3.0 REVIEW OF SCIENTIFIC LITERATURE

3.1 SCIENTIFIC LITERATURE

Over the past century, figures like B.K.S. Iyengar, T.K.V. Desikachar, and Pattabhi Jois have brought yoga to global prominence by introducing adaptations that align it with modern lifestyles, thereby increasing its accessibility and appeal. This expansion has spurred scientific interest, positioning yoga as an important component of complementary and alternative medicine (Field, 2016) (Pandurangi et al., 2017).

Researchers have extensively studied the diverse health benefits of yoga, primarily as a traditional (in-person) and holistic approach to mental and physical well-being. Research highlights its effectiveness in managing chronic conditions such as pain, diabetes, aging, heart disease, and mental health issues, including anxiety and depression (RB Saper & C. Lemaster, 2017), (Innes & Selfe, 2016), (Cramer et al., 2015), (McCall et al., 2013), (Tolahunase et al., 2017). Additionally, studies have shown positive effects of yoga on the immune system, supporting its integration into healthcare (Hsueh et al., 2021).

However, yoga's adaptability (variability) across regions also introduces significant challenges for the reliability of outcomes. Variability in styles, delivery modes, and cultural contexts complicates the standardization required for reliable studies (Cramer et al., 2015). Yoga's practices (yama and niyama), physical postures (asana), breathing techniques (pranayama), and meditation styles make validating cause-and-effect relationships difficult, especially since yoga studies lack uniformity, protocols, and strict control like clinical and drug intervention studies. The digital age has added further complexity, with yoga evolving to incorporate remote delivery, making it accessible globally while also raising questions about consistency and authenticity (K. J. Sherman, 2012), (Ross & Thomas, 2010). These

factors underscore the need for structure and standardized frameworks to ensure yoga interventions maintain both authenticity and applicability across different cultural and demographic settings.

The COVID-19 pandemic accelerated the adoption of digital platforms for yoga, increasing the popularity of remote or "teleyoga" sessions (James-Palmer et al., 2022). This transition to remote delivery has expanded access, particularly for populations with limited access to yoga studios or healthcare facilities. However, the move from in-person to online platforms has raised concerns about maintaining the discipline, rigor, and philosophical depth that characterize traditional in-person practice (De Michelis, 2007). The commercialization of online yoga risks reducing it to a physical activity, which may lack the holistic dimensions essential to yoga. A small number of studies on remote yoga, were limited by small sample sizes, restricted demographics, and focusing on outcomes like weight loss, stress relief, and pandemic-related adaptations (S. A. Sherman et al., 2024), (Wadhen & Cartwright, 2021), (Jasti et al., 2020).

Yoga perceptions, motivations, and goals differ across countries and cultures, reflecting diverse interpretations and practices. The fragmentation of cross-sectional comparative studies in yoga, along with their limited scope and sample size, has hindered their ability to address the key issues driving integration in healthcare. The remote model of yoga delivery, while offering benefits, also introduces variability and divergence, and there are limited research studies to draw robust and impactful conclusions. The variety that came about shows how important it is to have a strict, standardized framework to prove that remote yoga works as a reliable health intervention.

Cross-sectional studies are crucial, particularly in comparing yoga's scientific and social impacts within Eastern (India) and Western (North America) cultures. Both within and across countries, knowledge gaps and discrepancies in practice levels, also known as KAP (Knowledge-Attitude-

Practice) gaps, influence the approach and perception of yoga. Such gaps create unique barriers and benefits specific to each population segment (Mishra et al., 2020). Some cross-country studies have explored aspects like yoga motivation (Park et al., 2019), practitioners characteristics (Birdee et al., 2008), and health associations with yoga styles (Cramer et al., 2016). However, there aren't many cross-sectional, comparative global studies that look at how and why remote yoga is different for different groups of people, delivery methods, and content.

This study incorporated a comprehensive scientific review and analyzed a wide range of studies conducted over the past decade, with a focused examination of research from the last five years. Comparative cross-sectional studies, the role of yoga in complementary medicine, remote yoga practices, tools for evaluating yoga delivery, and studies on telehealth interventions were all looked at scientifically. Major databases like NIH/PubMed, Web of Science, Google Scholar, and Scopus were searched. The searches included randomized controlled trials (RCTs), reviews, systematic reviews, meta-analyses, descriptive studies, observational studies, and comparative analyses. A significant gap exists in comparative observational studies specifically addressing remote yoga practices. Moreover, there is a notable lack of large-scale global comparative observational studies on yoga practices, particularly those comparing demographics and practices between Eastern and Western populations. In addition to these findings, we conducted a thorough review of methodologies, instruments, and analytical frameworks employed in the reviewed studies to identify strengths and limitations in the current body of research.

A notable example is a longitudinal study titled 'Satisfaction with Online Versus In-Person Yoga' by Jacinta et al. (2023), conducted in Australia with a sample of 156 participants. While the study offers meaningful perspectives, it does not explore the intricacies of remote yoga delivery processes.

Similarly, past cross-sectional studies from countries like Germany, India, the UK, and the USA have predominantly focused on yoga-related beliefs, perceptions, behaviors, knowledge-attitude-practice (KAP), and general health conditions.

The study also highlights the need for a structured framework to enhance the efficacy of remote yoga by defining protocols and methodology. Such a framework will be critical to addressing the issues related to remote yoga heterogeneity and variability across all global demographics. Remote learning model, such as Addie (Nadiyah & Faaizah, 2015) have been implemented for remote learning and evaluation in many domain of training and education.

3.2 SUMMARY

The scientific literature underscores the relevance of this study's objectives by highlighting the variability in yoga practices across regions, delivery modes, and cultural contexts. Research has documented yoga's positive impacts on health—ranging from mental well-being to chronic disease management—and its rising integration into complementary and alternative medicine. However, the lack of standardized protocols and consistency across studies presents challenges in validating yoga's outcomes, particularly when comparing remote and in-person practices. The rapid adoption of remote yoga delivery during the COVID-19 pandemic has expanded access but raised concerns about maintaining authenticity and the holistic benefits central to traditional in-person yoga. The existing literature provides a strong foundation for understanding these challenges, setting the stage for developing frameworks that ensure yoga remains authentic, adaptable, and effective across both traditional and digital platforms.