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CURRENT TRENDS IN FITNESS DEVELOPMENT

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Abstract. Lack of physical activity has emerged as a considerable public health concern worldwide. Recent advancements in fitness technologies in the past ten years provide novel prospects to encourage physical activity and combat increasing levels of sedentary lifestyles, obesity, and related chronic illnesses. This paper examines the empirical evidence on the potential advantages, restrictions, and optimal practices pertaining to three predominant trends in fitness technology: wearable gadgets, artificial intelligence platforms, and social media. Wearable activity monitors demonstrate potential to boost physical activity engagement and enhance certain health indicators, however their precision and long-standing compliance appear inconsistent. Preliminary evidence indicates artificial intelligence holds promise for individualized fitness instruction and tracking via conversational agents, albeit necessitating further substantiation. Social media and fitness influencers can galvanize their followers, but concerns remain regarding promotion of unrealistic body ideals. Overall, these technologies exhibit promise to facilitate more accessible, personalized and social fitness participation if consciously implemented based on scientific findings. Further interdisciplinary investigation is imperative to optimize these burgeoning innovations equitably and ethically, so as to best promote global population health and wellness.

Keywords: physical activity, exercise, fitness technology, wearable devices, activity trackers, artificial intelligence, social media.

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СОВРЕМЕННЫЕ ТЕНДЕНЦИИ В РАЗВИТИИ ФИТНЕСА

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Аннотация. Недостаточная физическая активность стала серьезной проблемой для здоровья населения во всем мире. Последние десять лет развития фитнес-технологий открывают новые перспективы для стимулирования физической активности и борьбы с растущим уровнем сидячего образа жизни, ожирением и сопутствующими хроническими заболеваниями. В данной статье рассматриваются эмпирические данные о потенциальных преимуществах, ограничениях и оптимальных практиках, относящихся к трем доминирующим направлениям фитнес-технологий: носимым гаджетам, платформам искусственного интеллекта и социальным сетям. Носимые мониторы активности демонстрируют потенциал для повышения физической активности и улучшения некоторых показателей здоровья, однако их точность и долговременное соблюдение требований представляются противоречивыми. Предварительные данные свидетельствуют о том, что искусственный интеллект многообещающе подходит для индивидуального обучения фитнесу и его отслеживания с помощью разговорных агентов, хотя и требует дальнейшего обоснования. Социальные сети и фитнес-активисты могут стимулировать своих последователей, но при этом сохраняется обеспокоенность по поводу пропаганды нереалистичных идеалов тела. В целом, эти технологии обещают способствовать более доступному, персонализированному и социальному фитнесу, если их сознательно внедрить на основе научных данных. Дальнейшие междисциплинарные исследования необходимы для того, чтобы оптимизировать эти развивающиеся инновации на справедливой и этической основе, чтобы наилучшим образом способствовать здоровью и благополучию населения во всем мире.

Ключевые слова: физическая активность, упражнения, фитнес-технологии, носимые устройства, трекеры активности, искусственный интеллект, социальные медиа.

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Introduction. Engaging in physical activity (PA) is incredibly important for maintaining physical as well as mental health and wellbeing. For older individuals, physical activity plays a role in preventing diseases, preserving independence, and enhancing overall quality of life [21]. However, the global challenges of physical inactivity (PI) and obesity have become increasingly prevalent [4]. The World Health Organization (WHO) recommends that adults engage in 150-300 minutes of moderate PA or 75-150 minutes of vigorous PA per week along with muscle strengthening activities twice a week [26]. Surprisingly than 31 % of the world population fails to meet these recommendations for sufficient activity levels [14], while obesity rates continue to rise worldwide [11, 19].

Physical inactivity contributes to 9 % of deaths globally [10] and leads to substantial economic costs as well [23]. Additionally, it significantly increases the risk of conditions such as cardiovascular disease, diabetes and cancer [10, 13]. Studies conducted worldwide indicate that the percentage of adults who meet PA guidelines varies widely from 2.4 % to 83 % depending on how measurement methods utilized [21]. Although some regions have

observed improvements in physical activity levels over time, overall trends still raise concerns regarding physical inactivity rates [19, 21].

Nevertheless, significant advancements and emerging trends within fitness technology and media sectors over the past decade, offer promising opportunities to address issues related to inactivity and obesity. These consist of devices that can be worn, applications for phones that utilize artificial intelligence, and platforms on social media that focus on motivating and sharing fitness related content.

The main aim of this paper is to evaluate the advantages and limitations of key fitness technology trends. We will also assess their impact so far, considering future implications. In particular we will examine activity trackers, artificial intelligence systems for fitness coaching and monitoring, well as social media's role in fitness engagement. For each trend we will analyze the claimed benefits, evidence on effectiveness, limitations, challenges, and solutions to eliminate them. Lastly, we will provide conclusions and discuss future directions for promoting fitness with the help of technology and innovations. Considering that these innovations are relatively new, this analysis aims to offer insights into their utilization to encourage physical activity and healthy lifestyles.

Harnessing Digital Technologies to Promote Fitness and Wellness

This section delves into emerging trends, in fitness particularly focusing on the impact of technologies and artificial intelligence. The American College of Sports Medicine (ACSM) conducts surveys to track changes in popular exercise methods and programs providing insights for physical activity interventions [2, 21]. It is crucial to understand how fitness trends are evolving in order to develop strategies that appeal to populations and combat the worldwide issue of physical inactivity.

Over the 18 years ACSM surveys have revealed a transformation in leading fitness trends. Personal training has consistently remained among the 10 trends since its introduction in 2007. High intensity interval training (HIIT) which involves bursts of exercise (>80 % maximum heart rate) followed by recovery periods has gained popularity, but it has fallen to the 20th place, (previously ranked 7th for 2023). Wearable technologies that track metrics such as steps taken heart rate and sleep patterns have consistently topped the lists since 2016 [2]. This reflects consumers increasing interest, in monitoring their health metrics.

Wearable technology is still the number one trend and represents the growing importance of digital technologies. There are other leading trends, at present such as worksite health promotion and fitness programs for older adults [2]. We are also seeing the emergence of intelligence chatbots that provide personalized recommendations [3, 5]. Research indicates that wearable devices and AI interventions can effectively encourage physical activity and weight loss [5, 7, 3]. However more research is needed to explore term adherence and optimal designs [5, 24, 3].

In the coming years new technologies are likely to shape innovations in fitness. If optimized for behavior change, wearables and AI hold promise [5, 7, 24, 3]. By keeping track of trends and staying informed about rising interests we can develop interventions rooted in theory. Addressing obstacles like engagement will maximize impacts, on population health. Overall embracing evidence-based tools has the potential to revolutionize physical activity promotion.

Wearable Technology and Artificial Intelligence for Fitness Promotion

In todays paced world, health and fitness have embraced technologies to cater to the changing needs and lifestyles of society. Alongside traditional methods wearable devices, artificial intelligence and online platforms have become tools, in promoting wellness. In this section we will delve into two technologies, wearable devices and artificial intelligence – by examining the current evidence of their applications and effectiveness in the realm of fitness.

Wearable technologies encompass devices that can be worn on the body, such as activity trackers, smartwatches and GPS devices [7, 1, 25]. These gadgets have gained popularity due to their convenience and ability to continuously monitor users' behaviors and biometrics [1]. Comprehensive reviews indicate that wearable technologies can significantly increase activity by around 1800 steps on average while also adding an extra 30-40 minutes of activity per day [7]. Some studies even suggest benefits for weight loss, heart health and other clinical outcomes [7, 24, 25]. However, it's important to note that accuracy levels may vary depending on the type of device used and the metrics being measured; step counting tends to be more accurate than estimating energy expenditure [1].

While there are advantages to these technologies, challenges still exist. Ensuring the representativeness, across contexts and populations remains a concern [22]. Additionally, adherence tends to decline over time without engagement strategies [24]. Moreover, ethical concerns arise from privacy breaches when sharing personal data [15].

By updating software and integrating wearables with methods that encourage behavior change we can overcome existing limitations and fully utilize their capabilities [7, 24, 25]. In general, wearable technologies hold potential in enhancing approaches, to promoting physical activity.

Artificial intelligence (AI) comprises technologies, like chatbots, virtual fitness coaches and personalized programs [5, 6, 3, 18]. Reviews indicate that AI applications have the potential to assist in promoting health behaviors by providing motivational messages setting goals collecting data and offering customized feedback [5, 6, 3]. For example, conversational agents or chatbots have been found to increase activity and adherence to dietary plans in certain studies [3]. Virtual fitness assistants have also shown success in detecting disease flares through analyzing minute level activity data [6].

Nevertheless, it's important to note that AI methods are still in their stages of development and evaluation. Prioritizing transparency of algorithms and addressing biases should be considerations [5, 18]. By integrating AI with behavioral theories and engagement strategies we can maximize its potential through long term interaction and guidance [3, 18]. We must also pay attention to privacy concerns related to data sharing well as ensure safety measures and obtain consent regarding data usage [14, 15]. To establish standards and address well as ethical concerns surrounding AI applications for wellness purposes, requires collaboration among computer scientists, healthcare professionals and social scientists from different disciplines [5, 15, 18]. As the field progresses it is crucial to validate AI tools, across real world populations.

In conclusion modern digital technologies hold promise in complementing fitness methods by offering support based on evidence-based approaches while also enabling monitoring. However, there are both negative aspects when it comes to factors, like precision, compliance, effectiveness across groups of people, maintaining long term changes in behavior, safeguarding data privacy and ensuring transparency in algorithms. By conducting research across disciplines, following standardized protocols, we can enhance the potential of these technologies to positively influence public health. In the end, incorporating fitness technologies in a manner taking into account credibility and giving importance to user health, privacy and consent, could help create widespread solutions to promote wellness worldwide.

The Rise and Impacts of Fitness Influencers on Social Media

Social media platforms have become increasingly popular, for promoting health and facilitating communication about physical activity [17, 8]. Influencers, who are individuals with a large social media following and strive to influence others [20], have emerged as important conduits for sharing fitness related information and ideals on platforms like Instagram [9, 16, 3]. It is worth noting that over 68% of Instagram users claim that fitness influencers on the platform have motivated them to engage in physical activity [12].

Research indicates that social media and influencers can have a positive impact on activity levels. One study found that exposure to fitness influencers was associated with higher rates of moderate exercise [12]. During the COVID-19 lockdowns, influencers played a coaching role by providing workout instructions and livestream sessions to keep their audiences active [9]. Social media also facilitates the exchange of health information and motivation as followers identify with influencers comments and rely on their advice for guidance [16]. Combined interventions that incorporate media alongside channels show promise, in improving attitudes, knowledge and behaviors related to nutrition and physical activity compared to no intervention or relying solely on other sources of information [8].

However, it is noteworthy that social media influencers tend to focus on promoting appearance-based fitness goals such as low body fat and well-defined muscles, and this emphasis on appearance may potentially have consequences for individuals body satisfaction [23]. Various studies have found a correlation between exposure to idealized influencer images, with decreased mood, as well as increased dissatisfaction with one's own body [17]. Moreover, it is worth mentioning that many influencers lack professional training and fail to provide safety recommendations when endorsing exercise routines [9]. The existing evidence on the impact of media on health behaviors is somewhat limited due to constraints such as small sample sizes, reliance on self reported data and cross-sectional study designs, and consequently the confidence and generalizability of these findings are somewhat undermined [17, 8]. Furthermore, certain important topics remain understudied in the literature while specific populations are underrepresented in research efforts [20].

To harness the benefits of media while minimizing associated risks it becomes imperative to establish regulations and prioritize education initiatives [16]. Influencers should strive to offer health information based on evidence backed practices while also promoting safety measures as role models within the health sphere [9]. Researchers must address knowledge gaps by conducting rigorous studies that encompass diverse populations and evaluate real world interventions involving social media platforms [17, 8]. Simultaneously public health experts can leverage the reach of influencers by involving them in health campaigns aimed at fostering wellbeing [20]. With correct guidance and curated content, social media holds significant promise, for effectively promoting active lifestyles on a large scale.

Conclusion

This review has delved into the major trends and advancements, in fitness technology over the decade. Wearable devices, artificial intelligence systems and social media platforms have emerged as tools to motivate physical activity and combat global inactivity and obesity rates. However it's important to note that the evidence supporting these technologies is still limited, highlighting the need for research to validate and optimize their effectiveness.

The findings suggest that wearable trackers can indeed increase daily steps and activity levels, although their accuracy and long term adherence may vary. AI applications such as conversational agents have shown promise in providing personalized data and feedback to support fitness goals. Social media platforms and influencers play a role in encouraging activity among their followers, but concerns arise regarding unrealistic body ideals that they promote. Overall, these technologies have the potential to make fitness engagement more accessible, social and tailored to individual needs.

To fully reap the benefits of these technologies, several recommendations can be made. Integrating wearable devices into workplace wellness programs or community fitness initiatives, while incorporating behavior

change techniques, could enhance adherence. It is vital for AI development to adhere to transparency and ethical standards that foster trust among users. Social media platforms should be utilized positively by sharing evidence-based guidance on fitness knowledge and practices. Further research should address limitations related to accuracy, bias, privacy concerns and safety, through real world studies conducted across populations.

However, there are still challenges when it comes to implementing emerging technologies, in an equal manner across socioeconomic backgrounds. Factors like cost, digital literacy, accessibility barriers and varying effectiveness among groups could potentially worsen existing disparities. It is also crucial to address concerns related to privacy, accountability and the spread of misinformation in a manner. Nonetheless, if used judiciously based on scientific evidence, new fitness technologies have the potential to greatly combat the global physical inactivity epidemic by providing personalized and engaging platforms.

To sum up, by embracing advancements in wearable devices, artificial intelligence (AI) and social media, we can revolutionize how we promote fitness and contribute to healthier and longer lives for millions of people. This calls for increased investment in research, well as the development of ethical standards. In our technology driven age, promoting physical activity remains essential and imperative for both individual well being and public health.

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