

MOBILE APPS USED TO ASSESS AND MONITOR NUTRITIONAL STATUS AND MALNUTRITION AMONG SENIORS

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ABSTRACT

Introduction. The threat of progressive malnutrition as well as the consequences thereof among seniors have become more frequent. Systematic assessment of nutritional status becomes an indispensable element of actions towards elderly people. It allows for quick detection of risks and undertaking nutritional interventions. Unfortunately, malnutrition or threat of malnutrition is often undetected or neglected in treatment. Modern applications designed for the elderly and their caregivers may be helpful in monitoring nutritional status and taking corrective actions.

Aim & methods. The purpose of this study is to present the feasibility of remote assessment and monitoring of nutritional status with particular emphasis on the state of malnutrition. This paper attempts to present available applications for early identification of risks and initiation of nutrition interventions and actions based on analysis of solutions available or developing in Poland.

Results. In recent years, progress has been made in the field of e-health, with applications and programs dedicated to health and prevention that allow the users to increase control over their own health (Łukasik, 2021). There are applications available that allow one to calculate body weight, plan a diet, check the calorific value of products, their glycemic index, calculate the nutritional value of a meal or analyse the body composition, thus effectively allowing the user to control malnutrition.

Conclusion. A senior care program for the prevention or treatment of malnutrition must involve a physician, a nurse, a dietician, a psychologist, a physiotherapist, as well as the caregiver of the elderly person and the senior themselves. In Poland, programs aimed at improving the health of seniors have been implemented, also in the area of malnutrition, but the scale of the problem is still large.

Key words: malnutrition, eating disorders, apps, senior

INTRODUCTION.

The threat of progressive malnutrition and the consequences thereof among seniors are becoming a growing issue. Despite highly developed medicine, it still remains a serious problem: the PolSenior2 study showed that 3.2% of its participants are undernourished and 23.6% are at risk of malnutrition. The risk of malnutrition increases with age, especially in people older than 80 (Błędowski et al., 2022; Cybulski & Krajewska-Kulak, 2021). The development and implementation of nutritional telemonitoring for older adults appears to be a solution worth considering. It appears that telemonitoring has contributed to positive changes in the diet and physical activity of the elderly, which confirms the effectiveness of new technologies in patient care (Gąsowski et al., n.d.). In contrast, according to the Central Statistical Office (CSO) (2006), it is estimated that 2.6% of people aged 60–69 and 5.3% of people aged 70 and above are affected in Poland (Gąsowski et al., n.d.). European data report that malnutrition occurs in 28% of inpatients, 17.5% of inpatient care patients and 8.5% of outpatients. Individuals at particular risk of

malnutrition are those over 80 years of age, with at least one comorbid disease, and women (Leij-Halfwerk et al., 2019). Malnutrition and the risk of malnutrition are a cause of more severe disease course, exacerbations of chronic diseases, complications of elective and emergency surgical procedures, and injuries, thereby worsening quality of life, increasing hospitalizations, worsening prognosis, and increasing mortality. Conducting a systematic assessment of nutritional status is becoming an essential component of interventions for the elderly. It allows for quick detection of risks and undertaking nutritional interventions. Unfortunately, malnutrition or threat of malnutrition is often undetected or neglected in treatment. Modern apps designed for older adults and their caregivers can be helpful in monitoring nutritional status and corrective actions taken. Unfortunately, many people, due to physical disability, intellectual disability, economic factors, and other roadblocks, are unable to take advantage of the capabilities of technology on their own (Al-Shorbaji, 2022).

OBJECTIVE AND METHODS

The aim of this paper is to present possibilities of remote assessment and control of nutritional status with special emphasis on malnutrition. In this paper an attempt has been made to present available applications enabling early risk identification and undertaking nutritional actions and interventions. Data for the study were collected on the basis of available websites and web portals: Google, *Wirtualna Polska*, *Health Guide* and websites of the Polish Ministry of Health. All described applications are available in Poland in the same language.

RESULTS AND DISCUSSION

In reducing social inequalities in health through the use of telemedicine and e-health in geriatrics, various types of e-health solutions have been developed in recent years. There are applications and programs being developed to reduce and improve health inequalities through the use of telemedicine, telecare and e-health solutions. The European Parliament together with the European Commission, as part of the Recovery Plan for Europe, pledge to strengthen individual care through digital services, the development of innovative healthcare systems including telemedicine, and thus increase control over one's own health. Identifying and intervening in malnutrition or at risk of malnutrition requires the interaction and involvement of many members of the treatment team. It is difficult to require every elderly person to be engaged and willing to use new technologies. It should not be an added burden and instead provide real support. There are systems available today that can be used for the prevention and prevention of malnutrition that could include sensors, video telecare, and videoconferencing that allow for meal reminders, patient education, or measurements (Suliga et al., 2020; *Zdalne monitorowanie zdrowia pacjenta*, 2022; Łukasik, 2021). Currently available applications allow their users to calculate their body weight, plan a diet, check the

calorie content of products, verify the glycemic index or calculate the nutritional value of a meal; these include portals such as Fresh Diet.pl, KalkulatorKalorii.net, VitaScale. All the described applications have a Polish menu, they are accessible and easy to use, however, they require mobile devices and access to the Internet and a short training for seniors. Another example here could be the online diet calculators such as BMI calculator, which will determine the body fat content, WHR calculator allowing for accurate determination of body shape and the possible type of overweight, and AMR calculator (i.e., a tool measuring active metabolism spent by the body during various physical activities such as walking, dancing, reading). In addition, one can use the BMR calculator, which determines the amount of energy needed to maintain basic vital functions, as well as the TER calculator determining the daily energy requirements (Sprawdzi twoje zdrowie e-manus.pl, KCALKulator). An example of a nutrition education app could be Health Assistant. The application is designed to teach seniors the principles of proper nutrition and physical activity, and thus improve their eating habits. The Assistant can teach its user to prevent diseases due to nutrition and lack of physical activity; it was created by the National Center for Nutrition Education. Another example of an app for healthy eating is MyFitnessPal, which includes a food diary that automatically calculates the caloric and nutritional value of foods. It has a code scanner, making it easy for seniors to make healthy choices. Healthy Eating Assistant, an application developed by the Institute of Food and Nutrition, allows the users to calculate the calorie and nutritional value of meals consumed by the senior throughout the day and teaches them the principles of healthy eating through a built-in healthy eating pyramid. There are also apps on the market to help seniors choose to prepare a healthy meal. The website "<https://www.sidechef.com/>" is a pocket library of over 4,000 recipes, each including detailed preparation instructions and a shopping list. SideChef makes it easy to prepare healthy meals, adjusting portion sizes and ingredients to their needs. In turn, through myIKP, the National Health Fund has provided ready-made diets that seniors can also use. Admittedly, the diet is not created individually for each patient, but if necessary, the patient can be referred to the free online counselling service of the National Center for Nutrition Education. There, they will receive the advice of the day, a shopping list and access to educational videos and e-books (Serwis Ministerstwa Zdrowia i Narodowego Funduszu Zdrowia).

A senior care program on prevention or treatment of malnutrition must involve a physician, nurse, dietician, psychologist, physiotherapist, as well as the caregiver of the elderly person and the senior himself. In Poland, there are programs aimed at improving the health of seniors also in terms of malnutrition, but the scale of the problem is still large (Błądowski et al., 2022). What seems to be a worthy solution is the development and introduction of nutritional telemonitoring of the elderly. Such a study was conducted in the Netherlands where seniors were monitored and controlled in terms of weight, diet, nutritional status, appetite and blood pressure parameters. With the support of telecare and training provided by the nurse, the client received appropriate support and assistance depending on the analysed results. It turned out that telemonitoring contributed to positive changes in the

diet and physical activity of the elderly (Łukasik, 2021), which confirms the effectiveness of new technologies in patient care.

In Poland, a multicenter study was conducted among seniors qualified for surgery who met the criteria for malnutrition according to ERAS and ESPEN guidelines. A proprietary mobile application NutriOptima was used therein. The aim of the study was to observe the potential effect of nutritional therapy on the impact of nutritional status in patients requiring nutritional treatment of surgical wards fed industrial diets (oral or enteral) during the perioperative period. This study demonstrated that preoperative nutritional intervention leads to both decreased perioperative weight loss and more rapid normalization and weight gain in the postoperative period (Francuzik et al., 2019).

CONCLUSIONS & SUMMARY.

The use of a variety of treatments and forms of support including control apps and reminder systems is an expedient and appropriate action in the care of the geriatric patient. Despite existing apps and programs that could provide support to seniors, the scale of the problem is still large. Accessing apps and knowing how to use them often requires the support and assistance of a family caregiver. It is important to keep in mind that seniors range in age from 60 years old to over 100 years old and not all of them are ready, equipped with the knowledge, motivation, and skills to make changes regarding their nutritional status so programs should be created that are friendly and easy to accept and implement for seniors.

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