

Holistic Approaches for Women's Sustainable Health

Volume 3

Herbs, Spices, Phytochemicals, and Cereals
Body Care, Cancer Prevention,
and Hormonal Health



Megh R. Goyal
Anamika Chauhan
Kamalesh Raja
Editors

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HOLISTIC APPROACHES FOR WOMEN'S SUSTAINABLE HEALTH

Volume 3

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Body Care, Cancer Prevention,
and Hormonal Health*

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Dedication



In the sacred verses of Proverbs 31, we find a timeless ode to the essence of womanhood—a testament to strength, wisdom, and compassion. It is within these words that we uncover the embodiment of virtues celebrated in the life of Subhadra Devi Goyal—a remarkable woman whose journey resonates with the noblest qualities of a daughter, wife, mother, pastor, and social worker.

From her earliest days, Subhadra Devi Goyal has exemplified the profound bond of filial love and respect. Her reverence for family, her unwavering support, and her tender care stand as a testament to the enduring legacy of familial ties.

In the sacred covenant of marriage, Subhadra Devi Goyal has shown boundless strength and unwavering commitment. Her partnership with her beloved spouse is marked by resilience, mutual respect, and a shared journey toward growth and understanding.

As a mother, Subhadra's love knows no bounds. Her nurturing embrace, her guiding hand, and her boundless affection shape the lives of her three children, instilling in them the values of integrity, empathy, compassion, and love for God, others, country, and nature.

In her role as a pastor, Subhadra serves as a beacon of light and hope for her congregation and community. Her wisdom, her faith, and her compassionate guidance inspire others to seek solace, understanding, and spiritual growth.

As a social worker, Subhadra's heart knows no bounds. Her selfless service, her tireless advocacy, and her unwavering commitment to justice uplift the marginalized, empower the oppressed, and transform communities with love, compassion, and dedication.

In recognition of her exemplary life, filled with service, devotion, and unwavering faith, we dedicate this book to Subhadra Devi Goyal—a living embodiment of the timeless wisdom of Proverbs 31. May her legacy continue to inspire and uplift all, who are touched by her remarkable spirit!

About the Editors



Megh R. Goyal, PhD

Retired Professor in Agricultural and Biomedical Engineering, College of Engineering at the University of Puerto Rico—Mayaguez Campus; Senior Technical Editor-in-Chief, Biomedical Engineering and Agricultural Science, Apple Academic Press Inc.

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He received his BSc degree in engineering from Punjab Agricultural University, Ludhiana, India; his MSc and PhD degrees from the Ohio State University, Columbus; his Master of Divinity degree from Puerto Rico Evangelical Seminary, Hato Rey, Puerto Rico, USA.

Since 1971, he has worked as Soil Conservation Inspector (1971); Research Assistant at Haryana Agricultural University (1972–1975) and the Ohio State University (1975–1979); Research Agricultural Engineer/Professor at the Department of Agricultural Engineering of UPRM (1979–1997); and Professor (Agricultural and Biomedical Engineering) at UPRM (1997–2012). He spent one-year sabbatical leave in 2002–2003 at Biomedical Engineering Department, Florida International University, Miami, USA.

He was the first agricultural engineer to receive the professional license in Agricultural Engineering in 1986 from the College of Engineers and Surveyors of Puerto Rico. On September 16, 2005, he was proclaimed as “Father of Irrigation Engineering in Puerto Rico for the twentieth century” by the American Society of Agricultural and Biological Engineers, Puerto Rico Section, for his pioneer work on micro-irrigation, evapotranspiration, agroclimatology, and soil and water engineering.

During his professional career of 52 years, he has received awards such as: Scientist of the Year, Blue Ribbon Extension Award, Research Paper Award, Nolan Mitchell Young Extension Worker Award, Agricultural Engineer of the Year, Citations by Mayors of Juana Diaz and Ponce, Membership Grand Prize for ASAE Campaign, Felix Castro Rodriguez Academic Excellence, Rashtrya Ratan Award and Bharat Excellence Award and Gold Medal, Domingo Marrero Navarro Prize, Adopted son of Moca, Irrigation Protagonist of UPRM, Man of Drip Irrigation by Mayor of Municipalities of Mayaguez/Caguas/Ponce and Senate/Secretary of Agriculture of ELA, Puerto Rico.

The Water Technology Centre of Tamil Nadu Agricultural University in Coimbatore, India recognized Dr. Goyal as one of the experts “who rendered meritorious service for the development of micro-irrigation sector in India” by bestowing *Award of Outstanding Contribution in Micro Irrigation*. This award was presented to Dr. Goyal during the inaugural session of the National Congress on “New Challenges and Advances in Sustainable Micro Irrigation” on March 1, 2017, held at Tamil Nadu Agricultural University.

At Annual Meeting on August 01, 2018 in Detroit, MI, ASABE bestowed on him Netafim Microirrigation Award for his unselfish contribution. VDGOD Professional Association of India awarded Lifetime Achievement Award at 12th Annual Meeting on Engineering, Science and Medicine that was held on 20–21 of November of 2020 in Visakhapatnam, India.

He has authored more than 200 journal articles and more than 150 books including: *Elements of Agroclimatology (Spanish)* by UNISARC, Colombia; two *Bibliographies on Drip Irrigation*. Apple Academic Press, Inc. (AAP) has published his books, namely: *Management of Drip/Trickle or Micro Irrigation*, and *Evapotranspiration: Principles and Applications for Water Management*, 10-volume set on *Research Advances in Sustainable Micro Irrigation*. During 2016–2025, AAP will be publishing book volumes on emerging technologies/issues/challenges under book series, *Innovations and Challenges in Micro Irrigation*, and *Innovations in Agricultural & Biological Engineering*.

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Anamika Chauhan, PhD, is an accomplished academician who holds a master's degree and a PhD from HNB Garhwal Srinagar, Central University, Uttarakhand, India. In addition to her impressive academic credentials, she boasts master's degrees in English and Education, showcasing the breadth of her intellectual pursuits.

Furthermore, Dr. Chauhan has proven her academic prowess by successfully qualifying for UGC-NET, USET, and MPhil. Her dedication and excellence in the field have earned her the prestigious "Young Scientist Award" from the *Uttarakhand State Council for Science and Technology* and the esteemed "Teacher's Excellence Award" from Motherhood University in Uttarakhand. Notably, she was also recognized with the distinguished "Dr. Sarvepalli Radhakrishnan Global Educator Award-2022" by the International Council for Education, Research, and Training Delhi, India and Teacher of the Year 2023 by the Government of Uttarakhand, India.

Dr. Chauhan's contributions extend beyond accolades, as she holds a patent for her groundbreaking work on "Gold Nanoparticles with *Albizia lebbek* (L.) Benth Leaves Extract for Dermal Cancer." This patent exemplifies her commitment to advancing scientific knowledge in the field.

Her involvement in academia is not only recognized through awards and patents but is also evident in her role as a valuable member of the Board of Studies at the University. Dr. Chauhan's commitment to academic excellence is further underscored by her lifetime memberships in esteemed organizations, including the Indian Science Congress Association Kolkata, Scientific and Technical Research Association (STRA), and Home Science Association of India.

A prolific researcher, Dr. Chauhan has authored numerous research papers published in peer-reviewed national and international journals. Additionally, she has contributed to academia through the publication of eight edited books and a textbook. Her intellectual engagement extends to active participation in workshops and conferences, further showcasing her dedication to the dissemination of knowledge.

Dr. Chauhan's research interests span a wide spectrum, encompassing critical areas such as the food and nutrition, human health, and social issues. Her multifaceted expertise and commitment to advancing knowledge make her a distinguished figure in the academic community.



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Kamalesh Raja, PhD, is a PhD student in environmental biotechnology at the Saveetha School of Engineering, SIMATS, Chennai, India. He earned his master's degree from Rajalakshmi Engineering College, Chennai, India. During his undergraduate studies in biotechnology, he achieved notable recognition with an Indian Academy of Science Fellowship at the International Rice Research Institute (IRRI) in Hyderabad. Adding to his academic accolades, he secured a nine-month paid internship with the Research and Development Department at Kemin Industries India & South Asia, Chennai. Prior to embarking on his PhD journey, he served as an R&D Scientist at Oriens Global Marketing Pvt Ltd, showcasing his commitment to applied research. Notably, he has included as one of the top 25 finalists for the prestigious Nutri-Scholars Award, organized by Dupont in both 2020 and 2018. A prolific author, he has contributed significantly to the scientific community with 16 journal publications and several book chapters. His research interests span diverse fields, encompassing environmental biotechnology, food technology, and waste-to-energy conversion.

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Abbreviations

1U3S	crystal structure of estrogen receptor complexed with WAY 797
3EKK	insulin receptor complexed with inhibitor
5-HT5A	5 hydroxy tryptamine receptor type A
ACE2	angiotensin converting enzyme-2
ACS	American Cancer Society
AG	aged garlic
AICR	American Institute of Cancer Research
Akt	Ak strain transforming
AMPK	AMP-activated protein kinase
AP-1	activator protein-1
APS	Astragalus polysaccharide
AV	aloe vera
BMI	body mass index
BV	bacterial vaginosis
Ca-ATP	calcium (+2)-adenosine triphosphatase
CAM	complementary and alternative medicine
CBT	cognitive behavioral therapy
CCA	canonical correlation analysis
CDC	centers for disease control and prevention
CDDP	cis-diammine dichloro platinum(II)
CDK	cyclin dependent kinase
CDK4	cyclin dependent kinase 4
CLA	conjugated linoleic acid
CMDs	cardio metabolic diseases
CMPA	cow's milk protein allergy
COX	cyclooxygenase
CT	computed tomography
CVD	cardio vascular diseases
DASH	dietary approaches to stop hypertension
DHEAS	dehydroepiandrosterone
DNA	deoxyribonucleic acid
EC	epicatechin
ECG	epicatechin-3-gallate
EGC	epigallocatechin
EGCG	epigallocatechin gallate
EGCG	epigallocatechin-3-gallate

EMT	epithelial-mesenchymal transition
ENT	ear, nose and throat
EOF	<i>Emblica officinalis</i>
ERa/ERb	selective -estrogen receptor alpha and beta
FAMMM	familial atypical multiple mole melanoma
FAP	familial adenomatous polyposis
FBS	fasting blood sugar
FDA	Food and Drug Administration
FEN	flap endonuclease
FSH	follicle stimulating hormone
G0/G1	quiescent phase/gap 1 phase
G2/M→	gap 2 phase/mitosis phase
GABA-A	gamma aminobutyric acid type a
GADD45A	growth arrest and DNA damage-inducible, alpha
GDH	glutamate dehydrogenase
GERD	gastroesophageal reflux disease
GFR	growth factor response
GH	growth hormone
GLP-1	glucagon-like peptide 1
GnRH	gonadotropin-releasing hormone
GRAS	generally recognized as safe
HBOC	hereditary breast and ovarian cancer syndrome
HBV	hepatitis B virus
HCC	hepatocellular carcinoma
HCMV	human cytomegalovirus
HCTZ	hydrochlorothiazide
HCV	hepatitis C virus
HI	hyperinsulinemia
HNF-4	hepatocyte nuclear factor 4 alpha
HNSCCs	head and neck squamous cell carcinomas
HP	hereditary pancreatitis
HSD	hydroxy steroid dehydrogenase
HTN	hypertension
IgE	immunoglobulin E
IGF-1	insulin-like growth factor 1
IR	insulin resistance
IRS-2	insulin receptor substrate 2
JNK	JUN-N-terminal kinase
LH	luteinizing hormone
LS	lynch syndrome
MBSR	mindfulness-based stress reduction
MCF-7	Michigan Cancer Foundation-7

MMPs	matrix metalloproteinases
MOFAs	mono-unsaturated fatty acids
MRI	magnetic resonance imaging
mRNA	messenger RNA
NCGS	nonceliac gluten sensitivity
NCI	national cancer institute
NF	nuclear factor
NF-Kb	nuclear factor kappa b
NGO	nongovernmental organizations
NKCs	natural killer cells
NO	nitric oxide
NOVX rats	nonovariectomized control rats
Nrf2	nuclear factor erythroid 2-related factor
NSAIDs	nonsteroidal anti-inflammatory drugs
OPLS	orthogonal partial least squares
OVX	ovariectomized control rats
p38 MAPK	p38 mitogen-activated protein kinases
p53	tumor suppression gene
PC	pancreatic cancer
PCBs	polychlorinated biphenyls
PCNA	proliferating cell nuclear antigen
PCOS	polycystic ovarian syndrome
PDX-1	pancreatic duodenal homeobox-1
PET	positron emission tomography
PgR	progesterone receptor
PI3K	phosphatidylinositol 3'-oh kinase
PI3K	phosphoinositide 3-kinases
PJS	Peutz-Jeghers syndrome
PKC	protein kinase c
PMS	premenstrual syndrome
PUFAs	poly unsaturated fatty acids
RAAS	renin-angiotensin-aldosterone system
RDA	recommended daily allowance
ROS	reactive oxygen species
SAC	organosulfur component
SAPK/JNK	stress activated protein kinase/c-Jun NH (2)-terminal kinase
SCC	squamous cell carcinoma
SHBG	sex hormone-binding globulin
SSAT	spermidine/spermine n-1 acetyltransferase
STAT3	signal transducer and activation of transcription 3
STIs	sexually transmitted infections
T2DM	diabetes mellitus type 2

T2DM	type 2 diabetes mellitus
TB (MDR-TB)	multidrug-resistant
TB (XDR-TB)	extensively drug-resistant
TB	tuberculosis
TBW	total body water
TC	total cholesterol
TCAM	traditional complementary and alternative medicine
TCM	traditional Chinese medicine
Th1/Th2	type 1 helper/ type 2 helper
TNF-alpha	tumor necrosis factor alpha
USDA	US Department of Agriculture
UV	ultraviolet
VEGF	vascular endothelial growth factor
VEGFR-2	vascular endothelial growth factor receptor 2
WCRF	world cancer research fund
WHO	World Health Organization
WHR	waist hip ratio
WT1	Wilms tumor 1

Preface

The health and well-being of women throughout their lives are pivotal not only to their own individual development but also to the stability and prosperity of communities and nations. Women's health spans a wide array of stages and conditions, each with its unique necessities and challenges. As we explore the intricacies of women's health, it is crucial to take a thorough and integrative approach that marries modern science with time-honored traditions. This book volume, *Holistic Approaches for Women's Sustainable Health, Volume 3: Herbs, Spices, Phytochemicals, and Cereals: Care for Body and Cancer and Hormonal Disorders*, serves as a testament to this philosophy, offering an in-depth exploration of the role of nutrients and traditional natural medicines in fostering female health.

The introductory section lays the foundation by exploring the integral role of nutrients and traditional natural medicines in female health. This review comprehensively covers how these elements contribute to the well-being of women at various stages of life. From vitamins and minerals essential for reproductive health to traditional herbal remedies that have been used for centuries to treat female-specific ailments, this section highlights the symbiotic relationship between modern nutritional science and ancient wisdom. One of the most difficult health issues that women globally still confront is cancer. This volume's second section is devoted to investigating the possibilities of medicinal herbs in the prevention and treatment of cancers, most of which primarily affect women.

It begins with an overarching perspective on the integration of nutrients and traditional natural medicines in the holistic management of cancer in women, underscoring the importance of a multifaceted approach that, in addition to targets the disease, nevertheless also promotes general health and wellbeing. Subsequently, it delves into specific medicinal herbs that have shown promise in the management of lung cancer, examining their therapeutic properties and potential benefits. As breast cancer remains the most common cancer among women globally, the exploration continues with various medicinal herbs traditionally used or currently researched for their efficacy in managing breast cancer, offering insights into their mechanisms and applications. The discussion further investigates the role

of medicinal herbs in the management of liver and pancreatic cancers, focusing on herbs that can support liver function and potentially inhibit cancer progression. Cancers of the ear, nose, and throat present unique challenges, and this volume explores how traditional medicinal plants and herbs can be used as part of a comprehensive therapy plan to help control certain malignancies.

The third part of this volume addresses the use of medicinal herbs in managing infectious diseases, hormonal disorders, and body care, all of which are crucial aspects of women's health. Tuberculosis remains a significant health issue in many parts of the world, and this section examines the potential of medicinal herbs in the management of TB, highlighting those that enhance the immune response and assist in combating the infection. This section examines the use of medicinal herbs in controlling diabetes, with an emphasis on herbs that help regulate blood sugar levels and enhance metabolic health, as diabetes is a condition that is becoming more and more common among women. This section also addresses many herbal treatments supports both hormonal balance and overall wellness and that can help control the symptoms of polycystic ovary syndrome, a common hormonal disorder that impacts women who are fertile. Vaginal health is a crucial aspect of women's health, and this part explores herbal remedies that can support vaginal health and hygiene, preventing infections and promoting a balanced microbiome. Integrating the discussion of nutrients, herbs, and natural essential oils, this volume highlights their combined potential to support various aspects of female health, from skincare to stress relief.

The final part of this volume broadens the scope to include the benefits of everyday dietary components such as spices, cereals, phytochemicals, and milk products, emphasizing their role in promoting women's health. Spices are more than just flavor enhancers; they are potent sources of phytochemicals with health benefits. This section explores how various spices can contribute to women's health, from anti-inflammatory properties to enhancing digestion. Cereals and pseudocereals are staple foods in many diets, and their nutritional benefits are discussed with a focus on how they support female health through essential nutrients and fiber. Phytochemicals, bioactive compounds found in plants, have various health benefits, and this volume explores their role in female health, from antioxidant properties to hormone regulation. Dairy products, rich sources of calcium and other nutrients essential for bone health and overall well-being, are

also discussed, particularly in the context of female health. Lastly, garlic (*Allium sativum*) has been traditionally used to manage blood pressure, and this volume delves into its specific benefits for women, highlighting its role in cardiovascular health.

The journey through volume 3 of *Holistic Approaches for Women's Sustainable Health* reflects a commitment to integrating diverse knowledge systems for the betterment of women's health. By combining modern nutritional science with traditional natural medicines, this volume aims to provide a comprehensive resource for healthcare practitioners, researchers, and women seeking to enhance their health holistically. Through this integrative approach, we can aspire to achieve sustainable health and well-being for women across their lifespan. The entire 4-volume set consists of:

Holistic Approaches for Women's Sustainable Health

Volume 1: Foundations, Innovations, Challenges, and Management

Volume 2: Advancements, Socioeconomic Impacts, and Innovative Strategies

Volume 3: Herbs, Spices, Phytochemicals, and Cereals: Body Care, Cancer Prevention, and Hormonal Health

Volume 4: Benefits of Vegetables, Medicinal Plants, and Trees

Ultimately, this 4-volume set is a celebration of the strength, resilience, and boundless potential of women. It is a call to action, a source of knowledge, and a testament to the transformative power of holistic healthcare. Together, let us embark on a journey toward a future where women's health is embraced, understood, and elevated to its rightful place of honor.

—*Editors*

PART I
INTRODUCTION

CHAPTER 1

Role of Nutrients and Traditional Natural Medicines for Female Health: A Review

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ABSTRACT

In the pursuit of optimal female health, a holistic approach encompassing both essential nutrients and traditional natural medicines has gained significant recognition in recent years. This overview explores the synergistic potential of integrating nutrition and traditional healing practices to promote well-being and prevent disease. It delves into the rich tapestry of traditional medicine systems from around the world, emphasizing their cultural significance and the accumulated wisdom of generations. The chapter also highlights the scientific underpinnings of these traditional remedies, revealing their potential in modern healthcare paradigms. Traditional natural medicines, often derived from plants, animals, or minerals, offer a comprehensive spectrum of therapeutic modalities, addressing the root causes of ailments rather than merely alleviating symptoms. This overview advocates for collaborative research efforts, interdisciplinary dialogues, and cross-cultural exchanges to harness the collective wisdom of the past and the advancements of the present, thereby fostering a holistic paradigm of health that addresses the multifaceted dimensions of human well-being. By embracing both nutrients and traditional natural medicines, we can move closer to achieving a state of optimal health and wellness.

Holistic Approaches for Women's Sustainable Health Volume 3: Herbs, Spices, Phytochemicals, and Cereals: Body Care, Cancer Prevention, and Hormonal Health. Megh R. Goyal, Anamika Chauhan, and Kamalesh Raja (Eds.)

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for individuals and societies alike, acknowledging the profound interconnectedness between human beings and the natural world.

1.1 INTRODUCTION

The pursuit of holistic well-being and the maintenance of optimal health have been enduring goals of human civilization. In recent times, a compelling shift toward a holistic approach that integrates both essential nutrients and traditional natural medicines has emerged as a promising paradigm in healthcare. This holistic viewpoint emphasizes the significance of taking the full person into account, considering physical, mental, and emotional components, and recognizes that health is more than just the absence of sickness. It stands in contrast to reductionist medical approaches that often address symptoms in isolation. Rooted in ancient wisdom and informed by contemporary scientific understanding, this holistic approach recognizes the interconnectedness between human health and the broader natural world. This introduction sets the stage for an exploration of the synergistic potential of combining nutrients and traditional natural medicines to promote well-being and prevent disease, highlighting the cultural significance of traditional healing practices and the scientific underpinnings of both modalities [35].

This chapter discusses role of nutrients and traditional natural medicines in female health.

1.2 OVERVIEW ON THE HOLISTIC APPROACH TO FEMALE HEALTH

The state of someone's body, mind, emotions, and even soul is all considered by the holistic approach to human health, which is an all-encompassing and integrated. This approach seeks to move beyond the reductionist model of healthcare, which often focuses on isolated symptoms or specific diseases, and instead embraces the interconnectedness of all facets of a person's life [39].

- **Holistic view of health:** The fundamental tenet of the holistic approach is that health is a dynamic condition of balance and harmony within the body and mind, rather than only the absence of sickness. "According to this perspective, health is defined by

the World Health Organization as a condition of whole physical, mental, and social well-being rather than only the absence of illness or infirmity” [86]. This definition underscores the idea that health is a multifaceted concept that goes beyond the absence of illness to encompass mental and social dimensions.

- **Consideration of multiple factors:** The holistic approach acknowledges that a wide range of elements, including the environment, cultural traditions, heredity, lifestyle, and lifestyle choices, have an impact on female health. It acknowledges that these factors interact and intertwine, shaping an individual’s overall health. For example, diet, exercise, stress levels, and social connections all play integral roles in determining a person’s well-being [9].
- **Emphasis on prevention:** Prevention is a central tenet of the holistic approach to health. Rather than waiting for illness to manifest and then treating it, this perspective advocates for proactive measures to maintain health and prevent disease. This might include dietary plans that promote the body’s innate capacity for healing and balance, stress-reduction methods, and lifestyle adjustments [83].
- **Holistic healthcare modalities** incorporate a diverse range of modalities and practices, including but not limited to nutrition, exercise, mindfulness, meditation, herbal medicine, acupuncture, and conventional medical practices including Traditional Chinese Medicine (TCM) and Ayurveda. As these modalities are often chosen based on their ability to address the root causes of ailments and promote overall well-being rather than merely alleviating symptoms [10].
- **Integrative approach:** An essential aspect of the holistic approach is its integrative nature. It encourages collaboration between different healthcare disciplines, recognizing that no single approach has all the answers. Integrative healthcare teams may include conventional medical practitioners, naturopaths, nutritionists, mental health professionals, and complementary and alternative medicine providers, everyone collaborating to meet the patient’s various demands [61].

1.3 SIGNIFICANCE OF INTEGRATING NUTRIENTS AND TRADITIONAL NATURAL MEDICINES

TABLE 1.1 Integrating Nutrients and Traditional Natural Medicines

Aspect	Explanation	Significance	References
Cultural preservation	Integrating traditional medicines helps preserve cultural knowledge and practices	It maintains the richness of cultural heritage while advancing healthcare	[90]
Enhanced absorption	Nutrients can improve the absorption and efficacy of certain natural medicines	This ensures that traditional remedies are more effective and efficient in addressing health issues	[89]
Evidence-based approach	Combining scientific research with traditional knowledge provides an evidence-based approach to healthcare	It bridges the gap between tradition and modern medicine, offering validated treatment options	[20]
Holistic healthcare	Combining nutrients and traditional medicine promotes holistic healthcare by addressing both nutritional deficiencies and specific health issues	It supports the body's overall well-being and helps prevent and treat various health conditions	[84]
Nutrient deficiency correction	Traditional medicines can sometimes deplete essential nutrients. Integrating nutrients helps correct these deficiencies	Ensuring nutrient balance is crucial for long-term health and to prevent adverse effects of traditional remedies	[89]
Personalized medicine	Tailoring nutrient and natural medicine combinations to an individual's specific needs and genetics	This strategy lowers the possibility of negative effects while improving therapeutic efficacy	[62]
Reduced side effects	Nutrients can help mitigate potential side effects of natural medicines	This integration can make traditional remedies safer and better tolerated by patients	[87]
Synergistic effects	Nutrients and natural medicines often work together synergistically, enhancing their individual benefits	Better health outcomes and a potential decrease in the requirement for pharmacological treatments can result from this synergy	[81]

Source: World Health Organization (WHO) [90].

1.4 TRADITIONAL NATURAL MEDICINES: CULTURAL SIGNIFICANCE AND WISDOM

1.4.1 EXPLORATION OF TRADITIONAL HEALING PRACTICES FROM AROUND THE WORLD

Traditional healing practices are deeply ingrained in cultures world-wide and offer unique insights into humanity's relationship with nature and the body. These practices, passed down through generations, vary widely in their approaches, encompassing herbal remedies, spiritual rituals, and holistic philosophies. This exploration delves into a selection of traditional healing practices from different regions, shedding light on their historical roots, cultural significance, and enduring relevance.

- **Ayurveda in India:** “Ayurveda is one of the world’s oldest holistic medicine systems, having been practiced for over 5000 years.” Ayurveda is based on ancient Indian philosophy and emphasizes harmony between the body, mind, and spirit. Central to Ayurveda is the belief in three doshas—“Vata, Pitta, and Kapha”—which represent individual constitutions and imbalances. Ayurvedic practitioners use herbal treatments, dietary recommendations, and lifestyle modifications to restore harmony [23]. Ayurveda’s holistic approach has gained recognition globally for its potential to complement modern medicine.

The ancient wisdom of Ayurveda, Unani, and Siddha traditions forms the foundation of Indian traditional medicine, which takes a holistic approach to treating human health by taking into account mental, bodily, and spiritual aspects of wellbeing. Ayurveda, dating back over 5000 years, emphasizes the balance of bodily energies or “doshas” and prescribes natural remedies, including herbal formulations, dietary recommendations, and lifestyle practices, tailored to an individual’s constitution [13]. Siddha medicine, originating in South India, similarly addresses health by balancing the three humors (Vata, Pitta, and Kapha) and incorporates herbal medicine, mineral substances, and therapeutic practices [11]. Unani medicine, influenced by Greek and Islamic traditions, focuses on humoral theory and utilizes natural substances, especially herbs and minerals, to restore the balance

of bodily fluids [1]. While deeply rooted in cultural and historical significance, these traditional systems are gaining recognition in modern scientific research. Studies have highlighted the potential of Indian traditional medicines in managing various health conditions, including the use of turmeric in inflammation management and triphala in digestive health [35, 90].

- **TCM:** Over thousands of years, China has developed a sophisticated medical system known as TCM. It encompasses acupuncture, herbal medicine, dietary therapy, and qigong exercises. TCM is grounded in the concept of Qi (life force) and the harmony of Yin and Yang energies. Practitioners diagnose and treat illnesses by restoring this balance. Acupuncture has gained international acceptance for its efficacy in pain management and various health conditions [44].

China's cultural and philosophical traditions form the foundation of TCM, an age-old, holistic healing system that has developed over thousands of years. Considering the body as a complex system with interwoven physical, mental, emotional, and environmental elements, TCM approaches human health from a holistic perspective. Qi, the essential life energy that runs through the body's meridians and the dynamic balance between Yin and Yang forces, is central to TCM theory. Among the many treatment modalities included in TCM, herbal medicine and acupuncture are the most well-known. The herbal medicine in TCM relies on a vast pharmacopeia of natural substances, including herbs, minerals, and animal products, to restore balance and promote health. These substances are often combined into intricate formulas tailored to an individual's specific patterns of disharmony. With acupuncture, imbalances are corrected and Qi flow is stimulated by carefully inserting tiny needles into designated acupoints along meridians. Other TCM practices include dietary therapy, qigong exercises, and lifestyle recommendations—all of which aim to maintain health, prevent disease, and address the root causes of ailments [40]. The holistic perspective of TCM views the body as a self-regulating system capable of healing when balance is restored. Modern scientific research has increasingly explored the efficacy of

TCM therapies, investigating herbal remedies like ginseng for energy and astragalus for immune support [36, 45]. Within the holistic healthcare framework, TCM provides a sophisticated and well-proven method that respects the interdependence of the environment, the body, and the mind with an emphasis on maintaining health and reestablishing equilibrium.

- **Native American healing traditions:** Indigenous cultures in North and South America have diverse healing practices, deeply rooted in a profound connection with nature. These traditions often involve the use of medicinal plants, sweat lodges, and spiritual ceremonies. The Cherokee, for example, use herbs like yarrow and blackberry for healing, and their Green Corn Ceremony is a spiritual and physical renewal practice [48]. Native American healing emphasizes the importance of harmony between humans and the environment.
- **African traditional medicine:** Africa boasts a wealth of traditional healing practices influenced by diverse cultures and belief systems. Practices range from divination and rituals to the use of specific plants for medicinal purposes. Traditional healers, known as “sangomas” in South Africa, often serve as community leaders and offer treatments for various ailments, drawing on ancestral knowledge [29]. African traditional medicine showcases the role of spirituality and community in healthcare.

1.4.2 CULTURAL SIGNIFICANCE AND HISTORICAL CONTEXT OF TRADITIONAL REMEDIES

- **Cultural significance:** Traditional remedies are deeply rooted in the cultural fabric of societies, representing a repository of indigenous knowledge passed down through generations. They are often intertwined with cultural identity, spirituality, and community cohesion. These practices reinforce cultural values and strengthen the connection between individuals and their heritage [85]. For example, the use of specific plants in Native American healing traditions is not just about physical healing but also about maintaining a spiritual connection to the land and ancestors.

- **Historical context:** The historical context of traditional remedies is a testament to human adaptability and resilience. Many traditional healing practices have ancient origins and have evolved in response to changing environments, migrations, and encounters with other cultures. For instance, “TCM traces its roots back thousands of years and has been shaped by various historical influences, including Taoist philosophy, the spread of Buddhism, and interactions with neighboring cultures” [86]. Understanding this historical context helps contextualize the development of these practices.
- **Preservation of traditional knowledge:** Traditional remedies also serve as a vital repository of traditional knowledge related to medicinal plants, animal products, and healing techniques. This knowledge is often transmitted orally or through apprenticeships within communities. Efforts to document and preserve this knowledge are critical not only for the cultural heritage of communities but also for the advancement of modern medicine. Ethnobotanical studies, for instance, have been instrumental in recording traditional plant uses and guiding conservation efforts [30].
- **Community well-being:** Traditional remedies are integral to community well-being, offering accessible and culturally relevant healthcare options. They are often the first line of defense against common health issues and can address the physical, psychological, and spiritual aspects of health. Additionally, they foster a sense of empowerment and self-reliance within communities. Traditional healers, recognized and respected members of their communities, play a pivotal role in providing care and guidance [21].

1.4.3 YOGA AND MEDITATION

Yoga and meditation stand as integral pillars within the holistic approach to human health, intertwining the ancient wisdom of traditional healing systems with contemporary scientific understanding. Yoga, rooted in Indian culture, offers a comprehensive system that seeks to harmonize

the physical, mental, and spiritual dimensions of well-being. Through physical postures (asanas), controlled breathing exercises (pranayama), ethical principles (yamas and niyamas), and meditation techniques, yoga fosters an alignment between individuals and the cosmos, emphasizing holistic wellness [27, 81].

Similarly, meditation, a practice spanning cultures and traditions, holds a profound place in holistic healthcare. Its core aim is the cultivation of mindfulness, self-awareness, and inner tranquility. Meditation techniques nurture mental clarity, emotional equilibrium, and spiritual insight, embodying the holistic principle of inner harmony [26]. Beyond their cultural significance, scientific research underscores the myriad health benefits of yoga and meditation. Studies reveal their capacity to reduce stress, ameliorate mental health conditions, enhance physical flexibility and balance, and promote overall well-being [14]. As holistic healthcare continues to evolve, yoga and meditation serve as essential tools that honor ancient wisdom while providing evidence-based avenues to nurture holistic health.

1.4.4 ALLOPATHY DRUGS

Allopathy, often referred to as conventional or Western medicine, is a well-established healthcare system that relies on pharmaceutical drugs as a primary mode of treatment for various diseases and conditions. Allopathic drugs are typically synthesized chemical compounds designed to target specific disease mechanisms or symptoms. These drugs undergo rigorous testing through clinical trials to establish safety and efficacy. While allopathy has made remarkable advancements in managing acute and critical health issues, it often emphasizes symptom management and disease treatment rather than prevention or addressing underlying causes. Despite its effectiveness in many cases, concerns have arisen about potential side effects, drug interactions, and overreliance on pharmaceutical interventions. In the context of the holistic approach to health, allopathy can complement other healthcare modalities by providing acute care and life-saving treatments, but it may benefit from a more integrated approach that incorporates nutrition, lifestyle modifications, and traditional natural medicines to promote long-term well-being and prevent chronic diseases [41].

1.4.5 SCIENTIFIC FOUNDATIONS OF TRADITIONAL REMEDIES

TABLE 1.2 Scientific Basis with Its Description and Examples

Scientific Foundations of Traditional Remedies	Description of Scientific Basis	Examples and Citations
Active compounds and pharmacology	Many traditional remedies contain scientifically recognized active compounds with pharmacological properties	Curcumin, an antioxidant and anti-inflammatory compound found in turmeric [2]
Antimicrobial properties	Traditional remedies often exhibit antimicrobial properties, scientifically validated in modern research	Honey's antimicrobial activity is attributed to hydrogen peroxide and antimicrobial peptides [49]
Cultural knowledge of plant properties	Indigenous cultures often possess in-depth knowledge of local plants with medicinal properties	The rosy periwinkle led to the development of metformin, an antidiabetic drug [31]
Empirical observations	Traditional remedies are based on centuries of empirical observations and practical experiences	Willow bark contains salicin, a precursor to aspirin [50]
Synergy and combinatorial effects	Traditional remedies often rely on the synergy of multiple ingredients for enhanced efficacy	Certain combinations of herbs in TCM exhibit greater therapeutic effects [46]

1.4.6 EXAMINATION OF THE BIOACTIVE COMPOUNDS IN TRADITIONAL NATURAL MEDICINES

TABLE 1.3 Bioactive Compounds with Its Description/Pharmacological Properties and Examples

Bioactive Compounds	Description of Compounds and Pharmacological Properties	Examples and Citations
Chemical diversity	Traditional natural medicines contain diverse bioactive compounds, including alkaloids, flavonoids, terpenoids, and polyphenols	Alkaloids like morphine (from opium poppy) have analgesic properties [84] Flavonoids such as quercetin exhibit antioxidant and anti-inflammatory effects [3]
Mechanisms of action	Understanding mechanisms of action is crucial for evaluating therapeutic potential	Curcumin, derived from turmeric, exhibits anti-inflammatory properties through various molecular pathways [15] Quinine, obtained from cinchona bark, treats malaria by inhibiting parasite growth [4]
Pharmacological properties	Bioactive compounds often possess specific pharmacological properties contributing to therapeutic effects	Artemisinin, from sweet wormwood, has potent antimalarial properties [51] Resveratrol, found in grapes and red wine, benefits cardiovascular health [11]

1.4.7 MODERN SCIENTIFIC STUDIES SUPPORTING THE EFFICACY OF TRADITIONAL REMEDIES

TABLE 1.4 Traditional Medicines

Traditional Remedy	Health Condition Treated	Scientific Study Supporting Efficacy	References
Echinacea	Common cold	Echinacea extract has been shown in meta-analyses to lessen the intensity and duration of common cold symptoms	[82]
Ginger	Nausea and vomiting	Ginger can help reduce nausea and vomiting brought on by chemotherapy, according to many studies	[52]
Honey	Wound healing	Honey’s antibacterial and anti-inflammatory qualities have been demonstrated in clinical experiments to be beneficial in the healing of wounds	[37]
Turmeric (curcumin)	Inflammation and arthritis	Patients with rheumatoid arthritis were shown to benefit from curcumin’s anti-inflammatory properties in a randomized controlled experiment	[16]

1.4.8 AYURVEDIC MEDICINES

Ayurvedic medicine, originating from ancient Indian traditions, embodies the holistic approach to human health by focusing on the mental, emotional, and spiritual facets of wellbeing. Ayurvedic remedies are predominantly derived from natural sources such as herbs, minerals, and plant extracts, often prepared through traditional processes like decoctions and oil infusions [17]. These remedies are designed to balance an individual’s unique constitution, or “dosha,” consisting Vata, Pitta, and Kapha elements, to promote optimal health [83]. Ayurveda underscores the importance of individualized treatment and prevention, aiming to address the root causes of ailments rather than merely alleviating symptoms. While Ayurvedic medicines have a rich cultural and historical significance, contemporary scientific research is increasingly exploring their efficacy and safety. Studies have highlighted the potential of Ayurvedic herbs and formulations in managing various health conditions, such as turmeric for its anti-inflammatory properties and ashwagandha for stress reduction [18, 34]. Within the holistic healthcare framework, Ayurvedic medicines offer valuable natural alternatives that align with the principles of prevention and holistic well-being.

1.4.9 TRADITIONAL MEDICINE’S INCORPORATION INTO EVIDENCE-BASED HEALTHCARE

TABLE 1.5 Aspects of Integration of Traditional Medicines

Aspect of Integration	Description	References
Collaboration and integration	Encouraging collaboration between traditional and conventional healthcare systems for comprehensive patient care	[5]
Education and training	Providing education and training for traditional medicine practitioners to ensure safe and effective practice	[83]
Healthcare policy and insurance	Developing policies that recognize and reimburse traditional medicine services through health insurance systems	[63]
Recognition of traditional medicine	Acknowledging traditional medicine as a valid and valuable component of healthcare systems	[82]
Regulation and standardization	Developing regulatory frameworks and quality standards for traditional medicines and practitioners	[84]
Research and evidence gathering	Carrying out scientific studies to verify the security and effectiveness of conventional treatments	[64]

1.4.10 ESSENTIAL ELEMENTS OF TAI CHI EXERCISE AND ITS HEALTH ADVANTAGES

- **Improves balance and strength:** Tai Chi’s slow, deliberate movements and weight shifts engage various muscle groups, enhancing both balance and strength. By promoting stability and coordination, it reduces the risk of falls, particularly in older adults, while also fortifying muscles throughout the body, especially in the legs and core. This not only fosters physical resilience but also supports independence and mobility in daily activities.
- **Enhances flexibility:** Through its gentle, flowing motions, Tai Chi facilitates flexibility by systematically stretching muscles and joints. This gentle stretching alleviates stiffness, enhances joint range of motion, and diminishes the likelihood of injury. Over time, regular practice can lead to increased suppleness, allowing for greater ease of movement and improved overall physical function.
- **Stress reduction:** Tai Chi serves as a powerful tool for stress management, combining deep breathing, meditative movements,

and focused awareness. By inducing a state of relaxation and mental calmness, it aids in reducing cortisol and other stress-related hormone levels. This holistic approach to stress reduction fosters emotional well-being, promotes mental clarity, and cultivates a sense of inner peace amidst life's challenges.

- **Mindfulness and meditation:** Often referred to as “moving meditation,” Tai Chi cultivates mindfulness by encouraging practitioners to be fully present in each moment. By synchronizing movement with breath and awareness, it fosters a profound sense of mindfulness, promoting mental clarity and emotional balance. This meditative aspect of Tai Chi provides a sanctuary for self-reflection, helping individuals develop resilience in the face of stress and adversity.
- **Pain management:** Tai Chi offers a gentle yet effective approach to managing chronic pain conditions such as arthritis, back pain, and fibromyalgia. Its gentle movements, combined with an emphasis on body awareness, help alleviate muscular tension, improve posture, and reduce discomfort. Additionally, the mind-body connection fostered by Tai Chi can modulate pain perception, providing relief and improving the general quality of life for people who have chronic pain.
- **Cardiovascular health:** While Tai Chi is gentle on the joints, it still provides a moderate aerobic workout when practiced consistently and with proper technique. By elevating heart rate, improving circulation, and lowering blood pressure, Tai Chi enhances cardiovascular health. Its rhythmic movements stimulate the cardiovascular system, promoting endurance, stamina, and overall heart health without placing undue stress on the body.
- **Boosts immune function:** Research suggests that regular practice of Tai Chi can bolster immune function, potentially reducing the risk of illness and enhancing the body's ability to fight off infections. The gentle, rhythmic movements of Tai Chi, combined with its stress-reducing effects, may support immune system regulation, promoting overall health and resilience against pathogens.
- **Emotional well-being:** Tai Chi fosters emotional well-being by promoting a harmonious balance between the mind and body. Its

meditative qualities and focus on mindfulness help individuals manage emotions effectively, cope with stressors, and cultivate a positive outlook on life. By fostering a sense of inner peace and emotional resilience, Tai Chi empowers individuals to navigate life's challenges with grace and equanimity.

- **Social connection:** Tai Chi classes offer more than just physical exercise; they provide a supportive community where individuals can connect with others who share similar health goals. This sense of camaraderie and mutual support fosters a positive environment for personal growth and well-being. Additionally, numerous health advantages of social connection have been identified, such as lowered stress levels, elevated moods, and increased general quality of life [27].

1.5 FUNCTIONS OF NUTRIENTS IN PROMOTING HEALTH AND PREVENTING ILLNESSES

1.5.1 ESSENTIAL NUTRIENTS: VITAMINS, MINERALS, AND MACRONUTRIENTS

TABLE 1.6 Essential Nutrients: Vitamins, Minerals, and Macronutrients

Nutrient Type	Role in the Body	Examples	References
Vitamins			
Vitamin A	Immune system, skin health, and vision	Sweet potatoes, spinach, and carrots	[65]
Vitamin C	Immune support and collagen production	Strawberries and citrus fruits	[66]
Vitamin D	Immune function and bone health	Fatty fish and sunlight	[67]
Vitamin E	Skin health and antioxidant	Seeds (e.g., sunflower seeds), spinach nuts (e.g., almonds, peanuts)	[68]
Vitamin K	Bone health and blood clotting	Broccoli, Brussels sprouts, and leafy greens (e.g., kale, spinach)	[69]
Vitamin B1	Nerve function and energy metabolism	Nuts, beans and whole grains, pork	[70]
Vitamin B2	Tissue repair and energy production	Lean meats, leafy greens, dairy products	[71]
Vitamin B3	Skin health and DNA repair	Whole grains, nuts, meat, fish, poultry	[72]

TABLE 1.6 (Continued)

Nutrient Type	Role in the Body	Examples	References
Vitamin B5	Energy metabolism and fatty acid synthesis	Vegetables and meat, whole grains	[73]
Vitamin B6	Immune function and neurotransmitter synthesis,	Bananas, potatoes, poultry, fish	[74]
Vitamin B7	Skin health and fatty acid synthesis	Sweet potatoes, nuts, eggs, liver	[75]
Vitamin B9	Cell division, DNA synthesis	Legumes, leafy greens, and fortified cereals	[76]
Vitamin B12	Nerve activity and formation of red blood cells	Fortified foods and animal products (meat, dairy)	[77]
Minerals			
Calcium	Muscle function and bone health	Leafy greens and dairy products	[78]
Iron	Energy production and Oxygen transport	Fortified cereals, red meat, and beans	[79]
Potassium	Blood pressure regulation and nerve function	Bananas, potatoes, and spinach	[80]
Macronutrients			
Carbohydrates	Energy source and brain function	Whole grains, fruits, and vegetables	[24]
Proteins	Tissue repair and immune function	Lean meats, dairy, legumes, and nuts	[28]
Fats	Energy storage and organ protection	Avocados, olive oil, and fatty fish	[53]

1.6 INTERCONNECTION BETWEEN NUTRITION AND PHYSIOLOGICAL BALANCE

The interconnection between nutrition and physiological balance is a complex and multifaceted relationship that profoundly influences overall well-being and health. Nutrition plays a pivotal role in maintaining the body’s physiological equilibrium, and conversely, the body’s physiological processes dictate its nutritional requirements.

- **Nutrient supply and cellular function:** “The macronutrients—proteins, fats, and carbohydrates—and micronutrients—minerals and vitamins—necessary” for the best possible functioning of cells and tissues are provided through proper diet. These nutrients serve as building blocks, energy sources, and cofactors for enzymatic reactions [27]. For instance, carbohydrates supply glucose,

the primary energy source for cells, whereas proteins include the amino acids needed for protein synthesis as well as a number of physiological processes.

- **Homeostasis and regulation:** Nutritional intake and metabolism contribute significantly to maintaining homeostasis, the capacity of the body to control internal factors such as blood sugar levels, pH, and temperature. For instance, insulin, a hormone produced in response to carbohydrate intake, helps regulate blood glucose levels [84]. Adequate vitamin and mineral intake is crucial for enzymatic reactions that control metabolic pathways, ensuring that homeostasis is maintained.
- **Immune system and inflammation:** Nutrition profoundly influences the immune system's function. Deficiencies or imbalances in specific nutrients can compromise immune responses [54]. On the other hand, a healthy diet boosts immunity, assisting the body in fighting off infections and illnesses. For example, vitamin C is essential for both decreasing inflammation and immune cell function.
- **Hormonal regulation:** Nutrition influences the production and secretion of hormones that regulate various physiological processes. Adequate nutrient intake is necessary for the synthesis of hormones such as thyroid hormones, sex hormones, and growth hormone [38]. Hormonal imbalances resulting from inadequate nutrition can lead to various health issues.
- **Genetic and epigenetic influences:** Nutrition can also have epigenetic effects, modifying gene expression patterns that influence physiological processes [55]. Dietary choices can impact DNA methylation and histone modification, which, in turn, affect susceptibility to diseases and physiological balance.

1.7 DIETARY GUIDELINES FOR PREVENTION OF DISEASES AND OVERALL WELL-BEING

A diet rich in nutrients and well-balanced is essential for preventing illness and promoting general health. Dietary guidelines are essential tools for individuals and healthcare professionals to optimize nutrition, reduce the risk of chronic diseases, and support physical and mental health.

- **Emphasize plant-based foods:** A diet rich in fruits, vegetables, whole grains, legumes, nuts, and seeds provides essential vitamins, minerals, fiber, and antioxidants. These components lower the chance of heart disease, diabetes, obesity, and numerous cancer types [6].
- **Control portion sizes:** Moderation in portion sizes helps maintain a healthy weight and prevents overconsumption of calories, which is a significant risk factor for various chronic diseases [56].
- **Prioritize lean proteins:** Fish, chicken, tofu, lentils, and low-fat dairy products are examples of lean protein sources that are important for maintaining muscle mass and that minimize saturated fat intake while providing vital amino acids [32].
- **Limit saturated and trans fats:** Lowering cholesterol and the risk of heart disease can be achieved by cutting back on saturated and trans fats, which are frequently present in processed snacks, fried foods, and fatty meat portions [57].
- **Choose healthy fats:** Add healthy fat-containing foods such as avocados, nuts, seeds, and olive oil. Both brain and cardiovascular health are enhanced by these lipids [42].
- **Monitor sugar intake:** Consuming too much added sugar is linked to obesity and a higher chance of developing type 2 diabetes. Reduce your intake of processed meals, sweets, and sugary drinks [58].
- **Reduce sodium intake:** Hypertension (high blood pressure) can be brought on by a high salt diet. Heart health is improved by reducing the amount of salt in processed meals and adding flavor with herbs and spices [33].
- **Stay hydrated:** Maintaining adequate hydration is crucial for general health. Water aids in temperature control, circulation, and digestion. Make it a point to stay hydrated all day [86].
- **Plan balanced meals:** Creating balanced meals that include a variety of foods ensures the intake of a wide range of nutrients. Incorporate a mix of carbohydrates, proteins, fats, and fiber [19].
- **Practice Mindful Eating:** Pay attention to hunger cues, savor food flavors, and eat slowly. Mindful eating promotes healthy eating behaviors and weight management [43].

- **Individualized approach:** Recognize that dietary needs vary among individuals based on age, activity level, and health status. Consult a registered dietitian for personalized guidance [85].

1.8 SYNERGY AND INTEGRATION

To maximize patient care and outcomes, synergy and integration in healthcare offer a potent strategy that combines the advantages of several healthcare modalities, such as lifestyle modifications, complementary and alternative treatments, and conventional medication [12].

- **The concept of synergy:** In the context of medicine, synergy is the cooperative interplay of many modalities or therapies that produce a result bigger than the sum of their separate impacts [61]. It recognizes that certain combinations of therapies can increase the effectiveness of therapy, reduce adverse effects, and promote patient satisfaction.
- **Integration of conventional medicine and complementary therapies:** One key aspect of synergy and integration is the collaboration between conventional medicine and complementary therapies. Conventional medicine, with its evidence-based practices and pharmaceutical interventions, excels in acute care and the treatment of many diseases. However, it may fall short in addressing chronic conditions and the holistic needs of patients. Complementary therapies, acupuncture, chiropractic adjustments, herbal remedies, and mind–body therapies like yoga and meditation are examples of alternative medicine that emphasize health, sickness prevention, and the root causes of disease.

These treatments frequently stress the significance of the mind and body link and the influence of lifestyle choices on health [7].

- **Evidence-based synergy:** Synergy and integration are most effective when supported by rigorous scientific research. This involves carrying out clinical trials and research to assess integrative healthcare techniques' efficacy, safety, and affordability. Evidence-based practices help identify which combinations of treatments are most beneficial for specific conditions and patient populations.
- **Patient-centered care:** A patient-centered approach is fundamental to synergy and integration. Healthcare professionals

collaborate closely with patients to create personalized treatment programs that consider their particular requirements, pH references, and values. This encourages a sense of cooperation between patients and providers and individuals have power to actively engage in the healthcare decisions [22].

- **Multidisciplinary healthcare teams:** Synergy and integration often involve multidisciplinary healthcare teams that include medical doctors, nurses, nutritionists, physical therapists, mental health professionals, and complementary therapists. Each team member contributes their expertise to address different aspects of a patient’s health, leading to comprehensive and holistic care [59].
- **Challenges and considerations:** While synergy and integration offer numerous benefits, challenges exist. These include issues related to standardization, credentialing of complementary practitioners, insurance coverage, and cultural acceptance of integrative healthcare. Overcoming these challenges requires ongoing dialogue, research, and policy development [25].

1.9 CHALLENGES

TABLE 1.7 Challenges in Integrative Health Using Traditional Chinese Medicines

Challenge	Description
Communication and coordination of care	Effective communication and coordination among conventional healthcare providers and CAM practitioners can be challenging, leading to fragmented care [59]
Cost and affordability	CAM treatments may not be affordable for all patients, and some can be costly, leading to financial barriers to access [60]
Credentialing and licensing	Determining the qualifications and credentials of CAM practitioners can be challenging, as there is no uniform credentialing system across different therapies [8]
Cultural acceptance	CAM therapies often have cultural or traditional roots that may not be widely accepted or understood by patients and healthcare providers from different cultural backgrounds [25]
Ethical and legal considerations	Ethical dilemmas can arise when patients pursue CAM treatments that conflict with conventional medical recommendations, raising questions about informed consent and safety [34]
Insurance coverage	Many CAM treatments may not be covered by health insurance, limiting accessibility for patients who rely on insurance for healthcare services [81]

TABLE 1.7 *(Continued)*

Challenge	Description
Lack of standardization	Inconsistent treatment and safety risks may result from variations in the education, certification, and oversight of practitioners of complementary and alternative medicine (CAM) [61]
Patient information and well-informed choices	For shared decision-making to occur, patients must be fully educated about CAM alternatives, risks, and possible benefits [47]
Research and evidence-based practices	Some CAM therapies lack rigorous scientific evidence of their safety and efficacy, making it difficult to integrate them into evidence-based healthcare [82]

1.10 DISCUSSIONS

A holistic approach to human health emphasizes the interconnectedness of various aspects of well-being, including nutrition and traditional natural medicines. This method acknowledges that being in a condition of balance and harmony both physically and mentally constitutes optimal health, rather than just the absence of sickness. Nutrition plays a pivotal role in this holistic framework, as it provides the essential building blocks for bodily functions and supports overall vitality. A varied and well-balanced diet full of vital vitamins, minerals, and nutrients is critical for immune system support and physical well-being.

In tandem with nutrition, traditional natural medicines have been used for centuries in many cultures to promote health and treat various ailments. These remedies often harness the healing properties of plants, herbs, and other natural substances. While scientific research continues to explore the efficacy and safety of these traditional practices, they offer a complementary approach to modern medicine, addressing not only physical symptoms but also emotional and spiritual well-being.

A holistic approach encourages individuals to consider their physical, emotional, and mental health as interconnected elements of their overall well-being. It promotes mindfulness, stress management, and lifestyle choices that support health and vitality. Additionally, it acknowledges the importance of preventative measures, such as a healthy diet, regular physical activity, and natural remedies, to maintain optimal health and prevent the onset of chronic diseases. By embracing both nutrition and traditional natural medicines within a holistic framework, individuals can take proactive steps toward achieving a balanced and vibrant state of health.