

Revolutionizing Mental Health Care in Dermatology: Advancing Digital Interventions for Patients with Psychiatric Comorbidities

Vivian Li¹, Kelly Frasier², Tillie Schumann³, Mahssa Rezaei⁴, Morgan Terrell⁵, Kathleen Click³, Emily Woolhiser³

¹Nuvance Health, Vassar Brothers Medical Center, Poughkeepsie, NY

²Northwell Health, New Hyde Park, NY

³Kansas City University College of Osteopathic Medicine, Kansas City, MO

⁴Burrell College of Osteopathic Medicine, Las Cruces, NM

⁵New York Institute of Technology College of Osteopathic Medicine, Old Westbury, NY

***Corresponding Author:** Vivian Li, Nuvance Health, Vassar Brothers Medical Center, Poughkeepsie, NY

Abstract

This review proposes an innovative, novel approach for improving the psychological well-being and enhancing treatment adherence among dermatology patients who experience psychiatric comorbidities, utilizing the potential of digital mental health interventions. By harnessing the capabilities of smartphone applications, telepsychiatry platforms, and virtual reality-based therapies, these interventions are meticulously designed to cater to individual patient needs and preferences. The incorporation of user-centered design principles alongside sophisticated machine learning algorithms is central to our approach, aiming to not only improve access to mental health resources but also to offer a more holistic, integrative care experience within dermatological practice. Future research directions include the necessity for thorough evaluation of these interventions' effectiveness, including scalability assessments and the identification of both barriers and facilitators to their broader adoption, paving the way for groundbreaking enhancements in the way mental health care is delivered to dermatology patients.

1. INTRODUCTION

The skin, being the physical barrier that differentiates our inner selves from the outside world, can have significant influence on social perceptions and self esteem. Patients living with chronic skin conditions have reported devastation to emotional wellbeing, avoidance of romantic relationships and intimacy, and loss of opportunities due to discrimination or physical disability [1]. The interplay between dermatologic conditions and mental health forms a complex web between cause and effect. An individual's primary condition may be dermatologic or psychiatric in etiology and present with a comorbid concern in the other domain. Additionally, several medications taken for skin conditions have potential to cause psychiatric side effects, and psychiatric medications can potentially produce side effects manifesting in the skin [2]. Patients are often unaware of the complex relationship between dermatologic conditions and mental health,

therefore they are poorly equipped to participate in managing their diseases and comorbidities [1]. Healthcare providers must consider the relationships that may exist between psychiatry and dermatology when attempting to provide comprehensive, patient-centered care.

Technological innovation impacts virtually every aspect of human life on a near constant basis. The rapidly changing landscape of our digital world yields great opportunities for improving and personalizing healthcare [3]. Psychiatry is an area of healthcare especially well suited for digital interventions [4]. The connection between dermatologic and mental health conditions underscores the importance of providing integrated care that addresses both aspects comprehensively. Employing digital mental health interventions, when appropriate, holds promise for educating and enhancing the well-being of dermatology patients while remaining convenient for dermatologists to integrate into their existing workflow.

This review describes the current role of digital mental health interventions and proposes important considerations for implementing this technology within the dermatology practice. While the primary focus of a dermatologist is to manage skin conditions, they often serve as pillars in the community, maintaining long term relationships with their patients. The psychological nature of managing skin disease in conjunction with their role in patients' lives presents dermatologists with a unique opportunity to identify and initiate management of mental health disorders which may otherwise go untreated. Utilizing digital mental health interventions within dermatology could reduce barriers to care for the unique psychodermatologic patient population and maximize their quality of life through a streamlined platform.

2. DISCUSSION

2.1. Dermatology Patients with Psychiatric Comorbidities

The relationship between dermatological conditions and psychiatric comorbidities presents a complex, multifaceted challenge within healthcare. Extensive research has revealed a significantly higher prevalence of psychiatric disorders among dermatology patients, highlighting the critical biopsychosocial dynamics at play [5,6,7,8]. Findings indicate that individuals with skin diseases are two to three times more likely to develop a psychiatric illness within seven years [6]. Moreover, up to 40% of patients with dermatological issues exhibit symptoms of psychological distress, predominantly depressive and anxiety disorders [7]. These insights underscore the urgent need for a comprehensive, integrated care approach that simultaneously addresses dermatological and psychiatric conditions.

Psychiatric comorbidities significantly affect dermatological conditions and their treatment outcomes. Stress, for instance, can impair skin barrier function and healing, involving complex interactions among the endocrine, immune, and nervous systems, including both peripheral and central pathways [9]. This disruption can create a cascade of responses, where deteriorating skin conditions further exacerbate underlying psychiatric issues. For example, the severity of depression in psoriasis patients correlates positively with the duration and intensity of their psoriatic lesions, suggesting a cyclical exacerbation between skin symptoms and

psychological distress [10]. Similarly, depressed patients with atopic dermatitis report significantly higher levels of induced itch compared to those without depression, and anxiety disorders can exacerbate conditions like eczema or acne due to increased scratching or picking which perpetuates a cycle of worsening symptoms [11,12].

Addressing the mental health needs of dermatology patients presents a unique set of challenges. One primary obstacle is the stigma associated with psychiatric disorders, which can deter patients from seeking mental health care. Furthermore, there is a notable deficiency in integrated care models that could enable seamless coordination between dermatology and mental health professionals. A survey of dermatologists found a significant gap in knowledge concerning the diagnosis, treatment, or referral for psychocutaneous disorders, highlighting an inconsistent practice of psychodermatology based on individual provider comfort [13]. Thus, the interaction between dermatological and psychiatric conditions necessitates a holistic, integrated approach to patient care. By adopting inclusive care models and cultivating an environment that minimizes stigma and promotes open dialogue about mental health, healthcare providers can markedly improve the well-being and treatment outcomes for this patient demographic. Emphasizing these strategies is crucial for developing effective interventions and ensuring that both the physical and psychological aspects of health are comprehensively managed.

2.2. Overview of Digital Mental Health Interventions

Digital mental health interventions (DMHI) offer a diverse array of technology-based solutions aimed at improving prevention, education, assessment, and treatment in the field of mental health. The urgency for more accessible care has significantly increased since the COVID-19 pandemic, highlighting the critical role of digital platforms in bridging gaps in healthcare provision [4,14,15]. DMHIs not only respond to the growing demand for new mental health services but also enhance the accessibility of existing services. These interventions address a variety of issues, including anxiety, depression, and stress, and have found consistent usage among specific demographics such as youth and adolescents, university students, and homeless individuals [16]. The DMHI continuum ranges

from digital health apps to advanced applications involving artificial intelligence (AI) with social robots.

DMHIs encompass a broad spectrum of modalities, including smartphone apps, telepsychiatry platforms, and virtual reality-based therapies, each designed to enhance the convenience, ease of use, and confidentiality of mental health services [14]. Smartphone apps have evolved to include features that track sleep, mood, and mindfulness, empowering users with tools for intentional self-regulation. Additionally, advancements in virtual reality (VR) and augmented reality (AR) have proven especially effective in treating phobias through exposure therapy [17]. These technologies not only increase accessibility for patients who may face barriers to traditional mental health services but also allow for personalized treatment strategies that can be tailored to individual needs and preferences.

Telepsychiatry, a critical component of DMHIs, utilizes electronic communication to provide psychiatric care from a distance. It operates in two forms: synchronous, allowing real-time interactions, and asynchronous, facilitating communication that occurs at different times.

Since its inception in the early 1970s, telepsychiatry has seen rapid growth, particularly suited to telehealth due to the minimal need for physical examinations and the efficacy of conversational assessments. The approach has been instrumental in extending mental health services to underserved and remote areas, helping to address the shortage of mental health professionals in certain regions. The convenience of telehealth appointments, which streamline both access and scheduling, further underscores the adaptability and potential of DMHIs in modern mental healthcare, facilitating more comprehensive, integrated care for patients with comorbid psychiatric and dermatologic conditions [4].

DMHIs offer a practical initial approach to providing care for populations with limited access to traditional health services [14]. While DMHIs generally facilitate easier access to care, they are not without barriers. A significant advantage of digital mental health care is the potential for blended care, which combines in-person therapy with digital data tracking. For patients engaged in both in-person therapy and DMHIs, this integration allows for the application of well-being practices in real-world

settings, extending beyond the confines of scheduled therapy sessions. This approach enables individuals to actively develop their coping skills and gain a deeper understanding of their personal challenges outside a structured clinical environment [17]. By integrating digital tools with traditional therapy, patients benefit from a more holistic and flexible approach to managing their mental health, increasing their capacity for self-management and sustained improvement.

However, the effectiveness of DMHIs can be limited by their utilization. There are instances where DMHIs have failed to achieve their potential impact due to inadequate implementation strategies. This shortfall can be attributed to various factors, including improper use by consumers, lack of awareness among providers, and prohibitive costs [16]. Moreover, there may be technological barriers, such as unreliable internet connectivity or limited access to devices, which further hinder the successful adoption of DMHIs. These challenges highlight the need for more robust implementation processes to ensure that DMHIs are not only accessible but also effectively integrated into users' care routines. By addressing these barriers through provider education, patient support, and improved infrastructure, healthcare systems can maximize the utility and impact of DMHIs, making them a more reliable component of integrated care models for patients with psychiatric and dermatologic comorbidities.

Emerging trends in digital mental health technologies point towards greater integration within existing practice workflows. To effectively incorporate DMHIs into current physician practices, it is essential for physicians to actively advertise its availability within medical offices. Although downloading new apps is rather simple and accessible, research indicates that few new DMHIs gain traction or are utilized extensively; the top two apps in this category dominate the market with 90% of user engagement [16]. Furthermore, while there is significant research targeting conditions like psoriasis and atopic dermatitis, there is a pressing need to set new objectives for developing digital interventions for other conditions that have profound psychological impacts on patients. Looking forward, DMHIs should not only focus on educating users but also on enhancing their motivation and personal capabilities. This approach will help to promote better adherence to the interventions and ensure that they are more

than just informational tools but are instrumental in fostering sustainable behavioral change [18].

2.3. Design Principles for Digital Mental Health Interventions in Dermatology

As digital technology becomes more integral to healthcare, assessing its accessibility and efficacy is essential to provide all patients with equal opportunities and resources. This is particularly important in a society where mental health is often stigmatized; to address these challenges, the adoption of user-centered design (UCD) in the development of DMHIs should be emphasized. UCD empowers future patients to participate actively in the design process, helping to tailor interventions that meet their needs and the objectives of evaluators [19]. Studies indicate that engaging users in the creation process not only shortens development time but also enhances the acceptance of these interventions [14]. For instance, a study employing UCD in developing a mobile health app for patients with chronic obstructive pulmonary disease (COPD) resulted in a protocol that was both effectively used by patients and efficacious in managing COPD exacerbations [20]. This process involved patients collaborating with healthcare professionals, a behavioral scientist, and an engineering team to conduct research, iterate designs, and promote self-monitoring, leading to the intervention's proper use and positive reception from both patients and healthcare providers.

Furthermore, patients often report deficiencies in mental health support, with concerns ranging from healthcare professionals not inquiring about their mental health to providing support that does not meet their needs; these challenges can be mitigated through UCD [1]. In one application of UCD, researchers assessed the backgrounds and daily routines of potential users to determine the most effective model for their health self-monitoring. This approach ensured that, with ongoing feedback, necessary adjustments were made before the final product was deployed and used successfully in the field [19]. This methodology has also proven successful in dermatology, specifically in monitoring melanoma patients' mindfulness [21]. Thus, UCD holds significant promise for enhancing the implementation of general DMHIs for dermatologic patients, ensuring interventions are both effective and well-received.

To enhance the efficacy and utility of UCD, integrating machine learning (ML) algorithms

into DMHIs can provide a more personalized approach to healthcare. ML has long been utilized across various medical fields, aiding in monitoring, diagnosing, and prognosticating conditions. Triantafyllidis et al. highlighted the significant benefits of incorporating these algorithms in health interventions for patients with conditions such as speech disabilities, phantom limb pain, and stress [22]. ML excels at identifying patterns in data indicative of specific disorders, making it a valuable tool for diagnosing mental health conditions.

Additionally, these algorithms enable continuous improvement through their predictive capabilities, reducing the likelihood of patients meeting the criteria for psychological symptoms such as depression and anxiety. Despite the challenges in predicting conditions such as anxiety, a study by Iyortsuun et al. evaluated various machine learning models, identifying an algorithm that achieved an accuracy of 82.6% and a precision of 84.1% [23]. This capability to tailor and optimize health interventions through advanced algorithms demonstrates the potential to significantly enhance the quality of care provided to dermatologic patients with psychiatric comorbidities, making DMHIs more personalized and effective. The ongoing integration of such algorithms not only improves the accuracy of mental health diagnoses but also enhances the overall quality of care provided to dermatology patients with psychiatric comorbidities. This strategic enhancement ensures that DMHIs are not only tailored to individual needs but are also adaptable to evolving healthcare demands.

While technology serves as a valuable tool in healthcare, the development of DMHIs necessitates careful consideration of ethical issues. As the field of ethics in digital interventions continues to evolve, various proposals have emerged to address challenges such as equitable access, patient data protection, and informed consent. Brall et al. have explored these issues from a justice perspective, offering recommendations on how to ethically shape digital interventions [24]. Those involved in creating these interventions bear an ethical responsibility to ensure accessibility for underserved communities, which, although potentially costly initially, can lead to long-term reductions in healthcare costs by mitigating productivity losses in the economy [25]. It is vital that users, especially those from underserved communities, are provided with comprehensive

information about digital technologies. This empowers them to make voluntary decisions to participate, fostering a sense of autonomy rather than coercion [24]. Additionally, when user data is utilized or stored for purposes beyond immediate health needs, a thorough assessment of the public health costs versus benefits is necessary. Protecting patient privacy and supporting patients in making informed decisions about their health information is paramount [24].

Another ethical approach to consider in the development and implementation of DMHIs is the prioritarian method, which prioritizes the benefits to individual users over those to the general public. This approach is particularly valuable when emphasizing the rights and autonomy of individuals in underserved communities, who may have limited access to traditional healthcare resources [26]. While healthcare providers and stakeholders often aim to benefit the greater good, it is crucial to weigh the ethical implications for individual users. By adopting a prioritarian focus, healthcare systems can work to mitigate disparities in access and ensure that vulnerable populations receive the personalized care they require. This focus on ethical practices fosters greater trust and rapport between healthcare providers and patients, enhancing the effectiveness and sustainability of these interventions, promoting responsible, patient-centric digital health solutions that prioritize equity and access.

2.4. Evaluation of Digital Mental Health Interventions

The primary goal of DMHIs is to develop products that are not only effective and efficacious but also scalable, capable of benefiting a broad spectrum of patients. User, administrator, and developer satisfaction are critical metrics for evaluating these interventions [14]. Notably, several randomized controlled trials demonstrated that telepsychiatry is as effective as traditional approaches for treating depression with medication. Additionally, studies indicate that therapy via video call is more effective for managing post-traumatic stress disorder (PTSD) than traditional in-person sessions [4].

The concept of accessibility in DMHIs primarily relates to a patient's willingness and ability to use the intervention, which is influenced by factors such as user-friendly design, clear instructions, and availability of support. Accessibility also involves ensuring that interventions cater to

diverse populations, including those with varying levels of digital literacy, socioeconomic status, and cultural backgrounds [14]. Feasibility, on the other hand, examines how well the DMHI product integrates into existing healthcare standards and workflows, determining whether it can be seamlessly adopted by both patients and healthcare providers without causing major disruptions. Psychological well-being is another critical component, as it encompasses users' mental state regarding their experience with the DMHI, their sense of empowerment, and their likelihood of continuing the practices they have adopted over time. Treatment adherence is assessed by tracking the frequency of engagement with the DMHI, as consistent use typically correlates with better outcomes, indicating the intervention's effectiveness. This engagement is monitored through technology that tracks data usage patterns, enabling providers to assess adherence and identify areas needing improvement. Additionally, patient satisfaction serves as a key indicator of success, as it reflects the overall acceptability and perceived value of the intervention [14].

The process of rigorously evaluating DMHIs presents numerous challenges. When developing new DMHIs, it is critical that they are simple, intuitive, and meet the satisfaction needs of both consumers and providers. The aim of promoting DMHIs is to facilitate their use and integration beyond standard care practices, ensuring they are practical and beneficial for patients. The more user-friendly and adaptable the intervention, the smoother its implementation will be. Ideally, a DMHI should seamlessly integrate into existing workflows with minimal disruption, thereby enhancing patient interest and adherence [16].

Dermatological conditions affect multiple aspects of an individual's life, including psychological, social, occupational, and physical dimensions. Therefore, it is essential to approach dermatologic care from a holistic perspective. A systematic review by Hewitt et al. demonstrated that digital interventions can significantly improve mood, quality of life, knowledge, and the therapeutic relationship for dermatology patients, especially highlighting the benefits for those suffering from conditions like psoriasis, atopic dermatitis, melanoma, and alopecia [18]. Given the profound psychological impact these conditions can have, it is essential to ensure that patients have adequate access to the necessary psychological support to address the mental health implications of dermatological issues.

2.5. Future Directions and Considerations

Digital interventions provide a promising avenue to expedite patient access to efficient and effective psychiatric care, particularly for those with dermatologic conditions. The scarcity of specialists trained extensively in both dermatology and psychiatry leads dermatologists to refer patients to psychiatric colleagues for comprehensive care [27]. To bridge this gap, dermatologists could benefit from further education on psychiatric comorbidities and the digital resources available to their patients. Practitioners familiar with these digital interventions can significantly reduce the patient stress associated with seeking psychiatric care and can provide quicker access to necessary services.

However, the effectiveness of these digital solutions hinges on patient access to the internet and smart devices, which are not universally available. Additionally, the cost of interventions and a patient's technological proficiency are significant considerations; providers must ensure patients are aware of potential financial burdens and assist those who may struggle with navigating digital platforms. To ensure equitable access to digital care, dermatology practices could facilitate digital psychiatric care by providing necessary equipment in-office for patient use. When recommending digital interventions, providers should consider socioeconomic factors and patient input to suggest feasible solutions. Digital psychiatric care should complement, not complicate, dermatologic treatment. For patients reluctant to engage in digital solutions, traditional in-office psychiatric appointments should remain an option.

Further research is needed to evaluate the feasibility and efficacy of implementing digital interventions for patients with psychiatric and dermatologic symptoms. Many digital interventions depend heavily on patient motivation to engage with the materials. Therefore, regular in-office evaluations are crucial to monitor psychiatric symptoms post-intervention. While many self-accessed resources may be adequate, it is crucial for patients to understand that worsening symptoms should prompt consultation with a psychiatrist. Despite these challenges, digital care holds the potential to revolutionize the treatment of comorbid psychiatric and dermatologic conditions.

There is potential for creating a dedicated digital space for managing comorbid psychiatric and

dermatologic disorders, which could streamline patient care and enhance the effectiveness and sustainability of interventions. As the digital healthcare landscape continues to evolve, ongoing improvements and education are essential to ensure that patients receive cutting-edge, multidisciplinary care at their fingertips. This approach not only caters to patients preferring not to schedule multiple office visits but also broadens access to quality care, reinforcing the transformative potential of digital interventions in healthcare.

Further education for practitioners on psychiatric comorbidities within dermatology and the resources available can enhance the effectiveness and sustainability of interventions. The potential development of a dedicated digital space for managing these comorbid conditions could streamline care, bringing multidisciplinary support directly to patients. For those averse to scheduling multiple in-office appointments, digital interventions offer a valuable alternative, simplifying access to care. As digital healthcare continues to evolve, ongoing enhancements to digital interventions are essential to provide patients with cutting-edge treatments. Through continuous improvement and a deeper understanding of the available programs, treatment plans can become more effective, ultimately enhancing the quality of care for patients with comorbid psychiatric and dermatologic conditions.

3. CONCLUSION

This review highlights the crucial need for integrated care that addresses both dermatologic conditions and psychiatric comorbidities. DMHIs have proven to be valuable in enhancing accessibility, personalization, and engagement in mental health management within dermatology. As technology continues to advance, there is a need for further research and broader implementation of DMHIs to refine their effectiveness and expand their reach. The potential of DMHIs to transform dermatological care is significant, offering a future where digital tools are seamlessly integrated into holistic treatment strategies, thus enhancing patient well-being and care efficiency. Continued development and adoption of these interventions will be essential in shaping a patient-centered approach in the intersecting fields of dermatology and psychiatry.

REFERENCES

- [1] Wheeler, M., Guterres, S., Bewley, A. P., & Thompson, A. R. (2022). An analysis of qualitative responses from a UK survey of the psychosocial wellbeing of people with skin conditions and their experiences of accessing psychological support. *Clinical and experimental dermatology*, 47(1), 37–42. <https://doi.org/10.1111/ced.14815>
- [2] Marshall, C., Taylor, R., & Bewley, A. (2016). Psychodermatology in Clinical Practice: Main Principles. *Acta Dermato-Venereologica*, 96, 30–34. <https://doi.org/10.2340/00015555-2370>
- [3] Stoumpos, A. I., Kitsios, F., & Talias, M. A. (2023). Digital Transformation in Healthcare: Technology Acceptance and Its Applications. *International Journal of Environmental Research and Public Health*, 20(4), 3407. <https://doi.org/10.3390/ijerph20043407>
- [4] Brunt, T. J., & Gale-Grant, O. (2023). Telepsychiatry: What clinicians need to know about digital mental healthcare. *BJPsych Advances*, 29(4), 230–238. <https://doi.org/10.1192/bja.2022.42>
- [5] Iannone, M., Janowska, A., Panduri, S., Morganti, R., Davini, G., Romanelli, M., & Dini, V. (2022). Impact of psychiatric comorbidities in psoriasis, hidradenitis suppurativa and atopic dermatitis: The importance of a psychodermatological approach. *Experimental dermatology*, 31(6), 956–961. <https://doi.org/10.1111/exd.14563>
- [6] Balieva, F., Abebe, D. S., Dalgard, F. J., & Lien, L. (2023). Risk of developing psychiatric disease among adult patients with skin disease: A 9-year national register follow-up study in Norway. *Skin health and disease*, 3(6), e294. <https://doi.org/10.1002/ski2.294>
- [7] Lakamsani, N., Sri, N. D., Devi, K. S., Murthy, D. R., Salecha, A. J., & K, V. (2023). A STUDY ON THE PREVALENCE OF PSYCHIATRIC COMORBIDITIES ASSOCIATED WITH DERMATOLOGICAL DISORDERS. *International Journal of Medical Science in Clinical Research and Review*, 6(01), Page: 147–154. Retrieved from <https://ijmscr.in/index.php/ijmscr/article/view/463>
- [8] Liu, L., Lin, N. X., Yu, Y. T., Wang, S. H., Wang, J., Cai, X. C., Wang, C. X., Zhang, M., Li, X., & Li, B. (2023). Epidemiology of mental health comorbidity in patients with psoriasis: An analysis of trends from 1986 to 2019. *Psychiatry research*, 321, 115078. <https://doi.org/10.1016/j.psychres.2023.115078>
- [9] Hunter, H. J., Momen, S. E., & Kleyn, C. E. (2015). The impact of psychosocial stress on healthy skin. *Clinical and experimental dermatology*, 40(5), 540–546. <https://doi.org/10.1111/ced.12582>
- [10] Pietrzak, D., Pietrzak, A., Grywalska, E., Kiciński, P., Roliński, J., Donica, H., Franciszkievicz-Pietrzak, K., Borzęcki, A., Socha, M., Niedziałek, J., & Krasowska, D. (2018). Serum concentrations of interleukin 18 and 25-hydroxyvitamin D3 correlate with depression severity in men with psoriasis. *PLoS one*, 13(8), e0201589. <https://doi.org/10.1371/journal.pone.0201589>
- [11] Schut, C., Bosbach, S., Gieler, U., & Kupfer, J. (2014). Personality traits, depression and itch in patients with atopic dermatitis in an experimental setting: a regression analysis. *Acta dermato-venereologica*, 94(1), 20–25. <https://doi.org/10.2340/00015555-1634>
- [12] Buske-Kirschbaum, A., Geiben, A., & Hellhammer, D. (2001). Psychobiological aspects of atopic dermatitis: an overview. *Psychotherapy and psychosomatics*, 70(1), 6–16. <https://doi.org/10.1159/000056219>
- [13] Jafferany, M., Vander Stoep, A., Dumitrescu, A., & Hornung, R. L. (2010). The knowledge, awareness, and practice patterns of dermatologists toward psychocutaneous disorders: results of a survey study. *International journal of dermatology*, 49(7), 784–789. <https://doi.org/10.1111/j.1365-4632.2009.04372.x>
- [14] Park, S. Y., Nicksic Sigmon, C., & Boeldt, D. (2022). A Framework for the Implementation of Digital Mental Health Interventions: The Importance of Feasibility and Acceptability Research. *Cureus*, 14(9), e29329. <https://doi.org/10.7759/cureus.29329>
- [15] Balcombe, L., & De Leo, D. (2022). Evaluation of the Use of Digital Mental Health Platforms and Interventions: Scoping Review. *International journal of environmental research and public health*, 20(1), 362. <https://doi.org/10.3390/ijerph20010362>
- [16] Liu, M., & Schueller, S. M. (2023). Moving Evidence-Based Mental Health Interventions into Practice: Implementation of Digital Mental Health Interventions. *Current Treatment Options in Psychiatry*, 10(4), 333-345. <https://doi.org/10.1007/s40501-023-00298-2>
- [17] Bond, R. R., Mulvenna, M. D., Potts, C., O'Neill, S., Ennis, E., & Torous, J. (2023). Digital transformation of mental health services. *npj Mental Health Research*, 2(1), 13. <https://doi.org/10.1038/s44184-023-00033-y>
- [18] Hewitt, R. M., Ploszajski, M., Purcell, C., Pattinson, R., Jones, B., Wren, G. H., Hughes, O., Ridd, M. J., Thompson, A. R., & Bundy, C. (2022). A mixed methods systematic review of digital interventions to support the psychological health and well-being of people living with dermatological conditions. *Frontiers*

- in medicine*, 9, 1024879. <https://doi.org/10.3389/fmed.2022.1024879>
- [19] De Vito Dabbs, A., Myers, B. A., Mc Curry, K. R., Dunbar-Jacob, J., Hawkins, R. P., Begey, A., & Dew, M. A. (2009). User-centered design and interactive health technologies for patients. *Computers, informatics, nursing: CIN*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2818536/>
- [20] Korpershoek, Y. J. G., Hermsen, S., Schoonhoven, L., Schuurmans, M. J., & Trappenburg, J. C. A. (2020). User-Centered Design of a Mobile Health Intervention to Enhance Exacerbation-Related Self-Management in Patients With Chronic Obstructive Pulmonary Disease (Copilot): Mixed Methods Study. *Journal of Medical Internet Research*, 22(6), e15449. <https://doi.org/10.2196/15449>
- [21] Russell, L., Ugalde, A., Orellana, L., Milne, D., Meinir Krishnasamy, Chambers, R. D., Austin, D. W., & Livingston, P. M. (2019). A pilot randomised controlled trial of an online mindfulness-based program for people diagnosed with melanoma. *Supportive Care in Cancer*, 27(7), 2735–2746. <https://doi.org/10.1007/s00520-018-4574-6>
- [22] Triantafyllidis, A. K., & Tsanas, A. (2019). Applications of Machine Learning in Real-Life Digital Health Interventions: Review of the Literature. *Journal of Medical Internet Research*, 21(4), e12286. <https://doi.org/10.2196/12286>
- [23] Iyortsuun, N. K., Kim, S.-H., Jhon, M., Yang, H.-J., & Pant, S. (2023). A Review of Machine Learning and Deep Learning Approaches on Mental Health Diagnosis. *Healthcare*, 11(3), 285. <https://doi.org/10.3390/healthcare11030285>
- [24] Brall, C., Schröder-Bäck, P., & Maeckelberghe, E. (2019). Ethical aspects of digital health from a justice point of view. *European Journal of Public Health*, 29(Supplement_3), 18–22. <https://doi.org/10.1093/eurpub/ckz167>
- [25] Mitchell, R. J., & Bates, P. (2011). Measuring Health-Related Productivity Loss. *Population Health Management*, 14(2), 93–98. <https://doi.org/10.1089/pop.2010.0014>
- [26] Zarif, A. (2021). The ethical challenges facing the widespread adoption of digital healthcare technology. *Health and Technology*, 12(1). <https://doi.org/10.1007/s12553-021-00596-w>
- [27] Katamanin, O., & Jafferany, M. (2023). Psychodermatology fellowship: Has the time arrived?. *Clinics in dermatology*, 41(3), 430–431. <https://doi.org/10.1016/j.clindermatol.2023.07.011>

Citation: Vivian Li et al. *Revolutionizing Mental Health Care in Dermatology: Advancing Digital Interventions for Patients with Psychiatric Comorbidities*. *ARC Journal of Dermatology*. 2024; 7(1):16-23. DOI: <https://doi.org/10.20431/2456-0022.0701003>

Copyright: © 2024 Authors. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.