THE SIGNIFICANCE OF NUTRITION-RELATED APPS FOR THE YOUNGER GENERATION IN JOHANNESBURG, SOUTH AFRICA

Hema Kesa[1], Gifty Efua Koufie[1], Alex Dimitri Tchuenchieu Kamgain[1,2]*

[1]Food Evolution Research Laboratory, School of Tourism and Hospitality, University of Johannesburg, South Africa

[2]Centre for Food, Food Security and Nutrition Research, Institute of Medical Research and Medicinal Plants Studies, Cameroon

Corresponding author: hemak@uj.ac.za

ABSTRACT

Introduction: Obesity and related non-communicable diseases (NCDs) are major public health concerns in many countries, including South Africa. While nutrition-related apps have been considered a promising solution to address these issues, their impact is not yet evident given their limited adoption and the persistently high prevalence of these diseases. This study aims to assess user perceptions of the effectiveness of these apps in Johannesburg (most urbanized region of the country) and their motivations for using them. **Methods:** A quantitative cross-sectional survey was conducted in the city in 2019, targeting 150 users aged 18 to 38 (Millennials and Generation Z). **Results:** The results revealed that participants used more than ten different nutrition-related apps, with 91.4% utilizing both diet and fitness features. However, only 56.6% to 67.4% of respondents agreed on the overall effectiveness of the nutrition apps they used. Users' expectations appeared to be more media-related, with the top five motivations being the monitoring capabilities, quality of information provided, support in achieving weight loss goals, recording ability, and the capacity to offer an overview of food consumption. These factors received average ratings of 3.75, 3.65, 3.54, 3.47, and 3.45 out of 5, respectively. **Conclusion:** These findings indicate that nutrition-related apps are seen as valuable tools for promoting healthier lifestyles. To enhance the effectiveness of strategies using these apps to combat obesity and chronic diseases, educational measures should be implemented for a widespread use.

Keywords: Millennials,Obesity, Non-Communicable Diseases, Nutrition-related apps, Johannesburg

INTRODUCTION

The rise in chronic diseases such as diabetes, cardiovascular diseases, and other nutrition-related health issues has underscored the growing use of personalized, technology-driven health interventions (Franco et al., 2016; Achieng & Ogundaini, 2022). The widespread adoption of mobile devices has contributed to an increase in software applications aimed at improving nutrition and promoting healthier lifestyles (Franco et al., 2016). The term "apps" refers to software applications that enable programs to run on smartphones and other digital devices (Elbert et al., 2016). This growth in mobile apps parallels the rapid expansion of smartphone usage over the past few decades. Consequently, nutrition-related apps have become more prevalent among diverse demographic groups (Zhao et al., 2016; Ulfa, 2022). According to Franco et al (2016), hundreds of such apps have been launched and installed by millions of people, largely due to their perceived effectiveness in enhancing dietary knowledge, supporting physical activity, and encouraging healthier lifestyles (DiFilippo et al., 2015). South Africa ranks among the countries with the highest rates of overweight and obesity. The 2016 national survey revealed that 68% of women and 31% of men are either overweight or obese, while 13% of children under the age of 5 are also classified as overweight. The increasing prevalence of overweight and obesity is leading to a higher incidence of Non-Communicable Diseases (NCDs) such as type 2 diabetes, cardiovascular diseases, hypertension, and cancer, which are now among the most significant threats to health and development (Department of Health, 2024). Given this situation and the limited use of nutrition-related apps (Tchuenchieu et al, 2021), it is important to question the impact of these apps within users, particularly among South African young generation who are more accustomed to digital devices. This study focuses on users in Johannesburg, the most urbanized region of the country, and aims to assess their motivations for using these nutrition-related apps and their perceptions of their effectiveness.

METHODS

Study design and sample size

This study employed a quantitative research approach. It was conducted in 2019 through a descriptive survey with as target population residents of Johannesburg aged 18 to 38. Indeed, Millennials (born between 1981 and 1996) and adults of Generation Z (born between 1997 and 2001) are known as primary smartphone users. Participants were required to use a nutrition-related app on their phone. The minimum sample size was estimated at 135 using the G*Power software, with input parameters including a medium effect size (f = 0.15), a power of 0.80, and a critical alpha of 0.05 (Faul, Erdfelder, Lang, & Buchner, 2007).The final sample size was majored at 150.

Sampling method

This study employed a self-administered questionnaire, which required little to no involvement from the researcher. A convenience sampling approach was used to efficiently access the target population through our contacts. Respondents were sampled from malls, fitness centres, and tertiary institutions in various areas of Johannesburg, as these locations are frequented by the millennial population and Gen Z adults. The questionnaire was distributed electronically via Google Forms, facilitating wide and rapid dissemination.

The first section of the questionnaire collected demographic information from respondents, including gender, age, ethnicity, income level, educational level, and residence area. The second section explored the nutrition-related apps used by respondents, as well as the frequency with which they accessed the Diet and Fitness sections, with responses categorized as Always, Often, Sometimes, Rarely, Never, or N/A. In the third section, respondents rated their agreement with six statements about the effectiveness of nutrition-related apps on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The final section required respondents to rate their motives for using nutrition-related apps on a 5-point Likert scale, where 1 indicated 'To no extent' and 5 indicated 'Very large extent,' based on various statements provided.

The questionnaire was drafted in English, and a pilot study was conducted with 20 voluntary respondents to ensure its validity and reliability (Tchuenchieu et al, 2021). It was important to ensure that all the questions were easily understood by the respondents.

Ethics

This study was conducted with ethics clearance number 2019STH007 from the University of Johannesburg. Participants were informed about the study's objectives and had to provide their consent before completing the online survey. Privacy and confidentiality were rigorously upheld throughout the process.

Data analysis

The data collected were analyzed using Statistical Package for Social Sciences (SPSS) version 27 (IBM SPSS Statistics, Chicago, IL, United States). Descriptive analysis was performed, including the calculation of frequencies and percentages, as well as means and standard deviations (SD) for questions using a 5-point Likert scale

RESULTS

Socio-demographics characteristics of the studied population

The demographic distribution shown in Table 1 reveals that participants were from various Johannesburg areas, 56% were female and 44% male. The majority were aged between 18 and 23 years (40.0%), followed by those aged between 24 and 28 years (33.3%).

Table 1: Demographic profile

Demographic Profile	Frequency (N)	Valid percentage (%)
Gender		
Male	66	44.0
Female	84	56.0
Total	150	100.0
Age		
18-23years	60	40.0
24-28years	50	33.3
29-33years	18	12.0
34-38years	22	14.7
Total	150	100.0
Ethnicity		
Black	71	47.3
White	34	22.7
Coloured	15	10.0
Indian	15	10.0
Asian	15	10.0
Total	150	100.0
Income level		
Below R5000	44	29.3
R5001-R15000	45	30.0
R15001-R25000	31	20.7
R25001-35000	30	20.0
Total	150	100.0
Highest educational qualification		
Grade 11 or lower (std 9 or lower	10	6.7
Grade 12 (Matric, std 10)	32	21.3
Post-Matric Diploma or certificate	34	22.7
Baccalaureate Degree(s)	43	28.7
Post Graduate Degree(s)	31	20.7
Total	150	100.0
Area of residence		
Johannesburg East	30	20.0
Johannesburg West	42	28.0
Johannesburg North	48	32.0
Johannesburg South	30	20.0
Total	150	100.0

The study also considered ethnicity and income levels. The ethnic composition was as follows: Black (47.3%), White (22.7%), Coloured (10%), Indian (10%), and Asian (10%). In terms of income, 30% of respondents

reported a monthly earnings range of R5000 to R15000, while 29.3% earned less than R5000. Only 6.7% of the respondents had an education level below secondary school.

Use of Nutrition-related app

As illustrated in Figure 1, MyFitnessPal was the most commonly used nutrition-related app, representing 20.8% of responses. The Samsung Health app ranked second, with 13.9% of users, followed closely by Fitbit, which was used by 13.0% of respondents. FatSecret ranked fourth with 9.1% of responses. Fitocracy followed with 8.2%, while MyPlate was the sixth most used app, scoring 6.5%. MyNetCoach came next with 5.2%. Fooducate, CarbsControl, and MyNetDiary were the least used, with scores of 4.3%, 4.8%, and 4.8%, respectively.

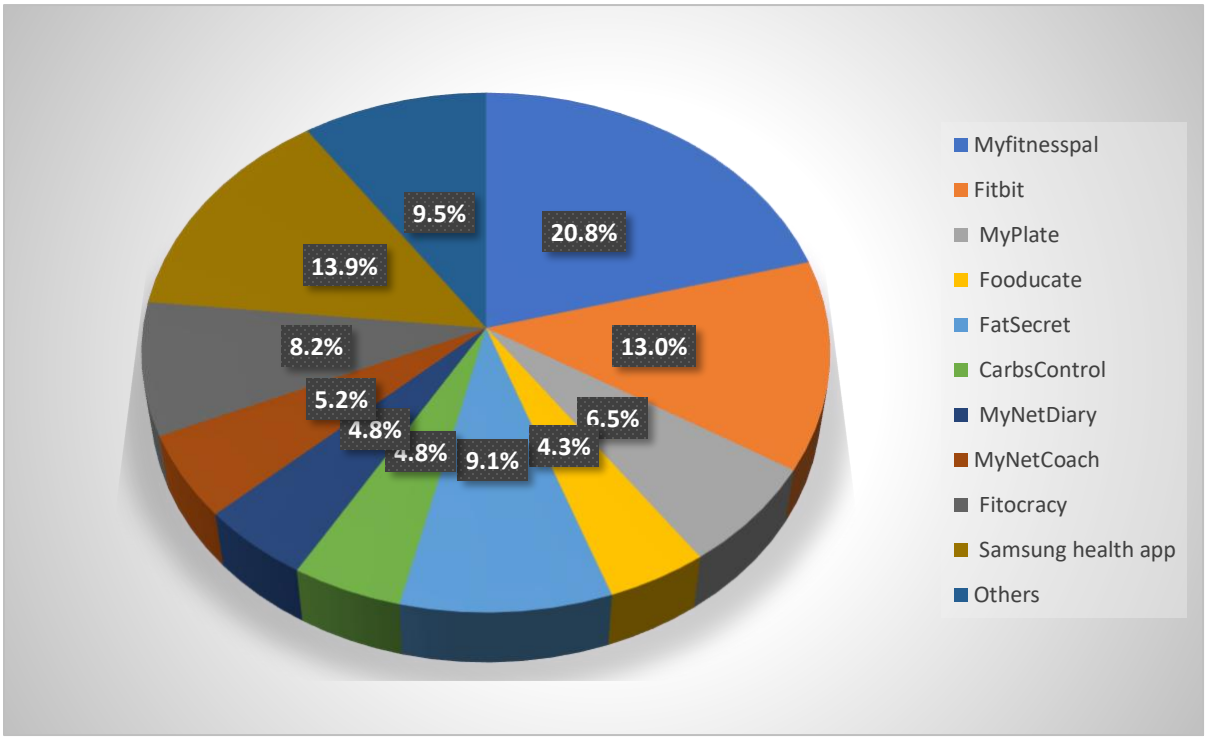

Figure 1: Nutrition-related apps used by respondents (N=150)

Table 2 presents the frequencies with which respondents logged into the two main sections of nutrition-related apps: the Diet section and the Fitness section. For the Diet section, 30% of respondents logged in often, 24% always, and 23.3% rarely. A smaller percentage, 4%, reported never logging into the Diet section. On the other hand, most respondents also logged into the Fitness section of their app from sometimes to always. Specifically, 28.7% selected "sometimes," 25.3% chose "often," and 20.7% indicated "always." Additionally, 16.7% chose "rarely," while 5.3% reported that their app did not include a fitness component. The smallest group, 3.3%, selected "never."

Table 2: The frequencies of logging into the Diet section and the Fitness section of the Nutrition-related application (N=150)

	Always	Often	Sometime	Rarely	Never	N/A*
Logging into the Diet section	24%	30%	23.3%	18.7%	4%	-
Logging into the Fitness section	20.7%	25.3%	28.7%	16.7%	3.3%	5.3%

***The nutrition app used does not have a Fitness component

Participants' personal evaluation of the effectiveness of nutrition-related apps was generally positive, with mean scores ranging from 3.44 to 3.74 out of 5 across various statements (Table 3). Specifically, for all six statements assessing the effectiveness of the nutrition apps, 56.6% to 67.4% of participants agreed, while maximum 26% disagreed.

Table 3. Personal evaluation of the effectiveness of using nutrition-related apps (N=150)

The effectiveness of using nutrition-related app		Strongly disagree/ Disagree	Neutral	Strongly agree/ agree	Mean	SD
Assists me in my actual goal setting to eat a healthy diet	Count	30	24	96	3.58	1.17
	Row N %	20%	16.0%	64%		
Increased my frequency of eating healthy foods	Count	39	26	85	3.44	1.33
	Row N %	26.0%	17.3%	56.6%		
Increases my consistency in eating healthy foods	Count	33	19	98	3.59	1.22
	Row N %	22%	12.7%	65.3%		
Influenced my eating behaviour positively	Count	27	24	99	3.62	1.19
	Row N %	18%	16.0%	66%		
Improved my healthy eating lifestyle	Count	29	21	100	3.74	1.28
	Row N %	19.4%	14.0%	66.6%		
Changed my poor eating habits into choosing healthier options	Count	30	19	101	3.64	1.21
	Row N %	20.0%	12.7%	67.4%		

The evaluation of the reasons behind the use of the nutrition-related app by participants (Table 4) revealed that they were primarily motivated by the app's monitoring capabilities (Mean 3.75) and the quality of the information it provides (Mean 3.65). Other reasons included its support in achieving weight loss goals (Mean 3.54), its recording ability (Mean 3.47), its capacity to provide an overview of food consumption (Mean 3.45), and its functionality for checking portion sizes (Mean 3.43). Respondents were less motivated by the scientific aspects of the app, such as calorie tracking, nutrient calculation, ingredient checking, or BMI calculation.

Table 4. The motives for adopting the use of nutrition-related app (N=150)

The motives for adopting the use of nutrition-related apps		To no extent/small extent	Moderate extent	Very large extent/large extent	Mean	SD
It tracks my calorie/ Kilojoule intake	Count	51	35	64	3.1	1.28
	Row N %	34%	23.30%	42.60%		
It calculates nutrients in my food	Count	12	77	61	3.39	1
	Row N %	8.00%	51.30%	40.70%		
It checks ingredient information because I have allergies, celiac disease, or other food-related health issues	Count	61	29	60	2.912	1.37
	Row N %	40.70%	19.30%	40%		
It gives an overview of my food consumption	Count	34	33	83	3.45	1.23
	Row N %	22.60%	22.00%	55.30%		
It facilitates my weight loss goal	Count	28	37	85	3.54	1.16
	Row N %	18.70%	24.70%	56.70%		
It checks my portion sizes	Count	33	31	86	3.43	1.2
	Row N %	22%	20.70%	57.30%		
It checks my body mass index	Count	46	29	75	3.26	1.34
	Row N %	30.70%	19.30%	50%		
Record ability	Count	31	39	80	3.47	1.22
	Row N %	20.70%	26.00%	53.30%		
Monitoring	Count	21	31	98	3.75	1.12

	Row N %	14%	20.70%	65.40%		
Trendiness	Count	37	40	73	3.35	1.15
	Row N %	24.70%	26.70%	48.60%		
Networkability	Count	46	38	66	3.15	1.24
	Row N %	30.70%	25.30%	44%		
Entertainment	Count	48	35	67	3.17	1.28
	Row N %	32%	23.30%	44.70%		
Information quality	Count	27	26	97	3.65	1.13
	Row N %	18%	17.30%	64.60%		

DISCUSSION

This study highlights the use of nutrition-related apps among the young population in Johannesburg, regardless of gender, age, race, education level, or monthly income. It can be inferred that young millennials in Johannesburg are increasingly adopting nutrition-related apps to manage healthier lifestyles. The growing awareness of the need for healthier living among Black communities is promising and crucial in the fight against obesity and non-communicable diseases (NCDs), especially given the rising rates of obesity and vulnerability to NCDs within this group, as noted in the literature (Mwakideu, 2019). As smartphones become central to daily life, mobile app usage is expected to grow, potentially fostering a more health-conscious society (Jones et al., 2017). Millennials, in particular, are highly engaged with mobile technology and are more health-conscious than previous generations (Bucuta, 2015; Nermoe, 2018). Technology offers easy access to wellness information and tips, with many nutrition-related apps and wearable devices catering to their needs. The most popular apps identified in this study include MyFitnessPal, Fitbit, and others, which can be downloaded for free or for a small subscription fee from the Google Play Store and Apple Store (Franco et al., 2016).

Nutrition-related apps are valued by dietitians and medical practitioners for monitoring dietary intake, assessing recovery, and evaluating dietary prescriptions (Karduck & Chapman-Novakofski, 2018). They also promote lifestyle changes and track health goals across various populations (Schoeppe et al., 2016). In advanced economies, these apps provide reliable data for health policy-making (Negash et al., 2018). Their multifunctionality, including

tracking both nutrition and physical activity, further contributes to their popularity as it was observed with the data collected in this study.

Nutrition-related apps are considered effective to different extents in promoting physical activity, enhancing eating habits, and supporting weight loss (Payne et al., 2015; Schoeppe et al., 2016). However, only 56.6% to 67.4% of users rated these apps as effective. Factors such as age, gender, and personal perception are critical in determining their effectiveness (West et al., 2017). Research shows that females generally perceive these apps as more effective than males, which may relate to individual expectations. Nutrition-related apps are designed with different goals in mind; for example, a fitness app's effectiveness differs from that of a diet app. Some apps combine both features, offering a more comprehensive option for users based on their goals. A survey conducted by Wang et al. (2016) involving 500 Norwegians with an average age of 25.8 ± 6.4 years also revealed that over half of the users felt the tools were effective in promoting healthier eating and increased physical activity. Similarly, Samoggia and Riedel (2020), based on data from 143 users with an average age of 38, reported that nutrition-information tools can effectively address the personal barriers consumers perceive when trying to adopt healthier eating habits.

Lee & Cho (2017) categorized motivations for using nutrition-related apps into two main groups: media-oriented and user-oriented. Media-oriented motives are centered on the primary functions of these apps, such as tracking diet and fitness activities, enabling user interaction, and acquiring information (Wharton et al., 2014). The top five motivations identified in this study fall under this category. On the other hand, user-oriented motives encompass factors like entertainment and trendiness. Previous studies have shown that the quality of information and entertainment value are key factors influencing technology adoption (Ferguson & Perse, 2000; Ho & Syu, 2010).

CONCLUSION

This study shows that young adults in Johannesburg increasingly use nutrition-related apps to track nutrition and support healthier lifestyles. These apps were generally viewed as effective, offering potential benefits for addressing obesity and chronic diseases in South Africa. Further research is needed to understand the full range of factors influencing user engagement and long-term health outcomes.

Conflicts of Interest

The authors declare no conflicts of interest.

REFERENCES

- Achieng, Mourine S., & Ogundaini, Oluwamayowa O.. (2022). Digital health and self-management of chronic diseases in sub-Saharan Africa: A scoping review. *South African Journal of Information Management, 24*(1), 1-8. https://dx.doi.org/10.4102/sajim.v24i1.1550
- Bucuta, A. (2015). A Review of the Specific Characteristics of the Generation Y Consumer. *International Conference "Marketing – from information to decision"*, 38- 47.
- Department of Health (2024). https://www.gov.za/news/media-advisories/government-activities/health-marks-world-obesity-day-4-mar-03-mar-2024 (Last accessed 08 August 2024)
- DiFilippo, K. N., Huang, Wen-Hao., Andrade, J. E. & Chapman-Novakofski, Karen M. (2015). The use of mobile apps to improve nutrition outcomes: A systematic literature review, *Journal of Telemedicine and Telecare* [Online], 21(5),243–253. Available from: http://sagepub.com/doi: 1[Accessed 7 February 2020]
- Elbert, S. P., Dijkstra, A. & Oenema, A. (2016). A Mobile Phone App Intervention Targeting Fruit and Vegetable Consumption: The Efficacy of Textual and Auditory Tailored Health Information Tested in a Randomized Controlled Trial. *Journal of Medical Internet Research*, 18(6),147. doi: 10.2196/jmir.5056.
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A Flexible Statistical Power Analysis Program for the Social, Behavioural, and Biomedical Sciences. *Behaviour Research Methods*, 39, 175-191. https://doi.org/10.3758/BF03193146
- Ferguson, D.A. & Perse, E. M. (2000). The World Wide Web as a functional alternative to television. *Journal of Broadcasting & Electronic Media, 44,. 155-174.*
- Franco, R. Z. Fallaize, R., Lovegrove, Julie A. & Hwang, F. (2016). Popular Nutrition-Related Mobile Apps: A Feature Assessment.. *JMIR mHealth and uHealth*., 4(3),85.
- Ho, H.Y & Syu, L.Y (2010). *Uses and gratifications of mobile application users*. International Conference on Electronics and Information Engineering, Kyoto, Japan.
- Jones, M., Maddox, J., Benavides-Espinoza, C. & Finnicum, P. (2017). Use of fitness and nutrition applications by college students. *Missouri Journal of Health, Physical Education, Recreation & Dance,* 2017 (27), 63-71.
- Karduck, J. & Chapman-Novakofski, K. (2018). 'Results of the Clinician Apps Survey, How Clinicians Working With Patients With Diabetes and Obesity Use Mobile Health Apps', *Journal of Nutrition Education and Behavior*. Elsevier, 50(1), p. 62–69.e1. doi: 10.1016/J.JNEB.2017.06.004.
- Lee, H. E. & Cho, J. (2017). What Motivates Users to Continue Using Diet and Fitness Apps? Application of the Uses and Gratifications Approach, *Health Communication*. 32(12), 1445–1453. Available from: Routledge [Acessed 21 may 2020].
- Mwakideu, C. (2019). *Obesity in Africa: A looming health catastrophe*, *dw.com*. Available at: https://www.dw.com/en/obesity-in-africa-a-looming-health-catastrophe/a-49920972 (Accessed: 8 December 2020).
- Negash, S., Musa, P., Vogel, D. & Sahay, S. (2018). Healthcare information technology for development: improvements in people's lives through innovations in the uses of technologies. *Information Technology for Development*. 24(2),189–197. doi: 10.1080/02681102.2018.1422477.
- Nermoe, K. (2018). *Millennials: The 'wellness generation', Standford.com.* Available at https://news.sanfordhealth.org/sanford-health-plan/millennials-wellness-generation/ (Accessed: 12 November 2020).
- Payne, H. E., Lister, C., West, J.H. & Bernhardt, Jay M. (2015). 'Behavioral functionality of mobile apps in health interventions: a systematic review of the literature.', *JMIR mHealth and uHealth*. JMIR Publications Inc., 3(1), pp20. doi: 10.2196/mhealth.3335.
- Samoggia, A., & Riedel, B. (2020). Assessment of nutrition-focused mobile apps' influence on consumers' healthy food behaviour and nutrition knowledge. *Food research international* (Ottawa, Ont.), 128, 108766. https://doi.org/10.1016/j.foodres.2019.108766
- Schoeppe, S., Alley, S., Van Lippevelde, W., Bray, N. A., Williams, S. L., Duncan, M J. & Vandelanotte, C. (2016). Efficacy of interventions that use apps to improve diet, physical activity and sedentary behaviour: a

systematic review. *International Journal of Behavioral Nutrition and Physical Activity*. BioMed Central, 13(1), 1-26. doi: 10.1186/s12966-016-0454-y.

- Tchuenchieu, A., Kesa, H., Koufie, G. & Onyenweaku, E.O. (2021). A pilot study of the Nutrition-related apps and software in Africa during COVID-19 pandemic. *SciMedicine Journal* 3(COVID-19), 16-23. https://doi.org/10.28991/SciMedJ-2021-03-SI-3
- Ulfa, M., Setyonugroho, W., Lestari, T., Widiasih, E., & Nguyen Quoc, A. (2022). Nutrition-Related Mobile Application for Daily Dietary Self-Monitoring. *Journal of nutrition and metabolism*, *2022*, 2476367. https://doi.org/10.1155/2022/2476367
- Wang, Q., Egelandsdal, B., Amdam, G. V., Almli, V. L., & Oostindjer, M. (2016). Diet and Physical Activity Apps: Perceived Effectiveness by App Users. *JMIR mHealth and uHealth*, 4(2), e33. https://doi.org/10.2196/mhealth.5114
- West, J. H., Belvedere, L. M., Andreasen, R., Frandsen, C., Hall, P. C. & Crookston, B. T. (2017). Controlling your 'app'etite: How diet and nutrition-related mobile apps lead to behavior change. *JMIR mHealth and uHealth*, 5(7), 95. doi: 10.2196/mhealth.7410.
- Wharton, C. M., Johnston, C. S., Cunningham, B. K. & Sterner, D. (2014). Dietary Self-Monitoring, But Not Dietary Quality, Improves With Use of Smartphone App Technology in an 8-Week Weight Loss Trial. *Journal of Nutrition Education and Behavior*, 46(5), 440–444.
- Zhao, J., Freeman, B. & Li, M. (2016). Can Mobile Phone Apps Influence People's Health Behavior Change? An Evidence Review. *Journal of medical Internet research*, 18(11), 287. doi: 10.2196/jmir.5692.