estimated to be about 5.7%. The prevalence of depression is higher in women, about 10% in pregnant women and in women in the post-partum period. Of note, the prevalence of depression is higher in women partly because of hormonal changes that take place in various stages of life. In the same year, the Centers for Disease Control (CDC), reported a prevalence of depression of 4.7% in adults, who are 18 years of age and above.

One of the unfortunate consequences of depression is suicide. According to the CDC, in 2023, over 700,000 people all over the world, including over 49,000 in the US passed away because of suicide. The implication of this tragic experience is multidimensional. When suicide takes place, it affects not only the immediate family and friends, but also has a ripple effect that touches other members of society.

The numbers are even more alarming among youngsters. About 42% of high school students have expressed feelings of sadness or hopelessness (CDC's Youth Risk Behavior Surveillance Data Summary & Trend Report). The COVID pandemic is one of the factors implicated in the rising prevalence of depression, especially among the younger generation. School age children missed attending school and engaging with their peers during the pandemic. That social withdrawal had a profound effect on regression of social skill as well as academic performance and the full effect of the pandemic is something we will find out in years to come.

Stigma and myths about mental illness

Stigma according to Webster's New World Dictionary, is defined as a mark of disgrace or dishonor associated with a particular circumstance, quality, or person. Various illnesses, associated with stigma and mental illness are no exception. Because of stigma attached to mental illness, patients may be reluctant to disclose their symptoms and seek medical care. This may lead to delay in treatment, or not being treated at all. Like any medical condition, depression or other mental conditions have a better prognosis if addressed earlier. People who suffer from different mental illnesses may also face discrimination because of the illness.

Myths about mental illness

Myth on the other hand is an unfounded or false notion. The following are common myths:

- Mental illness is a result of weakness in personality and that people if they try hard 'can snap out of it'. This myth is in sharp contrast to current scientific facts and discourage patients with mental illness from stepping forward and getting the help they need.
- Another myth is that people with mental illness are violent and dangerous. It turns out that patients with mental illness are in fact more victims of violence than aggressors.

- Some patients are afraid to take medication because of misconceptions that psychotropic medications are more harmful than the illness or are addictive and once you start taking them, one won't be able to stop taking them.
- Children can't be depressed, especially if provided with all the necessities.
- Bad parenting is a cause of mental illness in the offspring. These are some of the myths that circulate in different communities and sway patients and parents of the mentally ill from receiving necessary and timely care.

Dispelling these myths is an essential step towards promoting mental health awareness and fostering a supportive environment for those affected by mental illness.

Consequences of Mental Illness

The sequalae of mental illness can be divided into acute and chronic, individual or community wide. Depression with its typical symptoms of low energy and poor concentration can result in poor performance in school. Disrupted sleep and lack of motivation may affect school attendance. People with depression tend to isolate themselves, leading to self-neglect and withdrawal from social interactions. There is usually accompanying change in appetite, with resulting weight fluctuation and poor control of medical conditions such as diabetes and hypertension. Impulsive eating and not following recommended diet and exercise can lead to elevation of cholesterol resulting in heart attack and stroke. People with serious mental illness (SMI), which are Schizophrenia, Bipolar disorder and major depressive disorder, are said to have a 3.7 X higher mortality than the general population. Compared to the general public, patients with SMI can have up to a 25-year mortality gap.

One of the ways that mental illness affects patients is by causing absenteeism from school or work. This may in turn lead to loss of productivity and unemployment. Homelessness and interaction with the legal system can follow. In fact, the prison system in the US is considered the largest mental health facility.

Substance use disorder. One factor that predisposes people with mental illness to higher mortality is the high prevalence of substance use in this population. Sixty four percent of patients with schizophrenia, for example smoke and this is about four times that of the general population. Some people self-medicate with alcohol or other substances and these in turn mask or perpetuate the symptoms of mental illness.

Suicide is one of the unfortunate consequences of mental illness. It can happen with any mental illness including substance use disorder (SUD). It can be prevented in some cases with vigilance and a supportive relationship. Most people are said to have reached out for help within a few weeks before they commit suicide.

Mental illness has been in the limelight for various reasons. And more attention is being geared towards prevention. Psychoeducation, which is educating the public about mental illness, early education and screening, and early treatment are showing good outcomes.

How to increase mental health awareness

The following are various strategies that can be utilized to reach different groups of the population and engage them in increasing awareness of mental illness.

- Increasing awareness of mental health in schools and workplaces obviously has lots of benefits in decreasing the stigma associated with mental illness. Health personnel have a great responsibility to teach patients and the public and not only routinely screen for mental illness but also increase mental health awareness.
- Social media campaigns are a good medium to reach a vast number of people, especially the younger generation.
- Community events and workshops which can be organized by volunteers and different organizations are another means to engage some sectors of the population.
- Partnering with various organizations at the local or national level would open doors to different venues and funds. These agencies can help with allocation of resources, educational materials, getting different speakers for various programs and so on. In addition, collaborating with local media will help spread the work and can have a big impact.
- Engaging with policymakers and people in power can help in creating favorable legislation to promote mental health and ensure better mental

health service coverage by insurance companies. One important tip to consider here is using well-known personalities be it sport figures or artists who hold a big sway with their fan base.

Last but not least, it is very important to support the mentally ill. A non-judgmental and safe environment where people with mental illness can express their concerns is a prerequisite to start a good relationship and invoke willingness to engage in therapeutic services. A kind word or gesture makes a big difference and can prevent severely depressed and suicidal people from acting on their impulses. These patients can further be linked with different support groups.

One of the buzz words these days is collaborative care. It is a model of care in which mental health workers, be it psychiatrists, psychologists or social workers are embedded in a regular clinic with other primary health care services. A close working alliance between primary care providers and mental health providers facilitates easy access to needed care and good communication amongst different parties involved in the care of patients.

There are five key elements of Collaborative Care Model:

- Patient-centered team care – Primary care and behavioral health workers work closely and at the same facility. This facilitates not only easier access to care but also cuts back on redundancy of assessments.
- Population-based care – The team keeps closer track of identified patients and can proactively engage patients who do not follow recommendations.
- Measurement-based treatment to target – The treatment plan is individualized to each patient. Goals and progress are routinely evaluated using evidence-based tools.
- Evidence-based care is offered to patients.
- Accountable care – The emphasis is on quality of care and providers are reimbursed not for the volume of work done but for the quality of care provided.

Collaborative care has shown better access to care, improved clinical outcomes and increased patient satisfaction.

Role of pharmacists

Pharmacists, as team members of the health care team, can have a crucial role in teaching the public and increasing awareness about mental health. Every interaction with patients can be an opportunity for counseling. It is obvious that when people are aware of their condition, and are informed about their medication, they will have some buy-in into the whole treatment process. This leads to better medication adherence and patients will be aware of what to look for in terms of monitoring their progress in treatment, side effect of treatment and what to do if they have any questions about their medication.

Pharmacists also play a big role in monitoring drug-drug interactions and advising patients as well as treating providers. Providers may not be aware of all the medications that their patients may be taking at a given time. Most often, patients may also not be aware of their own medications. In these instances, the pharmacist may be the last line of defense and help avoid unwanted medication interactions, which unfortunately can be severe or even lethal.

In Psychiatry, one of the most effective medications for the treatment of Schizophrenia is clozapine. This medication comes with a protocol to monitor for adverse effects – lowering of the white blood count. Pharmacists are tasked with making sure that the recommended blood tests are done, and the results are within normal limits prior to dispensing the medication.

To summarize it all, there are different resources that are available to patients with mental illness. One has to acknowledge the condition in self or others to get the needed help. Early detection and treatment of mental illness have better outcome. Being informed about the stigma and myth about mental illness will hopefully help increase awareness and encourage people to be more open about their condition.

In July 2022, the National Suicide Prevention Lifeline, 988 went into effect. It can be reached by calling or texting 988 or chat 988lifeline.org. Help is available when people are in the dark throes of depression and feel suicidal. Emergency rooms are staffed with CRISIS workers and social workers that can assess patients for safety and guide them to the required level of care.

Key References

- World Health Organization (WHO)
- Centers for Disease Control (CDC)
- CDC's Youth Risk Behavior Surveillance Data Summary & Trend Report
- American Psychiatry Association

Unlocking the Serotonin - Linezolid Dilemma: A Clinical Perspective

Pawlose Ketema, PharmD, BCPS, BCIDP, AAHIVP

Linezolid is a member of the first class of oxazolidinone antibiotics that work by inhibiting bacterial protein synthesis through binding to the 30S and 50S bacterial ribosomal subunits. Linezolid has a wide spectrum of indications, including hospital-acquired pneumonia caused by Methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant Enterococcus faecium infections, complicated skin and soft tissue infections, diabetic foot infections, and osteomyelitis. Outside of these indications, linezolid also exhibits a wide range of activity against various gram-positive organisms, including *S. aureus*, *S. agalactiae*, *S. pyogenes*, *S. pneumoniae*, and *Enterococcus* spp. Linezolid is available in two formulations: intravenous and oral. The oral formulation has 100% bioavailability, making it a suitable agent when de-escalating or transitioning to an oral agent. In patients with complicated infections requiring long-term antimicrobial therapy, treatment options are limited and often involve the placement of a peripherally inserted central catheter (PICC). Given the characteristics mentioned above, linezolid offers a suitable alternative and can decrease catheter-associated complications, reduce hospital readmissions, and lower overall medical costs. However, linezolid has several associated side effects, including peripheral and ocular neuropathy, anemia, thrombocytopenia, and serotonin syndrome.

Serotonin syndrome is described as a clinical triad of mental status changes, autonomic hyperactivity, and neuromuscular abnormalities resulting from excess serotonin. While severe cases may present with the findings, most patients will have mild symptoms that may be overlooked. This presentation makes it challenging to diagnose and identify early on. To date, there are no laboratory tests to confirm the diagnosis of serotonin syndrome, and instead, clinicians rely on physical and historical examinations to make a diagnosis. Many classes of agents have been linked to increasing serotonin levels, including monoamine oxidase inhibitors such as linezolid. These agents decrease serotonin metabolism, thereby increasing serotonin levels in the synapse. This phenomenon, along with post marketing cases reported to the Food and Drug Administration (FDA), wherein patients taking linezolid concurrently with serotonergic antidepressants reported serotonin syndrome, led to the addition of a warning to the linezolid package insert. While linezolid has been associated with the potential to cause serotonin syndrome when used concurrently with other serotonergic agents, the incidence remains extremely low.

A retrospective chart review conducted by Taylor et al. in 2006 evaluated the incidence of serotonin syndrome in patients receiving linezolid and selective serotonin reuptake inhibitors (SSRIs). They reviewed patients on an SSRI and linezolid therapy and included seventy-two patients in their final analysis. They concluded that among the seventy-two patients, only two patients had a high probability of serotonin syndrome, and in both patients, symptoms reversed upon discontinuation of serotonergic therapy. More recently, Kufel et al. (2023) evaluated the incidence of serotonin toxicity among hospitalized patients who received linezolid with or without serotonergic agents. They screened over two thousand patients, among whom 67% received linezolid along with a serotonergic agent. They concluded that only two patients (0.11%) were identified as having a possible case of serotonin syndrome toxicity. These findings were consistent with other retrospective studies. Lastly, Butterfield et al. found that the incidence of serotonin toxicity did not differ as the number of serotonergic agents increased.

While linezolid can potentially cause serotonin syndrome when used concurrently with other agents, the overall risk remains low. Given these findings, linezolid should be considered as an option for patients who are receiving other serotonergic agents. Moreover, in patients who require long-term antimicrobial therapy, linezolid offers a suitable alternative for those who may not be good candidates for PICC placement. Clinicians should educate patients with concomitant serotonergic agents on the early signs of serotonin syndrome.

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The Use of Ethiopian Traditional Herbs in Cosmetics

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Cosmetics have been an integral part of Ethiopian culture for centuries, with traditional herbs playing a significant role in their formulation. Traditional herbs, also known as botanicals or plant-based ingredients, have been utilized in Ethiopian cosmetics for their therapeutic properties, fragrance, and natural appeal. This paper explores the historical significance, scientific basis, and contemporary applications of traditional herbs in Ethiopian cosmetics.

Historical Significance

The use of traditional herbs in cosmetics dates back to ancient civilizations, where botanical extracts were used for skincare, haircare, and body adornment purposes. Historical texts from ancient Egypt, China, and India document the use of herbs such as aloe vera, neem, and turmeric in cosmetic preparations. These herbs were revered for their healing properties and were incorporated into various beauty rituals (Mukherjee & Maity, 2011).

In ancient Egypt, for example, Cleopatra is said to have used aloe vera as part of her skincare regimen, while neem was commonly used in Ayurvedic medicine in ancient India for its antibacterial and antifungal properties. Similarly, traditional Chinese medicine has long utilized herbs like ginseng and green tea for their antioxidant and anti-inflammatory benefits (Tiwari et al., 2014).

The Use of Traditional Herbs in Cosmetics Among Ethiopians

The historical use of herbs among Ethiopians also dates back thousands of years, deeply rooted in traditional medicine, cultural practices, and religious rituals. Herbal remedies have been integral to Ethiopian society, offering remedies for various ailments, skincare solutions, and even spiritual purposes (Mesfin A, 2012; Asnake S, 2016; Giday M, 2003; and Alemu T, 2020).

In Ethiopian history, particularly during the time of the Aksumite Empire and beyond, there is evidence of the use of indigenous herbs and natural substances for skincare and beauty enhancement. Similar to Cleopatra's renowned beauty practices, Ethiopian royalty and elites may have utilized botanical ingredients in their skincare routines to maintain youthful and radiant skin. For instance,

Ethiopian women have long utilized ingredients like honey, shea butter, flaxseed, fenugreek, aloe vera, and various indigenous herbs for skincare purposes. These natural ingredients were often combined to create facial masks, moisturizers, and body treatments to nourish the skin, improve complexion, and protect against environmental damage. Moreover, traditional Ethiopian herbalists, known as "debteras," have preserved ancient knowledge of herbal remedies passed down through generations. With a deep understanding of indigenous plants and their medicinal properties, they possess invaluable knowledge passed down through generations. They are often consulted for their expertise in selecting, preparing, and applying herbal remedies for various skincare concerns and beauty enhancements. They continue to play a vital role in Ethiopian society, offering herbal treatments for various skin conditions, including acne, eczema, and dryness.

In our era, many individuals in Ethiopia predominantly rely on modern chemical-based beauty products from Western countries, by overlooking our abundant heritage of herbal knowledge and expertise. For example, the 2022 data suggests that Ethiopia imported US $72.39 million worth of essential oils, perfumes, cosmetics, and toiletries, according to the United Nations COMTRADE database on international trade (United Nations COMTRADE database).

Scientific Basis

Modern scientific research has validated many of the traditional uses of herbs in cosmetics. Studies have shown that botanical extracts contain bioactive compounds such as polyphenols, flavonoids, and vitamins, which exhibit antioxidant, anti-inflammatory, and antimicrobial properties (Draelos, 2019). For example, green tea extract has been found to protect the skin from UV-induced damage and reduce inflammation, while aloe vera gel has been shown to accelerate wound healing and soothe irritated skin (Farris, 2005).

Furthermore, advances in extraction and formulation technologies have enabled the development of more potent and stable herbal extracts for cosmetic use (Williams & Barry, 2004). Techniques such as

supercritical fluid extraction and nanoencapsulation allow for the extraction and delivery of bioactive compounds from herbs while preserving their efficacy and stability (Lin et al., 2017).

While there is limited scientific research specifically focusing on the effectiveness of Ethiopian herbs-based cosmetics, several studies have investigated the therapeutic properties of individual herbs commonly used in cosmetics. A study published in the Journal of Cosmetic Dermatology found that honey possesses various skincare benefits, including moisturizing, wound-healing, and antibacterial properties (Al-Waili, 2001). Research published in the International Journal of Molecular Sciences highlights the moisturizing and anti-inflammatory properties of shea butter, making it suitable for skincare formulations targeting dry skin, eczema, and dermatitis (Akihisa et al., 2010).

A systematic review published in the Journal of Traditional and Complementary Medicine concluded that aloe vera gel is effective in promoting wound healing, reducing inflammation, and soothing skin irritations (Surjushe et al., 2008). Studies have shown that fenugreek seeds contain compounds with antioxidant and anti-inflammatory properties, which may benefit skin health by reducing oxidative stress and inflammation (Amin et al., 2018; Kaviarasan et al., 2008). Research published in the Journal of Cosmetic Dermatology suggests that flaxseed oil, rich in omega-3 fatty acids, can improve skin hydration and barrier function, making it suitable for dry and sensitive skin (De Spirt et al., 2009).

Contemporary Applications

In recent years, there has been a resurgence of interest in traditional herbs in cosmetics, driven by consumer demand for natural and sustainable products. Cosmetic companies are increasingly incorporating botanical extracts into their formulations to capitalize on their perceived health benefits and appeal to eco-conscious consumers (Balakrishnan & Basha, 2019).

Herbs such as fenugreek, flaxseed, chamomile, lavender, and calendula are commonly used in skincare products for their soothing and calming effects on the skin, while botanical oils like argan oil and jojoba oil are prized for their moisturizing and nourishing properties. Additionally, traditional herbs are being utilized in haircare products for their ability to strengthen hair follicles, promote hair growth, and improve scalp health (Lephart, 2019).

In addition to the well-known botanicals, several lesser-known herbs have gained attention for their cosmetic benefits. Garden cress (Feto) extract, besides its many other medicinal uses, for instance, has been shown to possess skin and teeth -brightening properties and is used in skincare formulations to even out skin tone and reduce hyperpigmentation. Flaxseed oil, rich in omega-3 fatty acids, is another herbal ingredient that is often incorporated into stretch mark creams for its hydrating and nourishing effects on the skin. Fenugreek extract is prized for its anti-wrinkle properties and is commonly found in anti-aging skincare products for its ability to smooth fine lines and wrinkles (Ghavimi et al., 2021; Jiang et al., 2020; Khushboo et al., 2019).

Herbal-based Products Benefits for Ethiopia.

Producing herbal-based cosmetics locally in Ethiopia offers numerous benefits across economic, environmental, and cultural dimensions. By fostering a domestic cosmetics industry, Ethiopia can stimulate economic growth through job creation, provide support to local businesses, and help the retention of income within the country. Import substitution reduces reliance on foreign products, conserving foreign currency reserves and promoting economic self-sufficiency.

Furthermore, tapping into Ethiopia's rich tradition of herbal medicine and natural remedies preserves indigenous knowledge and cultural heritage while promoting sustainable practices. Herbal-based cosmetics are often perceived as environmentally friendly and less harmful to health compared to synthetic alternatives, aligning with global trends towards sustainability and wellness. Overall, investing in local herbal cosmetics production not only contributes to economic development but also enhances environmental sustainability, cultural preservation, and public health in Ethiopia.

Conclusion

In conclusion, the historical use of traditional herbs in Ethiopian cosmetics underscores the rich heritage and cultural significance of botanical ingredients in skincare and beauty practices. From ancient times to the present day, herbs like honey, shea butter, flaxseed, fenugreek, and aloe vera have been revered for their therapeutic properties and incorporated into various cosmetic formulations. Traditional Ethiopian herbalists have played a crucial role in preserving this ancient knowledge and continue to offer herbal remedies for skincare ailments. The significant amount spent on importing cosmetics

highlights the potential economic benefits of local production, including job creation, income retention, and reduced reliance on foreign products. Moreover, embracing herbal-based cosmetics aligns with global trends towards sustainability and wellness, promoting environmentally friendly practices and preserving indigenous culture. Investing in local herbal cosmetics production not only stimulates economic growth but also contributes to environmental sustainability, cultural preservation, and public health in Ethiopia.

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