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The Feasibility and Effectiveness of Telenutrition for Remote Dietary Consultation: A Systematic Review and Meta-analysis

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Abstract
Telenutrition refers to using telehealth and telemedicine technologies to provide nutritional care and counselling to patients remotely. Studies found that telenutrition can be an effective tool for managing chronic diseases in primary care settings. This review was conducted to gather information on telenutrition feasibility and effectiveness. A comprehensive search was conducted via the Cochrane Library, PubMed, Google Scholar, EBSCo, and Scopus databases. Randomised controlled trials published until 2022 that assessed the feasibility and effectiveness of telenutrition outcomes were included. Three reviewers worked independently on study selection and risk of bias assessment. The PRISMA 2020 version checklist was used to report and review the selected articles. This review identified 19 studies on telenutrition intervention for weight loss, personalised nutrition and physical activity, diabetes care, metabolic syndrome, bone health care, organ transplant, haematological cancer, kidney disease, and age-related macular degeneration. Feasibility (n=21) was determined by recruitment rate, adherence rate, completion rate, and satisfaction. Six studies were rated as good to high adherence; eleven achieved >80% of the completed intervention, and eight showed a high satisfaction rate (78-98.6%) with telenutrition. The effectiveness (n=14) measured physiological and physical conditions. The overall meta-analysis indicates that telenutrition showed a moderate effect. A majority of the studies favoured telenutrition intervention where there were significant effects of telenutrition for some outcomes (weight changes, BMI, waist circumference, and triglyceride levels), but not others (HbA1c, fasting blood glucose, total cholesterol, HDL-cholesterol, and blood pressure). Generally, telenutrition significantly improved BMI and waist circumference, yet there has been limited effectiveness in physiological conditions, such as in HbA1c, cholesterol, and blood pressure levels.

Author Keywords
Effectiveness; Feasibility; Meta-Analysis; Online Consultation; Telehealth; Telenutrition

Index Keywords
cholesterol, hemoglobin A1c, high density lipoprotein cholesterol, triacylglycerol; blood pressure, body mass, body weight loss, caloric intake, cholesterol blood level, clinical effectiveness, diabetes care, diet, electronic consultation, fasting blood glucose level, feasibility study, follow up, glucose blood level, human, kidney disease, leukemia, macular degeneration, meta analysis, metabolic syndrome X, nutrition, nutritional science, nutritional status, organ transplantation, outcome assessment, physical activity, primary health care, randomized controlled trial (topic), Review, social media, systematic review, telehealth, telemedicine, videoconferencing, waist circumference

Chemicals/CAS
cholesterol, 57-88-5; hemoglobin A1c, 62572-11-6

References

- Reynolds, R, Dennis, S, Hasan, I, Slewa, J, Chen, W, Tian, D, Bobba, S, Zwar, N.
  A Systematic Review of Chronic Disease Management Interventions in Primary Care
  (2018) *BMC Fam Pract*, 1 9 (1), p. 11.
- Khaw, WF, Chan, YM, Nasaruddin, NH, Alias, N, Tan, L, Ganapathy, S.S.
  Malaysian Burden of Disease: Years of Life Lost Due to Premature Deaths
  (2023) *BMC Public Health*, 23 (1), p. 1383.
- (2023) *National Health and Morbidity Survey (NHMS) 2023: Vol. I: NCDs—Non-Communicable Diseases: Risk Factors and other Health Problems*,
  National Institutes of Health, Ministry of Health Malaysia
- Budreviciute, A, Damiati, S, Sabir, D. K, Onder, K, Schuller-Goetzburg, P, Plakys, G, Katileviciute, A, Kodzius, R.
  Management and Prevention Strategies for Non-communicable Diseases (NCDs)

and Their Risk Factors
(2020) *Front Public Health*,

- (2020) *The Impact of the COVID-19 Pandemic on Non-communicable Disease Resources and Services: Results of a Rapid Assessment*,
Geneva. November 13

- Saleh, Z. T, Elshatarat, R. A, Elhefnawy, K. A, Elneblawi, H. N, Abu Raddaha, A. H, Al-Za'areer, M. S, Mofdy Almarwani, A, Tayeh, M.
Effect of a Home-based Mobile Health App Intervention on Physical Activity Levels in Patients with Heart Failure: A Randomized Controlled Trial
(2023) *J Cardiovasc Nurs*, 38 (2), pp. 128-139.

- Gokalp, H, de Folter, J, Verma, V, Fursse, J, Jones, R, Clarke, M.
Integrated Telehealth and Telecare for Monitoring Frail Elderly with Chronic Disease
(2018) *Telemed J E Health*, 24 (12), pp. 940-957.

- Clarke, M, Fursse, J, Brown-Connolly, N. E, Sharma, U, Jones, R.
Evaluation of the National Health Service (NHS) Direct Pilot Telehealth Program: Cost-Effectiveness Analysis
(2018) *Telemed J E Health*, 24 (1), pp. 67-76.

- Page, M. J, McKenzie, J. E, Bossuyt, P. M, Boutron, I, Hoffmann, T. C, Mulrow, C. D, Shamseer, L, Moher, D.
The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews
(2021) *BMJ*, 372, p. 71.

- Daud, N. L. H. M, Nor, N. M, Jaafar, N. H, Bakar, W. A. M. A, Shukri, N. A. M.
The Feasibility and Effectiveness of Telenutrition for Remote Dietary Consultation: A Systematic Review and Meta-analysis Protocol
(2023) *Malays J of Med and Health Sci*, 19 (9), pp. 337-342.

- Higgins, J. P, Altman, D. G, Gøtzsche, P. C, Jüni, P, Moher, D, Oxman, A. D, Savović, J, Sterne, J. A. C.
The Cochrane Collaboration's Tool for Assessing Risk of Bias in Randomised Trials
(2011) *BMJ*, 343, p. 5928.

- (2011) *Review Manager (RevMan) [Computer Program]*,
Copenhagen

- Jadad, A. R, Moore, R. A, Carroll, D, Jenkinson, C, Reynolds, D. J, Gavaghan, D. J, McQuay, H. J.
Assessing the Quality of Reports of Randomized Clinical Trials: Is Blinding Necessary?
(1996) *Control Clin Trials*, 17 (1), pp. 1-12.

- Guyatt, G. H., Oxman, A. D., Kunz, R., Brozek, J., Alonso-Coello, P., Rind, D., Schünemann, H. J.
GRADE guidelines: 6. Rating the quality of evidence— imprecision
(2011) *Journal of Clinical Epidemiology*, 64 (12), pp. 1283-1293.

- Popay, J, Roberts, H, Sowden, A, Petticrew, M, Arai, L, Rodgers, M, Britten, N, Duffy, S.
(2006) *Guidance on the Conduct of Narrative Synthesis in Systematic Reviews: A Product from the ESRC Methods Programme*,

- Haidich, A. B.
Meta-analysis in Medical Research
(2010) *Hippokratia*, 14 (1), pp. 29-37.

- Sterne, J. A. C, Sutton, A. J, Ioannidis, J. P. A, Terrin, N, Jones, D. R, Lau, J, Carpenter, J, Higgins, J. P. T.
  Recommendations for Examining and Interpreting Funnel Plot Asymmetry in Meta-Analyses of Randomised Controlled Trials
  (2011) *BMJ*, 343, p. 4002.

- Kelly, J. T, Conley, M, Hoffmann, T, Craig, J. C, Tong, A, Reidlinger, D. P, Reeves, M. M, Campbell, K. L.
  A Coaching Program to Improve Dietary Intake of Patients with CKD: ENTICE-CKD
  (2020) *Clin J Am Soc Nephrol*, 15 (3), pp. 330-340.

- Ventura Marra, M, Lilly, C. L, Nelson, K. R, Woofter, D. R, Malone, J. A.
  Pilot Randomized Controlled Trial of a Telenutrition Weight Loss Intervention in Middle-Aged and Older Men with Multiple Risk Factors for Cardiovascular Disease
  (2019) *Nutrients*, 11 (2), p. 229.

- Hung, Y. C, Bauer, J. D, Horsely, P, Coll, J, Bashford, J, Isenring, E. A.
  Telephone-delivered Nutrition and Exercise Counselling After Auto-SCT: A Pilot, Randomised Controlled Trial
  (2014) *Bone Marrow Transplant*, 49 (6), pp. 786-792.

- Kim, J, Bea, W, Lee, K, Han, J, Kim, S, Kim, M, Na, W, Sohn, C.
  Effect of the Telephone-Delivered Nutrition Education on Dietary Intake and Biochemical Parameters in Subjects with Metabolic Syndrome
  (2013) *Clin Nutr Res*, 2 (2), pp. 115-124.

- Tang, D, Mitchell, P, Liew, G, Burlutsky, G, Flood, V. M, Gopinath, B.
  Telephone-Delivered Dietary Intervention in Patients with Age-Related Macular Degeneration: 3-Month Post-Intervention Findings of a Randomised Controlled Trial
  (2020) *Nutrients*, 12 (10), p. 3083.

- Eakin, E. G, Winkler, E. A, Dunstan, D. W, Healy, G. N, Owen, N, Marshall, A. M, Graves, N, Reeves, M. M.
  Living Well with Diabetes: 24-Month Outcomes from a Randomized Trial of Telephone-Delivered Weight Loss and Physical Activity Intervention to Improve Glycemic Control
  (2014) *Diabetes Care*, 37 (8), pp. 2177-2185.

- Goulis, D. G, Giaglis, G. D, Boren, S. A, Lekka, I, Bontis, E, Balas, E. A, Maglaveras, N, Avramid, A.
  Effectiveness of Home-centered Care Through Telemedicine Applications for Overweight and Obese Patients: A Randomized Controlled Trial
  (2004) *Int J Obes Relat Metab Disord*, 28 (11), pp. 1391-1398.

- Benson, G. A, Sidebottom, A, Hayes, J, Miedema, M. D, Boucher, J, Vacquier, M, Sillah, A, VanWormer, J. J.
  Impact of ENHANCED (diEtitiaNs Helping pAtieNts CarE for Diabetes) Telemedicine Randomized Controlled Trial on Diabetes Optimal Care Outcomes in Patients with Type 2 Diabetes
  (2019) *J Acad Nutr Diet*, 119 (4), pp. 585-598.

- Azar, K. M, Aurora, M, Wang, E. J, Muzaffar, A, Pressman, A, Palaniappan, L. P.
  Virtual Small Groups for Weight Management: An Innovative Delivery Mechanism for Evidence-Based Lifestyle Interventions Among Obese Men
  (2015) *Transl Behav Med*, 5 (1), pp. 37-44.

- Alley, S, Jennings, C, Plotnikoff, R. C, Vandelanotte, C.
  Web-Based Video-Coaching to Assist an Automated Computer-Tailored Physical Activity Intervention for Inactive Adults: A Randomized Controlled Trial
  (2016) *J Med Internet Res*, 18 (8), p. 223.

- Gibson, C. A, Gupta, A, Greene, J. L, Lee, J, Mount, R. R, Sullivan, D. K.
  Feasibility and Acceptability of a Televideo Physical Activity and Nutrition Program for Recent Kidney Transplant Recipients
  (2020) *Pilot Feasibility Stud*, 6 (1), p. 126.

- Hickman, I. J, Hannigan, A. K, Johnston, H. E, Elvin-Walsh, L, Mayr, H. L, Staudacher, H. M, Barnett, A, Macdonald, G. A.
  Telehealth-delivered, Cardioprotective Diet and Exercise Program for Liver Transplant Recipients: A Randomized Feasibility Study
  (2021) *Transplant Direct*, 7 (3), p. 667.

- Johnson, K. E, Alencar, M. K, Coakley, K. E, Swift, D. L, Cole, N. H, Mermier, C. M, Kravitz, L, Gibson, A. L.
  Telemedicine-Based Health Coaching Is Effective for Inducing Weight Loss and Improving Metabolic Markers
  (2019) *Telemed J E Health*, 25 (2), pp. 85-92.

- Alencar, M. K, Johnson, K, Mullur, R, Gray, V, Gutierrez, E, Korosteleva, O.
  The efficacy of A Telemedicine-based Weight Loss Program with Video Conference Health Coaching Support
  (2019) *J Telemed Telecare*, 25 (3), pp. 151-157.

- Rollo, M. E, Haslam, R. L, Collins, C. E.
  Impact on Dietary Intake of Two Levels of Technology-Assisted Personalized Nutrition: A Randomized Trial
  (2020) *Nutrients*, 12 (11), p. 3334.

- van den Helder, J, Verlaan, S, Tieland, M, Scholten, J, Mehra, S, Visser, B, Kröse, B. J. A, Weijs, P. J. M.
  Digitally Supported Dietary Protein Counseling Changes Dietary Protein Intake, Sources, and Distribution in Community-Dwelling Older Adults
  (2021) *Nutrients*, 13 (2), p. 502.

- Izquierdo, R, Lagua, C. T, Meyer, S, Ploutz-Snyder, R. J, Palmas, W, Eimicke, J. P, Kong, J, Weinstock, R. S.
  Telemedicine Intervention Effects on Waist Circumference and Body Mass Index in The IDEATel Project
  (2010) *Diabetes Technol Ther*, 12 (3), pp. 213-220.

- Beleigoli, A, Andrade, A. Q, Diniz, M. D. F, Ribeiro, A. L.
  Personalized Web-Based Weight Loss Behavior Change Program with and Without Dietitian Online Coaching for Adults with Overweight and Obesity: Randomized Controlled Trial
  (2020) *J Med Internet Res*, 22 (11), p. 17494.

- Chen, Y. C, Tsao, L. I, Huang, C. H, Yu, Y. Y, Liu, I. L, Jou, H. J.
  An Internet-based Health Management Platform May Effectively Reduce the Risk Factors of Metabolic Syndrome Among Career Women
  (2013) *Taiwan J Obstet Gynecol*, 52 (2), pp. 215-221.

- Frank, L. L, McCarthy, M. S.
  Telehealth Coaching: Impact on Dietary and Physical Activity Contributions to Bone Health During a Military Deployment
  (2016) *Mil Med*, 181 (5), pp. 191-198.
  (Suppl)

- Kuzmar, I. E, Cortés-Castell, E, Rizo, M.
  Effectiveness of Telenutrition in A Women's Weight Loss Program
  (2015) *PeerJ*, 3, p. 748.

- Lima, D. P, Gomes, V. C, Viana Júnior, A. B, Carvalho de Assis, F. M, Oliveira, P. H. A, Cunha, L. C. V, Braga, I. C, Neto, P. B.
Telehealth for Parkinson Disease Patients During The COVID-19 Pandemic: The TeleParkinson Study. Telesaúde para pacientes com doença de Parkinson durante a pandemia de COVID-19: o estudo TeleParkinson
(2022) *Arq Neuropsiquiatr*, 80 (10), pp. 1026-1035.

- Peniche, P, Pinto, A, Ribeiro, R, Martins, J, Faria, C.
Recruitment, Retention, Attendance, and Adherence of a Randomized Controlled Trial to Evaluate the Effects of Task-Specific Training with Individuals Post Stroke
(2022) *Fisioterapia e Pesquisa*, 29, pp. 22-28.

- Ahn, E, Kang, H.
Introduction to Systematic Review and Meta-analysis
(2018) *Korean J Anesthesiol*, 71 (2), pp. 103-112.

- Egger, M, Smith, G. D, Schneider, M, Minder, C.
Bias in Meta-analysis Detected by a Simple, Graphical Test
(1997) *BMJ*, 315 (7109), pp. 629-634.

- Opie, J. E, Vuong, A, Welsh, E. T, Esler, T. B, Khan, U. R, Khalil, H.
Outcomes of Best-Practice Guided Digital Mental Health Interventions for Youth and Young Adults with Emerging Symptoms: Part II. A Systematic Review of User Experience Outcomes
(2024) *Clin Child Fam Psychol Rev*, 27 (2), pp. 476-508.

- Piovacari, S. M. F., Bisogni, G. T. B., Jensen, N. S. O, Lottenberg, A. M.
Impact of a Telenutrition Intervention on Body Composition and Eating Behaviour Changes in Individuals Living with Excess Weight
(2023) *Austin J Public Health Epidemiol*, 10 (3), p. 1151.

- Sotomayor, F, Hernandez, R, Malek, R, Parimi, N, Spanakis, E. K.
The Effect of Telemedicine in Glycemic Control in Adult Patients with Diabetes during the COVID-19 Era—A Systematic Review
(2023) *J of Clin Med*, 12 (17), p. 5673.

- Boels, A. M., Vos, R. C., Dijkhorst-Oei, L. T., Rutten, G. E. H. M.
Effectiveness of diabetes self-management education and support via a smartphone application in insulin-treated patients with type 2 diabetes: Results of a randomized controlled trial (TRIGGER study)
(2019) *BMJ Open Diabetes Res Care*, 7 (1), p. e000981.

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