Benedito Rodrigues da Silva Neto
(Organizador)

MEDICINA:

A ciência e a tecnologia em busca da cura

2

Atena Editora
Ano 2021

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APRESENTAÇÃO

Ciência é uma palavra que vem do latim, "*scientia*", que significa conhecimento. Basicamente, definimos ciência como todo conhecimento que é sistemático, que se baseia em um método organizado, que pode ser conquistado por meio de pesquisas. Já a tecnologia vem do grego, numa junção de "*tecnos*" (técnica, ofício, arte) e "*logia*" (estudo). Deste modo, enquanto a ciência se refere ao conhecimento, a tecnologia se refere às habilidades, técnicas e processos usados para produzir resultados.

A produção científica baseada no esforço comum de docentes e pesquisadores da área da saúde tem sido capaz de abrir novas fronteiras do conhecimento, gerando valor e também qualidade de vida. A ciência nos permite analisar o mundo ao redor e ver além, um individuo nascido hoje num país desenvolvido tem perspectiva de vida de mais de 80 anos e, mesmo nos países mais menos desenvolvidos, a expectativa de vida, atualmente, é de mais de 50 anos. Portanto, a ciência e a tecnologia são os fatores chave para explicar a redução da mortalidade por várias doenças, como as infecciosas, o avanço nos processos de diagnóstico, testes rápidos e mais específicos como os moleculares baseados em DNA, possibilidades de tratamentos específicos com medicamentos mais eficazes, desenvolvimento de vacinas e o consequente aumento da longevidade dos seres humanos.

Ciência e tecnologia são dois fatores que, inegavelmente, estão presentes nas nossas rotinas e associados nos direcionam principalmente para a resolução de problemas relacionados à saúde da população. Com a pandemia do Coronavírus, os novos métodos e as possibilidades que até então ainda estavam armazenadas em laboratórios chegaram ao conhecimento da sociedade evidenciando a importância de investimentos na área e consequentemente as pessoas viram na prática a importância da ciência e da tecnologia para o bem estar da comunidade.

Partindo deste princípio, essa nova proposta literária construída inicialmente de quatro volumes, propõe oferecer ao leitor material de qualidade fundamentado na premissa que compõe o título da obra, isto é, a busca de mecanismos científicos e tecnológicos que conduzam o reestabelecimento da saúde nos indivíduos.

Finalmente destacamos que a disponibilização destes dados através de uma literatura, rigorosamente avaliada, fundamenta a importância de uma comunicação sólida e relevante na área da saúde, assim a obra "Medicina: A ciência e a tecnologia em busca da cura - volume 2" proporcionará ao leitor dados e conceitos fundamentados e desenvolvidos em diversas partes do território nacional de maneira concisa e didática.

Desejo uma ótima leitura a todos!

Benedito Rodrigues da Silva Neto

SUMÁRIO

CAPÍTULO 25

USING THE THEORY OF PLANNED BEHAVIOR TO IDENTIFY WHAT MILLENNIALS THINK ABOUT DIABETES

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ABSTRACT: Millennials are approaching an age when the risk for diabetes onset increases. Since this condition has reached epidemic levels worldwide, it is advisable to explore how to communicate with this group about diabetes prevention. Hence, this study uses the Theory of Planned Behavior (TPB) to begin an exploration about how to build effective diabetes prevention messages for Millennials. Participants between the ages of 23 and 37, ranging between normal weight, overweight and obesity were recruited at a university in Puerto Rico. Three focus groups were conducted with an interview protocol that had questions based on the TPB psychological constructs attitude, perceived subjective norm, perceived behavioral control, intent, and how information on diabetes should be disseminated to capture Millennial's attention. Results showed participants' frustration and fear related to diabetes, their concerns over judgement from friends and family, their struggle with following a healthy lifestyle (despite showing intention to make better efforts) and their call for higher visibility and effectiveness in diabetes message production from health professionals. Recommendations based on the results are made.
KEYWORDS: Millennial; type 2 diabetes; theory of planned behavior; prevention messages.

RESUMEN: Los mileniales se acercan a una edad en la que aumenta el riesgo de diabetes. Dado que esta condición ha alcanzado niveles epidémicos en todo el mundo, es recomendable explorar cómo comunicarse con este grupo sobre la prevención de la diabetes. Por lo tanto, este estudio utiliza la teoría del comportamiento planificado (TPB, por sus siglas en inglés) para comenzar una exploración sobre cómo construir mensajes efectivos de prevención de la diabetes para los mileniales. En una universidad de Puerto Rico, se reclutaron participantes de las edades entre 23 y 37, que oscilaban entre el peso normal, el sobrepeso y la obesidad. Se llevaron a cabo tres grupos focales con un protocolo de entrevista que tenía preguntas basadas en la actitud de los constructos psicológicos de TPB, la norma subjetiva percibida, el control conductual percibido, la intención y cómo se debe difundir la información sobre la diabetes para captar la atención de los mileniales. Los resultados mostraron la frustración y el miedo de los participantes relacionados con la diabetes, sus preocupaciones sobre el juicio de amigos y familiares, su lucha por seguir un estilo de

vida saludable (a pesar de mostrar la intención de hacer mejores esfuerzos) y su llamado a una mayor visibilidad y efectividad en la producción de mensajes sobre la diabetes desde profesionales de la salud. Se hacen recomendaciones basadas en los resultados.
PALABRAS CLAVE: Mileniales; diabetes tipo 2; teoría del comportamiento planificado; mensajes de prevención.

INTRODUCTION

Communication is an intentional process in which, at least, two parties exchange information through signs, symbols, or any other valid form of mutual understanding between these individuals (Aguado, 2004). To achieve an effective information exchange, message design must consider the receivers, for whom the message is intended. In addition to identifying receivers' characteristics, senders must design messages according to those characteristics so that people can decipher and understand the information (Wells, 1994). Aspects to consider when communicating, such as culture, age, media use, lifestyle and language usage, are only some characteristics that broadcasters should take into consideration when designing messages for a group, especially when an action is expected (Besley & Dudo, 2019). These principles are applicable to diabetes prevention message design because risk behaviors for diabetes onset could be influenced by culture, economic status, and lifestyle (Ho, Cheslea & Chun, 2011).

Diabetes mellitus is considered a chronic metabolic disease that raises blood glucose levels and represents a global epidemic that affects 422 million people (World Health Organization, 2021). There are three types of diabetes: type 1, type 2, and gestational (American Diabetes Association, n.d.a), but a minority group develops diabetes due to other conditions. Diabetes causes health complications, but with physical activity, a balanced diet, and medication, type 2 diabetes onset can be prevented or delayed (World Health Organization, 2021). Although prevention information is disseminated (World Health Organization, n.d.; Pan American Health Organization, n.d.), diabetes prevalence continues to increase, as statistics show (World Health Organization, n.d.).

Diabetes prevalence has increased faster in low- and middle-income countries than in high-income countries (World Health Organization, n.d). Obesity and the lack of physical activity, among other factors, can lead to an increase in type 2 diabetes prevalence (Tuei et al., 2010; Pan American Health Organization, n.d.). The risks of developing type 2 diabetes are higher in people 45 years of age or older who are either Black, Hispanic, Native American, Asian American, or Pacific Islander, have a family member with diabetes, are overweight, lead sedentary lives, have high blood pressure, have had gestational diabetes, or have been diagnosed with polycystic ovary syndrome (American Diabetes Association, n.d.b). Therefore, prevention is the key to reducing this condition's prevalence. Because Millennials began to be born in 1981 (Bialik & Fry, 2020), some of them are already 40 years of age. Hence, it is advisable to emphasize diabetes prevention in this generation, since

there are older Millennials who already have type 2 diabetes (Ducharme, 2019).

MILLENNIALS

During childhood and youth, Millennials, who are born between 1981 and 1996, see the arrival of the internet and witness its evolution (Bialik & Fry, 2020). Wellbeing and personal care represent the lifestyle cultivated by this group, as Millennials value the consumption of healthy foods, keeping a stable weight and a healthy mind (Fona International, 2020). However, Ducharme (2020) indicates that Millennials suffer more health issues than Generation X. Between 2014 and 2017, the prevalence of type 2 diabetes increases by 22% in this generation (Blue Cross Blue Shield, 2019a). Nonetheless, a survey reveals that Millennials take type 2 diabetes less seriously than older generations, even though they claim to be more aware of it (Diabetes in Control, 2020). Therefore, it is necessary to create projects that show this generation the importance of diabetes prevention and medical care by employing the technology and language used by Millennials (Blue Cross Blue Shield, 2019b). The development of such projects must consider Millennials' intention to prevent type 2 diabetes, and the Theory of Planned Behavior can shed light by showing how they think about the condition before prevention messages are designed for this group.

THEORY OF PLANNED BEHAVIOR

Based on the Theory of Reasoned Action, Icek Ajzen develops the Theory of Planned Behavior (TPB) to study and understand human behavior (LaMorte, n.d). TPB stipulates that, by understanding human beings' behavioral and normative beliefs and society's norms, it is possible to establish the reason for people's behavior (Mathew et al., n.d). The difference between both theories is that Ajzen states that, to understand human behavior and its changes, it is also necessary to measure how much control a person thinks he or she has over his/her behaviors and his/her intention to perform actions (LaMorte, n.d). The intention to perform an action is not sufficient to perform it; there must be a total control of the factors that mediate the performance of the final behavior (Ajzen, 1985).

Thus, the TPB seeks to explain that human behaviors have a conscious and intentional decision, and, simultaneously, they are influenced by the attitude towards "the probability that the behavior has the expected result and the subjective evaluation of the risks and benefits of that result" (LaMorte, n.d). To provide this explanation, the theory uses four constructs that represent a person's control over his/her behaviors: 1) attitudes (level at which a person favors the behavior, taking into account the results of that behavior); 2) subjective and social norms (belief about the behavior's level of approval that individuals have in people's lives, a social group or cultural); 3) perceived behavioral control (the idea of how easy or difficult a person thinks performing a behavior is, based on the control of

the elements that can prevent or help in the implementation of a behavior); and 4) intention (motivational factors that influence behavior; where the greater the intention, the more likely the action is) (Mathew et al., n.d.; LaMorte, n.d.). The theory takes these constructs as elements that positively or negatively influence a person's intention to perform an action (Mathew et al., n.d.).

Studies in the health field use the TPB to analyze disease prevention, drug use, disease management and addictions, such as smoking, alcoholism, and other controlled substances (LaMorte, n.d.). Arafat et al. (2018) add that TPB can also be used to understand how to achieve behaviors related to chronic diseases, such as diabetes prevention and management. Akbar et al. (2015) demonstrate that the theory helps to achieve an understanding of people's behaviors and, consequently, create better intervention strategies to accomplish behavioral changes that promote chronic disease prevention.

Davies et al. (2010) conduct a study to understand the effects that personality has on intentions and physical activity in people with type 2 diabetes in Australia. The results show that, besides analyzing type 2 diabetes patients' personalities to motivate them to carry out physical activities, a change in their attitude must be sought and the perceptions of control they have over physical activity must be improved. Plotnikoff and other researchers (2010) conduct a study to help adults with diabetes understand the benefits of physical activity. The results show that the TPB contributes to anticipating, understanding, and implementing physical activity behaviors that help in managing the condition. Likewise, Blue (2007) studies the TPB usefulness and the risk perception of diabetes onset to identify those beliefs that could be modified for preventing this condition. The results show that risk perception of diabetes onset among participants is not related to the intention to change physical activity and / or eating behaviors. However, subjective norms and perceived behavioral control of participants' actions did have an impact on the intention to be physically active; meanwhile, attitude, subjective norms and perceived behavioral control were related to the intention to maintain a healthy diet. Based on these results, Blue (2007) affirms that the theory is effective in explaining and creating programs that promote better diabetes prevention habits.

This theory is usually applied in quantitative studies, but it is also used in qualitative research, seeking to understand different behaviors based on the type and amount of data available or the research methodological approach (Renzi & Klobas, 2008). The qualitative application allows the in-depth study of a smaller number of participants, where the wealth of information obtained has a greater value than the possibility of replicating the study (Renzi & Klobas, 2008). As an example of this application, Zoellner (2012) conducts a qualitative study to understand the patterns of beverage consumption among adults in Virginia, United States, to conceive the reasons why there were differences in behavior and preferences when drinking water or some sweetened beverages.

Based on the information discussed above, the purpose of this study is to use the TPB to investigate attitudes, subjective and social norms, perceived behavioral control and

the intention to prevent type 2 diabetes that Millennials have, to identify what they think about this condition so that health educators or communicators have a better understanding of the issues that must be addressed when designing effective diabetes prevention messages. In addition, the study seeks to identify the media and language that should be used to educate this group about diabetes prevention.

MATERIALS AND METHODS

The study was conducted in the fall of 2019 at a university in Puerto Rico. After receiving institutional approval for the research protocol CIPSHI #1819-232 from the Institutional Committee for the Protection of Human Beings in Research to do the study, three focus groups were conducted. A research assistant recruited participants for each focus group. In addition, this person, following a question guide, moderated the focus groups. A focus group design first emphasizes free discussion and then, moves toward a more structured discussion of specific questions (Morgan, 1997).

To participate in the study, individuals should have been born between 1981 and 1996 and had someone in their household diagnosed with diabetes. On the day of each focus group, participants received an informed consent form. After signing the sheet, they were asked to fill out a questionnaire that measured the risk they thought they had of developing diabetes in the future. To compare the perceived risk with the real risk, questions about risk factors for the development of the condition (physical activity, type of diet, weight, height, age) and if they have ever had sugar levels a little higher than normal without the person having been diagnosed with diabetes were included (Mayo Clinic, n.d.). Participants received a $10.00 gift card upon completion of their participation in the focus groups.

RESULTS

Three focus groups were conducted. With fourteen women and four men between the ages of 23 and 37 that participated in the study, saturation was achieved. Morse (1995) indicates that saturation occurs when the amount of variation in the data stabilizes, and new insights and explanations are no longer coming from the data. Participants were asked if they think that, based on their lifestyles, they are at risk for developing diabetes. Ten people indicated that they do not have a high probability of developing diabetes; seven people claimed to be at high risk and thought they will surely develop the condition in the future; and a person indicated to have no risk. The average physical activity (for example, brisk walking or activities that make you sweat for at least 30 minutes) of the group is 2.7 days a week, while the average number of weeks in a month in which they engage in those activities is 1.6. According to the weight and height reported by the participants and using the body mass index formula (Centers for Disease Control and Prevention, n.d.), these individuals

are classified as: normal weight (6 participants), overweight (7 participants) and obesity (5 participants), suggesting that, based on family history and body mass, 12 participants are at real risk of developing diabetes in the future. Four people reported having pre-diabetes already.

To measure participants' diabetes knowledge, they were asked what diabetes is and how many types there are. They agreed that diabetes is a disease related to blood sugar levels and the inability the body has to level it, but they were doubtful about identifying its types since they stated: "There are several types ...", but "I have no knowledge." On the causes of the condition, they indicated that it may be hereditary or genetic and lifestyle. There was a consensus that diabetes is preventable with a balanced diet and an active lifestyle that includes exercise. In addition, they stated that medical consultations help in diabetes prevention because they identify symptoms. All participants thought that anyone is at risk of developing the condition, but recognized that high-glucose diets, socioeconomic status, and people's accessibility to food increase the possibility of its onset. Participants showed a lack of knowledge about the complications caused by diabetes.

Attitudes

To find out participants' attitudes about diabetes, they were asked what they think about the condition and why. Everyone thinks diabetes is a social problem that haunts the area where they live, and it is caused by the system because it is difficult to lead a healthy lifestyle. They also think that there is misinformation about diabetes. For four participants, diabetes is a horrible disease, given the implications it has had on their families. One person stated: "I think that diabetes is a serious problem, but, more than a problem, it is a consequence. A consequence of this system that, to some extent, glorifies the fact that we are eating badly, that we do not have time to exercise." Participants manifested feeling sadness, frustration, fear, anger, and helplessness because there are no laws that support diabetes prevention and because not all people have access to adequate health services. For example: "It makes me sad that there are so many people who are going through this ... sad that it is something that is not being addressed in the way it is supposed to be addressed."

For them, diabetes prevention is not easy to achieve due to the following: 1) they believe Puerto Ricans have a high carbohydrate diet; 2) mass media pressure on food selection; 3) the lack of information on diabetes; 4) inefficient diabetes education materials; and 5) healthy food is expensive. Likewise, they understand that the health system on the island focuses on finding solutions once diseases are diagnosed and not on preventing its onset. They manifested that having a better quality of education and greater access to better nutrition would facilitate diabetes prevention. "I think it is not easy [to prevent diabetes] ... There are lots of things written about diabetes ... But, [diabetes] is not [an issue] that, like other campaigns, you can easily see it as something that is generally discussed

out there… There are organizations dedicated exclusively to treating diabetes [and] entire days are dedicated to [discussing information about] preventing diabetes. Likewise, it is not [an issue with which] you come across regularly, as you come across other campaigns or other efforts that are being made… by government institutions, or [whoever] it is [sharing information to prevent this condition]."

Perceived subjective norm

Ten participants mentioned that their family members' reactions would be positive if participants were making changes in their diet and amount of physical activity to prevent diabetes. For example, one participant said: "I think so, because family support helps me [get] ahead and then I could help my family ... Plan everything as a family to have that support." But some participants think that such people would find the change extreme, because usually that kind of behavior focuses on disease management and not prevention. There were five participants who indicated that there is a possibility of a negative reaction to changes due to the cost of healthy food. Participants indicated that people who are important to them would support them emotionally so they can engage in physical activities, but they would not join them, which is what participants wished for.

Perceived behavioral control

Thirteen participants indicated that they would be willing to make dietary and physical activity changes to prevent diabetes, but five of them stated that they would, only if they were at an imminent risk, since they think that, due to their lifestyles, it is difficult for them to modify their eating habits and physical activity. Regarding the necessary changes, one person said: "I think the words 'all you need' are a problem. I would be willing to change my habits. It would be super slow because I am a super chocolatier… And finding the time to exercise would also be difficult. But, if my life is in danger, I would have to start doing it." There were participants who indicated that the cost of exercising in safe places can be high, and that other options may be unsafe. One person manifested that he or she prefers to exercise at night, but security in the city is not good: "I am afraid to go out at night, […] that it is a good time [because] the sun does not shine." There were participants who were concerned about their social life being affected due to engaging in diabetes prevention behaviors.

Intent

Participants indicated that they do intend to make changes, hoping that these will bring positive effects to their lives. They would expect physical and emotional results that would put them in a better position. However, they acknowledge that it could have a negative impact, because "that lifestyle is expensive, both food and controlled physical activity." One person says, "Yes, I would. And it would affect my lifestyle, because I must create a new one, [one that fits] my schedule." While another said: "Of course I would, and even more if it comes from medical advice." There are participants who understand that the main reason

or motivation for making changes that help prevent diabetes would be to receive a diagnosis made by a doctor that shows imminent danger. Likewise, due to a social commitment, the participants understand that they would make the changes if they had to help a friend or relative, or that a relative or friend encouraged them to make the changes.

HOW TO DISSEMINATE INFORMATION ON DIABETES

Participants understand that the way health organizations disseminate information about diabetes prevention for Millennials is incorrect. Although they think that information sessions and pamphlets can work with another group, they think it is necessary to use technological formats, such as videos and infographics that capture their attention. “I don’t know, I think pamphlets are not very effective. I’m going to read them the first time someone gives them to me, but then, I’m going to discard them, and it’s not something [I’m] going to be actively thinking about ...” They pointed out that the content must be diverse, entertaining, and respectful to the intelligence of the receiver.

They agreed that digital formats and spaces that go beyond traditional media outlets should be used to transmit information. They believe that the use of creative and interactive videos, images and graphics is necessary in digital spheres and in mass media spaces. They suggested the use of influencers to humanize the issue and provide solutions. One person indicated: “As for [the] consumption of social networks, perhaps the first and second [time] I am going to see it, I am going to pay attention to it. Afterwards, it will bother me every time [the information] comes out, because I already saw it, and I am not necessarily going to be thinking about it…; You must include a varied content that does not repeat information on different social networks.” Also, participants pointed out that it is necessary to change the actual face diabetes has and emphasize that it can also affect young adults since they perceive that the condition is only diagnosed in elderly people.

Participants believe that diabetes prevention materials for Millennials should use a simple and serious vocabulary about preventing the condition. It should also encourage an honest conversation about diabetes. They believe that messages must appeal to emotions, without causing fear, and use statistical data. They understand that they need to be offered options on how to eat well and participate in physical activities daily. One person said: “A dialogue that offers me options would work for me. Tell me ‘We recommend that you do not do this, however, you can do this’. This may be more convenient. This [action] can result in X thing”. The information should be presented in narratives that tell stories that evolve, so it does not become repetitive.

DISCUSSION

An emphasis on preventing type 2 diabetes from an early age is important in reducing the diabetes epidemic. It is necessary to promote health behaviors in this generation since

Millennials are already approaching the age when the risk of developing type 2 diabetes increases (American Diabetes Association, n.d.b; Bialik & Fry, 2020). Based on the results, TCP can help identify what Millennials think about the condition so that effective prevention messages tailored at them can be designed.

Participants understand that eating healthy food is expensive. However, there are ways to consume a balanced diet at a lower cost (Bjarnadottir, 2017) and options should be presented in the messages. Studies indicate time might be an essential ingredient in the production of healthier eating habits among adults (Monsivais, et al. 2014). Therefore, suggestions and examples of how to save time when preparing food should be offered (Chen, 2016). There is a perception that physical activity is expensive and there is no time to do it. Thus, the messages should present physical activity options that are incorporated into daily living without having to go to a gym, such as taking the stairs instead of taking the elevator (American Heart Association, 2017).

The answer to the questions about perceived subjective norm showed that belonging to a group is important for diabetes prevention, which is an aspect tied to culture (Oomen Early; Owen; Suggs, 1999). There are participants who want their family members to prevent diabetes with them by adopting preventive behaviors, rather than only showing emotional support. In addition, there is concern about friends not wanting to socialize with a person who is trying to modify eating habits, because they cannot consume the same type of food that participants would. These arguments suggest that preventive messages should be directed to groups to explain to them how their members can help people who are at risk for developing type 2 diabetes, which should not present a problem, since healthy eating and physical activity benefits all individuals. Due to their social commitment, there are participants who are willing to help other people prevent diabetes. Although there are prevention campaigns that ask the audience to make changes for their families to prevent the condition (International Diabetes Federation, n.d.), it is recommended that, according to the responses in this study, the whole family should be involved in prevention.

Regarding the perceived behavioral control and the intention to prevent diabetes, the participants understand that diabetes can be prevented, but they consider that doing so is difficult due to their lifestyles, the high cost of food and the social sacrifice that it represents, because they think that their friends will not want to socialize with them if they have a different diet. A pre-diabetes diagnosis would motivate the prevention of this condition, but it is recommended that prevention begins before reaching this point by making some healthy changes, including eating healthier and getting active (Centers for Disease Control and Prevention, 2019), since not all people have time to avoid or delay type 2 onset diabetes. It is recommended to create messages that explain the importance of practicing health behaviors daily. The issue of how the health system does not support type 2 diabetes prevention should be addressed elsewhere.

The communication that is used to educate this group must consider that, according

to participants, diabetes affects older people, so they do not see the need to start preventing the condition immediately. Hence, it is advisable to design prevention messages that create a new identity for type 2 diabetes because there are participants in this study who do not perceive they are at risk of developing diabetes in the future, although they have a real risk because they are overweight or obese, live sedentary lives, have poor diets, and have a family history of diabetes. It is recommended to create a variety of interactive messages that include narratives, offer ideas on how to integrate prevention behaviors into practice without repeating the same information, and they must appeal to emotions and include statistics. Future research should concentrate on assessing diabetes prevention message design to determine what information resonates with this group.

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REFERENCES

Aguado, J.M. (2004). ***Introducción a las Teorías de la Información y Comunicación***. University of Murcia. https://bit.ly/3eVva6Z.

Ajzen, I. (1985). **From Intentions to Actions: A Theory of Planned Behavior. In J. Kuhl and J. Beckmann** (Eds.), Action-control: From Cognitions to Behavior (pp. 11-39). Springer, Heidelberg. https://link.springer.com/chapter/10.1007/978-3-642-69746-3_2.

Akbar, H., Anderson, D., & Gallegos, D. (2015). **Predicting intentions and behaviors in populations with or at-risk of diabetes: A systematic review**. *Preventive Medicine Reports*, *2*, 270-282. https://bit.ly/2YZnf2X.

American Diabetes Association. (n.d.a). **Prevention**. https://bit.ly/3eVGKyW.

American Diabetes Association. (n.d.b). **Diabetes Risk**. https://bit.ly/3eZVAV3.

American Heart Association. (2017). **No Time for Exercise? Here Are 7 Easy Ways to Move More!.** https://bit.ly/3ixlp0R.

Arafat, Y., & Ibrahim, M.I.M. (2018). **The Use of Measurements and Health Behavioral Models to Improve Medication Adherence**. In Mohamed Izham Mohamed Ibrahim, Albert I. Wertheimer, Zaheer-Ud-Din Babar (Eds.), *Social and Administrative Aspects of Pharmacy in Low- and Middle-Income Countries* (pp. 53-69). Academic Press. https://doi.org/10.1016/B978-0-12-811228-1.00004-2.

Besley, J.C., & Dudo, A. (2019). **What It Means To 'Know Your Audience' When Communicating About Science**. The Conversation. https://bit.ly/2ZJrRto.

Bialik, K & Fry, R. (2019). **How Millennials compare with prior generations?**. Pew Research Center. https://www.pewsocialtrends.org/essay/millennial-life-how-young-adulthood-today-compares-with-prior-generations/.

Bjarnadottir, A. (2017). **19 Clever Ways to Eat Healthy on a Tight Budget**. Healthline. https://bit.ly/2D4iYmg

Blue, C. (2007). **Does the Theory of Planned Behavior Identify Diabetes-Related Cognitions for Intention to Be Physically Active and Eat a Healthy Diet?**. *Public Health Nursing, 24*(2), 141-150. https://doi.org/10.1111/j.1525-1446.2007.00618.x.

Blue Cross Blue Shield. (2019a). **The Health of Millennials**. https://bit.ly/3e9h9S7

Blue Cross Blue Shield. (2019b). **Helping millennials embrace preventive medicine**. https://bit.ly/3f2aZV7.

Centers for Disease Control and Prevention. (n.d.). **Adult BMI Calculator**. https://bit.ly/3e3qjzg.

Centers for Disease Control and Prevention. (2019). **On Your Way to Preventing Type 2 Diabetes**. https://www.cdc.gov/diabetes/prevent-type-2/guide-prevent-type2-diabetes.html

Chen, A. (2016). **Here's How to Eat Healthy While Saving Time and Money**. Huffington Post. https://bit.ly/3gt0hqR.

Davies, C. A., Mummery, W.K., & Steele, R.M. (2010). **The Relationship between Personality, Theory of Planned Behaviour and Physical Activity in Individuals with Type II Diabetes**. *British Journal of Sports Medicine, 44*(13), 979-984. http://dx.doi.org/10.1136/bjsm.2008.050930.

Diabetes in Control. (2014). **"Millennial" Age Group Concerned about Managing Their Diabetes**. https://bit.ly/2C8zzoy.

Ducharme, J. (2019). **Millennials Love Wellness. But They're Not as Healthy as People Think, Report Says**. *Time*. https://bit.ly/2Z0co8R.

Fona International. (2019). **Millennials & Wellness: The New Health Horizon**. https://bit.ly/38uqLpb.

Ho, E.Y., Chesla, C.A., & Chun, K.M. (2011). **Health Communication with Chinese Americans About Type 2 Diabetes**. *The Science of Diabetes Self-Management and Care*, *38*(1), 67-76. https://doi.org/10.1177/0145721711428774.

International Diabetes Federation. (n.d.). **Posters: World Diabetes Day**. https://worlddiabetesday.org/resources/wdd2018-19/posters-2/

Lamorte, W.W. (2019). **The Theory of Planned Behavior**. Boston University School of Public Health. https://bit.ly/2C2Vuh4.

Mathew, M., Li, K., Kloosterman J., Albright A., & Taddesse N. (n.d.). **Development of Theory of Planned Behavior.** Lumen Learning Courses. https://bit.ly/2VK0BcI.

Mayo Clinic. (n.d.). **Type 2 Diabetes: Symptoms and Causes**. https://mayocl.in/2ZFRPO2

Monsivais, P., Aggarwal, A., & Drewnowski, A. (2014). **Time Spent on Home Food Preparation and Indicators of Healthy Eating**. *American Journal of Preventive Medicine, 47*(6), 796-802. https://doi.org/10.1016/j.amepre.2014.07.033

Morgan, D.L. (1997**). Focus Groups as Qualitative Research**. (2nd ed.). Sage Publishing.

Morse, J. (1995). **The Significance of Saturation**. *Qualitative Health Research, 5*(2), 147-149. https://journals.sagepub.com/doi/pdf/10.1177/104973239500500201.

Oomen-Early, J., Owen, L., & Suggs, L.S. (1999). **Culture Counts: Why Current Treatment Models Fail Hispanic Women with Type 2 Diabetes**. *The Diabetes Educator, 25*(2), 220-225. https://bit.ly/3e4oQZr.

Pan American Health Organization. (n.d.). **Diabetes**. https://www.paho.org/es/temas/diabetes.

Plotnikoff, R.C., Lippke, S., Courneya, K., Birket, N., & Sigal, R. (2010). **Physical activity and diabetes: An application of the theory of planned behavior to explain physical activity for Type 1 and Type 2 diabetes in an adult population sample**. *Psychology & Health*, 25(1), 7–23. https://bit.ly/3e42ZS2.

Renzi, S., & Klobas, J.E. (2008). **Using the Theory of Planned Behavior with Qualitative Research**. *Carlo F. Dondena Centre for Research on Social Dynamics.* https://bit.ly/31MfQ8P.

Tuei, Vivian & Maiyoh, Geoffrey & Ha, Chung-Eun. (2010). **Type 2 diabetes mellitus and obesity in sub-Saharan Africa**. *Diabetes/metabolism research and reviews*. 26. 433-45. http://dx.doi.org/10.1002/dmrr.1106.

Wells, J.A. (1994). **Readability of HIV/AIDS educational materials: The role of the medium of communication, target audience, and producer characteristics.** *Patient Education and Counseling,* 24(3), 249-259. https://bit.ly/2YWNd78.

World Health Organization. (2021). **Diabetes: Key Facts**. https://bit.ly/2VL2kPh.

World Health Organization. (n.d.). **Diabetes**. https://bit.ly/2NRV3c2.

Zoellner, J., Krzeski, E., Harden S., Cook, E., Allen, K., & Estabrooks, P.A. (2012). **Qualitative application of the theory of planned behavior to understand beverage consumption behaviors among adults**. *Journal of the Academy of Nutrition and Dietetics*, 112(11), 1774-1784. https://doi.org/10.1016/j.jand.2012.06.368.

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