Symposium 3

Possibilities and Prospects of Digital Therapeutics for Metabolic Diseases

Chairpersons

Won-Young Lee
Sungkyunkwan University, Korea

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Speakers

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Kyung Hee University, Korea

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Kakao Healthcare Corp., Korea

Panel Discussion

Young Sang Lyu
Chosun University, Korea

Byoungduck Han
Korea University, Korea

Sang Youl Rhee
Kyung Hee University, Korea

- ## Education

Period	Affiliation	Position
– **2006-2008**	Kyung Hee University	Ph.D.
– **2003-2005**	Kyung Hee University	M.Sc.
– **1995-2001**	Kyung Hee University	M.D.

- ## Affiliations / Experience

Period	Affiliation	Position
– **2011-Present**	Kyung Hee University	Professor
– **2018-2019**	Scripps Research Translational Science	Visiting Scholar

- ## Committee Memberships

  - Committee of IT Integrated Management of Metabolic Syndrome
  - Committee of Clinical Practice Guideline

- ## Publications

  - Park S, *et al*. Efficacy of information and communication technology interventions for the management of diabetes mellitus: An umbrella review and evidence map
  - Lee Y, *et al*. Weight Management Health Note, a Mobile Health Platform for Obesity Management Developed by the Korean Society for the Study of Obesity
  - Kim S, *et al*. Association between antidiabetic drugs and the incidence of atrial fibrillation in patients with type 2 diabetes: A nationwide cohort study in South Korea
  - Park S, *et al*. Real-World Evidence of a Hospital-Linked Digital Health App for the Control of Hypertension and Diabetes Mellitus in South Korea: Nationwide Multicenter Study
  - Kim S, *et al*. Effectiveness of Information and Communications Technology-Based Interventions for Obesity and Metabolic Syndrome

Symposium 3

Possibility of Digital Therapeutics for Treatment and Management of Metabolic Diseases

Sang Youl Rhee (Kyung Hee University, Korea)

The field of digital therapeutics for metabolic diseases, including obesity, prediabetes, and diabetes mellitus, is evolving with significant advancements in technology and patient care. This new frontier in healthcare leverages digital platforms to deliver personalized, adaptive treatment solutions that cater to the unique health profiles of individuals. Central to this approach is the utilization of digital tools that support disease monitoring and management, enhancing the accuracy and effectiveness of treatments.

These technologies are shaping the future of metabolic disease management by facilitating better patient engagement and adherence to treatment protocols. Digital therapeutics also integrate seamlessly into patients' daily lives, empowering them to take an active role in their health management. Furthermore, the use of telemedicine services expands access to healthcare professionals and specialized care, making medical advice more accessible to patients regardless of their location.

However, the expansion of digital therapeutics also brings to light critical challenges such as safeguarding patient data and ensuring that all patients have equitable access to these new technologies. Addressing these concerns is essential for the responsible development and deployment of digital therapeutics. This lecture will delve into both the opportunities and challenges presented by digital therapeutics in the management of metabolic diseases, advocating for a balanced approach that maximizes benefits while minimizing risks.

Hyung Jin Choi
Seoul National University, Korea

• Education

Period	Affiliation	Position
– **2013**	Seoul National University	Ph.D.
– **2011**	Seoul National University	M.S.
– **2002**	Seoul National University	B.S.

• Affiliations / Experience

Period	Affiliation	Position
– **2015-Present**	Seoul National University	Professor
– **2012-2015**	Chungbuk National University Hospital	Clinical Assistant Professor
– **2010-2012**	Seoul National University Hospital	Endocrinology Fellow
– **2009-2010**	Korea National Institute of Health	Resercher (Public Health Doctor)
– **2003-2007**	Seoul National University Hospital	Internal Medicine Resident

• Committee Memberships

– Korean Society for the Study of Obesity

– Korean Endocrine Society

– Korean Society for Brain and Neural Sciences

– Homeostasis Section of Korean Society for Brain and Neural Sciences

• Publications

– GLP-1 Increases Cognitive Satiation via Hypothalamic Circuits in Mice and Humans, Science (in revision)

– Hypothalamic neuronal activation in non-human primates drives naturalistic goal-directed eating behavior, Neuron

– Lateral Hypothalamic Leptin Receptor Neurons Drive Hunger-gated Food-seeking and Consummatory Behaviours, Nature Communications

– Machine-learning analysis identifies digital behavioral phenotypes for engagement and health outcome efficacy of mHealth interventions for obesity: post-hoc analyses of a randomized trial, Journal of Medical Internet Research

– Multidimensional Cognitive Behavioral Therapy for Obesity Applied by Psychologists Using a Digital Platform: Open-Label Randomized Controlled Trial, JMIR mHealth and uHealth

Symposium 3

Psychological Basis for the Effectiveness of Digital Therapeutics for Metabolic Diseases

Hyung Jin Choi (Seoul National University, Korea)

Obesity and eating behavior issues arise from a complex interplay of behavioral, cognitive, emotional, motivational, and anthropometric factors. Addressing these multifaceted aspects is essential for effective weight control and behavior change. Cognitive structuring and emotional regulation are critical for engagement in digital therapeutics (DTx).

Personalized DTx, which provide tailored feedback based on individual data from multiple domains, are more effective for long-term lifestyle changes. However, most current app-based interventions use generic strategies, limiting engagement and efficacy. Tailored feedback, leveraging real-time and baseline multifactorial measures, can enhance DTx's effectiveness.

Advanced digital technologies in behavioral medicine offer new opportunities for accessible and effective daily interventions. Monitoring and managing both physical and mental health are crucial for successful obesity DTx. Implementing a health coach system and conducting adequate randomized controlled trials (RCTs) with active placebos, grounded in evidence-based psychological theories, are recommended.

Adapting to digital transformation requires new policies at various levels, including community, city, government, and industry, to support the integration and effectiveness of DTx in combating obesity.

Min Kyu Han
Kakao Healthcare Corp., Korea

• Education

Period	Affiliation	Position
– **2011-2014**	Graduate School of Public Health, Seoul National University	M.A.
– **1988-2005**	Doctor of Medicine at Seoul National University	M.D.

• Affiliations / Experience

Period	Affiliation	Position
– **2022-Present**	Kakao Healthcare Corp	Director
– **2021-2022**	Jiahui Health (Shanghai)	Family Physician
– **2016-2021**	SK (Hynix) International Medical Center	Director
– **2014-2015**	Department of Family Medicine, Seoul National University Hospital	Assistant Professor
– **2012-2014**	Department of Family Medicine, Seoul National University Hospital	Clinical Fellow

• Committee Memberships

– KIC Program Committee

– Korean Association of Family Medicine

– Korean Society for the Study of Obesity

• Publications

– Lowering Barriers to Health Risk Assessments in Promoting Personalized Health Management. J. Pers. 316. https://doi.org/10.3390/jpm14030316

– A Mobile-Based Comprehensive Weight Reduction Program for the Workplace (Health-On): Development and Pilot Study. - JMIR Mhealth Uhealth

– Importance of Active Participation in Obesity Management Through Mobile Health Care Programs: Substudy of a Randomized Controlled Trial. - JMIR Mhealth Uhealth

– Assessment of Association between Metabolic Syndrome and Serum Uric Acid Level in Subjects Who Visited the Health Promotion Center. - Korean J Fam Pract

Symposium 3

Suggestions for Integrating Digital Therapeutics into Conventional Medical Settings

Min Kyu Han (Kakao Healthcare Corp., Korea)

The integration of digital therapeutics into conventional medical settings presents a transformative opportunity to enhance patient care and clinical outcomes. Digital therapeutics leverage technology to deliver evidence-based therapeutic interventions directly to patients, offering a new dimension to healthcare that complements traditional methods. This lecture will explore effective strategies for incorporating digital therapeutics into existing medical practices, emphasizing the synergy between technological innovation and conventional healthcare.

Key topics will include the use of patient-generated health data (PGHD) to personalize treatments, the role of precision medicine in improving therapeutic efficacy, and the importance of patient-reported outcomes (PROs) in monitoring and adjusting treatment plans. By harnessing real-time data and patient feedback, healthcare providers can tailor interventions more precisely, leading to better adherence and improved health outcomes.

The discussion will also cover the challenges and solutions in integrating these technologies, such as data privacy concerns, the need for interoperability between digital and traditional systems, and the importance of training healthcare professionals to effectively utilize these tools. Through case studies and practical examples, attendees will gain insights into the successful adoption of digital therapeutics in various medical settings.

Ultimately, this lecture aims to provide a comprehensive framework for seamlessly blending digital therapeutics with conventional medical practices, paving the way for a more efficient, personalized, and patient-centered healthcare system.