# Online Cross-Sectional Survey on the Plight of Patients With Diabetes Mellitus Regarding Primary Self-Care During the First COVID-19 Enhanced Community Quarantine in Metro Manila From March to May 2020

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## ABSTRACT

The enhanced community quarantine (ECQ) implemented from March 17 to May 30, 2020, in Metro Manila due to the COVID-19 pandemic had a tremendous impact on our society. However, the predicament among patients with preexisting conditions such as diabetics is of greater concern. Medical facilities were overwhelmed by the needs of COVID-19 patients, and patients having other medical conditions were discouraged from casually visiting the hospital for consultation due to the risk of acquiring COVID-19 infection.

An online cross-sectional survey was conducted among 107 diabetic participants aged 22 to 76 years. This study aimed to describe the plight of diabetics regarding their disease before and during the ECQ. Through this study, challenges and coping capabilities were identified. The survey revealed that, prior to the pandemic, diabetic patients were already having difficulty following their treatment regimen despite awareness of the benefits of following it. During the ECQ, patients with high educational attainment and financial capability also had insecurities regarding the adequacy of medication and glucose test strip supplies, maintaining the recommended level of physical activity, and access to medical attention. Majority of the participants continued to rely on personal out-of-pocket expenditure during the ECQ despite the government's amelioration program.

Keywords: COVID-19, diabetes mellitus, enhanced community quarantine, Metro Manila

#### INTRODUCTION

#### **Background of the Study**

In December 2019, the first news about an unknown virus emerged from Wuhan, China. Initially named as the 2019 novel coronavirus, later on, it was officially named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by the World Health Organization. "Coronavirus disease 2019" or COVID-19 is the disease resulting from this viral infection (World Health Organization, n.d.; Yi Chi, ChingSung, & Yu-Jiun, 2020). By March 2020, Europe became one of the major centers of the pandemic (*The Lancet*, 2020). The deaths in Italy had outnumbered the deaths in China, while Iran and Spain had over 1,000 deaths (Dale & Stylianou, 2020). In the end, it has spread in all seven continents.

The most common symptoms exhibited by an infected person include fever, dry cough, and tiredness. Moreover, there are a plethora of other symptoms that were documented, such as body pain, sore throat, diarrhea, conjunctivitis, and headache, loss of taste or smell, and skin rash (European Centre for Disease Prevention and Control, 2020; World Health Organization, 2020a).

Woefully, asymptomatic people pose greater concerns from an epidemiologic standpoint. They are able to unknowingly transmit the infection to other people who they come into contact with. This has led to the decision of many governments worldwide to mandate lockdowns in order to prevent "super spreader events" (Beldomenico, 2020).

The health sector's attention shifted towards the current pandemic and away from many preexisting health conditions. However, new data have shown that suffering from patients chronic noncommunicable diseases such as diabetes mellitus actually face compounding challenges in this pandemic (Centre for Evidence-Based Medicine, 2020). Aside from having increased risked mortality due to possible complications, their access to healthcare is also limited by the community quarantine implemented by the government (Peric & Stulnig, 2020).

With the confirmation of local transmission of COVID-19 in the Philippines, the government mandated enhanced community quarantine (ECQ), which included restrictions of people in

their homes except for essential activities, suspension of public transportation, and prohibition of intercity travel (Haw, Uy, Sv. & Abrigo, 2020;World Health Organization, 2020b). Although the scientific rationale for this policy is evident, the equitable implementation of the ECQ was critical especially for the vulnerable population, such as the poor, the old, the disabled, and those dependent on ongoing medical treatment among others (International Diabetes Federation, 2020; Lewnard & Lo, 2020).

On March 6, 2020, the fifth patient infected by the SARS-CoV-2 virus, a 52year-old Filipino with preexisting hypertension and diabetes, was confirmed by the Department of Health. As the number of cases increased, more cases of patients infected with COVID-19 who had preexisting diabetes were seen (Haw et al., 2020).

Diabetes mellitus is a disorder that requires constant monitoring, faithful treatment, and frequent visits to health facilities. Insulin is a sensitive hormone required by diabetics in severe situations to regulate their blood glucose level, and access to such medication is a critical link in the chain to survival of these patients (O'Keefe Osborn, 2019).

One concern among diabetics is that poor blood glucose control may lead to an immunocompromised state (Arcellana & Jimeno, 2020). Furthermore, diabetics infected with COVID-19 were found to have higher stress conditions leading to the release of hormones promoting elevated blood glucose levels (Hussain, Bhowmik, & do Vale Moreira, 2020).

To decrease the possibility of catching the virus, it is recommended for them to remain at home. While having diabetes does not necessarily place anyone at greater risk of infection, it raises their risk of serious complications (Davidson, 2020).

## **Research Objectives**

In this study, the plight of diabetics during the ECQ implemented in Metro Manila due to the surge in COVID-19 cases was analyzed. This study described the beliefs and practices of diabetics regarding their disease prior to the pandemic and associated it with their experiences during the ECQ. Through this study, challenges and coping capabilities were identified.

#### **Scope and Limitations**

Since individuals with underlying medical conditions were prohibited to leave their home during the period of the ECQ, only adult diabetics with Internet access were invited to participate in the study. Furthermore, the participants were limited to those guarantined in Metro since they shared similar Manila predicaments that were not present in Diabetic other provinces. patients requiring regular hemodialysis were excluded from this study since they should have established schedules and means of transport with their medical provider.

## Significance of the Study

This research will benefit diabetics and their family in understanding the importance of controlling their disease in the face of the continuing pandemic. This can also serve as a reminder for health practitioners and officials that people with preexisting medical conditions are more vulnerable to the threat of COVID-19.

# METHODOLOGY

## **Participants and Procedure**

Diabetic patients aged 22 to 76 years participated in an online survey conducted from May to August 2020. The prospective participants were sent a Google Forms link containing informed consent and a questionnaire. A total of 107 participants were able to complete the survey and meet the inclusion criteria.

## **Collection Tool**

Participants had the choice of answering either an English or a Filipino version of the online survey. Most questions were provided with a drop-down menu for convenient selection of appropriate answers. For responses not included in the choices, an open option was available.

The survey proper had three sections: (1) sociodemographic information of the participant, (2) questions regarding the participant's knowledge and practices regarding the management of diabetes, and (3) questions regarding how the participant coped during the period of the ECQ.

## **Research Design**

This is a cross-sectional descriptive study using closed-ended questions with an open option for the demographic data and the Likert scale model for the knowledge and practices of respondents.

## Data Analysis Strategy

Microsoft Excel 2016 was used for editing, sorting, and coding of data. The same software was used for generating descriptive statistics and graphs.

## **Ethical Consideration**

This study was conducted in accordance with the Declaration of Helsinki and the De La Salle University Code of Research Ethics.

## **RESULTS AND DISCUSSION**

#### **Sociodemographic Characteristics**

Out of the 107 participants, majority (71.03%) are female with many belonging to the age groups of 28–32 years (19.63%) and 38–42 years (16.82%) as seen in Table 1.

Variables	Frequency	Percentage
Gender		
Male	31	28.97%
Female	76	71.03%
Age Groups		
18-22	1	0.93%
23-27	10	9.35%
28-32	21	19.63%
33-37	12	11.21%
38-42	18	16.82%
43-47	15	14.02%
48-52	9	8.41%
53-57	10	9.35%
58 and older	11	10.28%
Residence in Metro Manila	1	
Capital (Manila)	16	14.95%
Eastern District	50	46.73%
Northern District	10	9.35%
Southern Distric	30	28.04%
Level of Education		
High School Graduate	10	9.35%
College Graduate	70	65.42%
Post Graduate	23	21.50%
Not Applicable	4	3.74%

Table 1. Demographic Characteristics of Participants (n = 107)

As mentioned, the participants were restricted to residents of Metro Manila. Table 1 shows that almost half of the participants (46.73%) reside in the Eastern District of Metro Manila, which includes Mandaluyong, Marikina, Pasig, Quezon City, and San Juan. The cohort is generally well educated with 65.42% being college graduates and 21.5% having postgraduate-level education.

Table 2 shows that the proportion of participants is scattered when it comes to the duration of having the disease. A good portion of the participants (19.63%) have been living with diabetes for more than a decade, with 12.15% living with it for about 3 to 4 years.

As expected from the inclusion criteria set for this study, many of the participants are financially capable. As seen in Table 2, a significant majority (78.5%) own a personal glucometer, but despite this fact, 14.95% get to monitor their capillary blood glucose (CBG) only when visiting medical facilities, while

Table 2. Demographic Characteristics of Participants Related to Diabetes Mellitus (n = 107)

15.89% never really monitor their CBG.

Variables	<b>Frequen</b> cy	Percentage	
Number of years diagnosed		0	
Less than 1 year	17	15.89%	
1 to 2 years	16	5.61%	
3 to 4 years	20	12.15%	
5 to 6 years	15	10.28%	
7 to 8 years	8	4.67%	
9 to 10 years	10	3.74%	
More than 10 years	21	19.63%	
Ownership of glucometer			
Yes	84	78.50%	
No	17	15.89%	
Borrowed	6	5.61%	
Frequency of CBG monitoring			
Once a day	38	35.51%	
2x a day	20	18.69%	
3x a day	4	3.74%	
4 or more	12	11.21%	
In clinic only	16	14.95%	
Never	17	15.89%	
Estimated date of last consult prior to start of ECQ			
January to March 2020	12	11.21%	
October to December 201	94	3.74%	
July to August 2019	2	1.87%	
April to June 2019	5	4.67%	
More than 1 year	19	17.76%	
Never	65	60.75%	
Use of medical diary to record	d daily regim	en	
Yes	45	42.06%	
No	62	57.94%	
Financial source of medicatio	n		
Personal (out-of-pocket)	98	91.59%	
Government	6	5.61%	
Private health insurance	1	0.93%	
Both Personal and Govern	ment 1	0.93%	
Did not take medication	1	0.93%	

Diabetes is a lifelong disease and needs to be followed by health-care professionals regularly. However, among the participants surveyed, 60.75% have not sought consultations for at least a year prior to the implementation of the ECQ. Furthermore, less than half (42.06%) keep a medical diary to document their daily CBG monitoring, food intake, and treatment. This is the reality of Filipinos who, like 91.59% of the study participants, have to pay for their medical treatment from out of their personal pockets.

According to the Global Diabetes Community, the frequency of CBG monitoring will depend on one's treatment plan and personal circumstances. However, for those taking hypoglycemic drugs, CBG monitoring will reduce the risk of hypoglycemic emergency (International Diabetes Foundation, 2020; The Global Diabetes Community, 2019).

The 2015 National Institute for Health and Care Excellence (NICE) guidelines suggest that type 1 diabetics should monitor their blood glucose at least four times a day, while type 2 diabetics should have CBG monitoring at least once a day. Increased monitoring is necessary if a diabetic is newly diagnosed or given a new treatment regimen (Thompson, 2010).

Evidence suggests that frequent CBG monitoring is associated with better metabolic control in both type 1 and type 2 diabetics (Schütt et al., 2006).

As shown in Figure 1, 51 out of 107 participants (47.66%) have a history of CBG greater than 260 mg/dL. Prolonged episodes of hyperglycemia at such high levels lead to either diabetic ketoacidosis or a hyperglycemic hyperosmolar state (Mathew & Tadi, 2020; Stoppler & Ferry, 2019).

On the other end of the diabetics' concern is the risk of hypoglycemia. Figure 2 shows that 33 out of 107 participants (30.84%) have documented CBG levels less than 60 mg/dL. Episodes of hypoglycemia

can lead to symptoms of confusion, sweating, blurred vision, or even seizures (Mathew & Tadi, 2020). Of greater concern are the 29 participants who are not aware of their lowest CBG level since unexpected hypoglycemic episodes may lead to risk of injury while performing regular activity, such as driving a vehicle.



*Figure 1*. Self-reported highest capillary blood glucose level obtained by the participants in the course of their disease (n = 107).



*Figure 2*. Self-reported lowest capillary blood glucose level obtained by the participants in the course of their disease (n = 107).

Hypoglycemia may occur in individuals with diabetes who take too much medicine (insulin) or take their normal amount but then eat less or exercise more than usual (American Diabetes Association, 2011).

Most patients affected with chronic lifestyle diseases are often not limited to a single affliction. As manifested in Figure 3, wherein almost half (44.92%) of the respondents have concomitant hypertension, 23.73% are diagnosed to be obese, and 8.41% have documented hyperlipidemia.



Figure 3. Self-reported concomitant diagnosed medical condition aside from diabetes mellitus (n = 107).

Metformin enhances the action of insulin in the liver to reduce the rate of gluconeogenesis. Use of metformin alone together with lifestyle modification is found to be beneficial for those who are in the early stages of diabetes mellitus (Hostalek, Gwilt, & Hildemann, 2015). In the case of failure to control with monotherapy or presence of contraindication to metformin, replacement or addition of other oral hypoglycemic agents is warranted (Rhee et al., 2017). Most combination therapies are still metformin based, and the regimen may be taken as a separate or combination pill (Maher, Abdelrahman, Alzoman, &

Aljohar, 2019). These treatment guidelines reflect the predominance of study participants (59.8%) using metformin in Figure 4.



*Figure 4.* Self-reported intake of medications for diabetes mellitus (n = 167, multiple response).

#### Knowledge and Practices Assessment Regarding Diabetes Mellitus Management

Overall, the majority of the participants are well aware of their medical condition and the regimen necessary to control their diabetes (Figure 5).

More than half of the respondents "strongly agree" that they are aware regarding proper control of diabetes mellitus (63.56%), health risks of missing medications (70.09%), food to avoid in diabetes order to control (60.75%),adequate physical exercise (55.14%), and contact details of their health-care access (52.34%). This is compounded by those who "agree" that they are aware of the asked questions regarding diabetes management.

Awareness of one's medical condition is important in coping with its control. According to the *American Journal* of *Pharmacy Benefits*, people with diabetes who take their drugs at least 80% of the time and people who exercised four or more days per week were at lower risk for poorly regulated blood sugar (Permanente, 2017).

However, knowing what to do is definitely different from practicing what is necessary. As seen in Figure 6, only 34 out of 107 respondents "strongly agree" that they observe proper practices to control their diabetes. The most obvious negligence among the responses is the failure of most respondents to commit that they practice adequate exercise or physical activity (37 out of 107) with only 11 out of 107 respondents able to provide a strong regarding faithfulness response in maintaining adequate physical activity.

Exercise and regular activities have both physical and psychological benefits. Physically, daily exercise can help fight disease by boosting our immune system and delay onset of other comorbidities such as obesity and cardiovascular diseases. Physical inactivity also leads to loss of aerobic fitness, musculoskeletal weakness, and cognitive decline. The low metabolic activity alters insulin signaling, which further aggravates diabetic pathophysiology (Woods et al., 2020).

The respondents' faithfulness in taking proper nutrition is also not as promising as their knowledge of the benefit of following the regimen. Nonetheless, in total, at least 85.98% of the respondents either strictly follow or at least try to follow proper nutrition regimen.

Though most of the participants sustain their diabetes management from personal income, majority of them (82.24%) either "strongly agreed" or "agreed" that they faithfully take their medications according to schedule.

In light of the ECQ implemented from March 17 to May 30, 2020, the respondents recalled their beliefs and experiences during this period (Figure 7).

of the Majority participants (81.31%) are aware that their diabetic condition puts them at greater risk of developing worse signs and symptoms in the event that they get infected with COVID-19. Though this awareness kept most of them faithfully staying at home during the ECQ, some participants who are aware of this ominous fact still went out of their houses. This can be due to the lack of a dependable person at home to help with their needs. Only 54 out of 107 respondents "strongly agreed" that they have someone to depend on. Likewise, only 46 out of 107 respondents have a strong sense of security that they are able to get enough supply of their medication and glucose testing strips. Despite the cash grants distributed to all residents of Metro under the government's Manila "Bayanihan to Heal as One Act," an overwhelming 81.31% of the respondents expressed that they either "strongly disagree" or "disagree" that they receive subsidies and medication from the barangay (Bayanihan Act, 2020).

In terms of the participants' ability to maintain their usual routine and level of physical activity, 57.94% either "strongly agreed" or "agreed" that they are able to do so. However, considering the cohort's baseline proportion with a low level of physical activity prior to ECQ, this may not reflect that a good proportion of the participants are able to meet the minimum required physical activity recommended for the control of diabetes.



Figure 5. Response regarding their awareness of managing diabetes mellitus (n = 107).



*Figure 6.* Response regarding their practices in order to manage diabetes mellitus (n = 107).



*Figure 7.* Response regarding their knowledge and practices as diabetic patients during the enhanced community quarantine brought about by the COVID-19 pandemic (n = 107).

Table 3. Response Regarding Experience in Seeking Medical Attention During the Enhanced Community Quarantine Period (n = 107)

Variables	Frequency	Percentage		
Tried to contact attending physician or seek medical attention (N=107)				
Yes	56	52.34%		
No	51	47.66%		
Found it easy to seek medical consult for those who did (n=56)				
Strongly agree	20	35.71%		
Agree	10	17.86%		
Neutral	11	19.64%		
Disagree	4	7.14%		
Strongly disagree	11	19.64%		

As shown in Table 3, during the ECQ period, 56 out of 107 participants mentioned that they needed to contact their attending physician or seek medical attention. Among those who sought medical attention, they were asked to compare the ease of getting medical attention during the ECQ to their experience prior to the lockdown. Despite the demographic profile of our participants, 26.79% of those who sought medical attention had a negative experience, while 19.64% were ambivalent regarding their experience in seeking medical attention during the ECQ period. This response highlights the challenges faced by patients with non-COVID-19 complaints during this extraordinary situation.

# CONCLUSION AND RECOMMENDATION

As the world was just starting to learn about the pathogenicity and transmissibility of SARS-CoV-2 in the first quarter of the year 2020, the government began to implement social-distancing policies and, later on, stricter policies such as the ECQ. During the implementation of the ECQ, everyone in Metro Manila was tremendously affected. However, the predicament among patients with preexisting conditions such as diabetics was more onerous.

Most participants gathered for this study were apparently well educated and financially capable compared to the general population. Despite their socioeconomic advantage, many still found it hard to comply with the diabetes control regimen even before the ECQ despite their good knowledge of what is good for them. Due to evidence of worse prognosis among those with preexisting conditions like diabetes, many of the participants adhered to the stay-at-home orders. However, those with a less dependable support network had to risk going out.

The out-of-pocket expenditure for health services has shattered the fragile sense of security of patients who are dependent on an adequate supply of medication, access to health-care facilities, proper nutrition, and the presence of a dependable caregiver, among others.

With the looming climate change and human encroachment into our environment, the emergence of new infectious diseases has become a matter of "when" instead of "if." The world may overcome the current pandemic eventually, but the prospect of another outbreak or pandemic in the future is highly probable.

Hence, there is an urgent need to strengthen national capacity through strategic leadership and policy development starting with the stakeholders in the government. There is also a need to foster accountability by setting and meeting targets for the control and prevention of diabetes, as well as access to essential medicines (World Health Organization, 2017).

At the community level, individuals during lockdown should maximize the use of technology such as social media to maintain communication with others and perform group activities. This will help maintain both the physical and mental health of each individual (Minnesota Department of Health, 2020). Community support groups should also ensure that each vulnerable member of the community is accounted for. As promoted by the government's Bayanihan program, we need to heal as one.

#### REFERENCES

- American Diabetes Association. (2011). Diagnosis and classification of diabetes mellitus. *Diabetes Care*, 34(Suppl 1), S62– S69. doi:10.2337/dc11-S062
- Arcellana, A. E., & Jimeno, C. (2020). Challenges and opportunities for diabetes care in the Philippines in the time of the COVID-19 pandemic. Journal of the ASEAN Federation of Endocrine Societies, 35(1), 55–57. doi:10.15605/jafes.035.01.04
- Bayanihan to Heal as One Act, Republic Act No. 11469 (2020).
- Beldomenico, P. M. (2020). Do superspreaders generate new superspreaders? A hypothesis to explain the propagation pattern of COVID-19. International Journal of Infectious Diseases, 96, 461– 463.
- Centre for Evidence-Based Medicine. (2020, April 8). Managing diabetes during the COVID-19 pandemic. Retrieved from https://www.cebm.net/covid-19/managingdiabetes-during-the-covid-19-pandemic
- Dale, B., & Stylianou, N. (2020, June 17). Coronavirus: What is the true death toll of the pandemic? *BBC News*. Retrieved from https://www.bbc.com/news/world-53073046
- Davidson, J. A. (2020, May 14). Diabetes and COVID-19: 5 tips to stay well during the pandemic. UT Southwestern Medical Center. Retrieved from https://utswmed.org/medblog/diabetescovid-19-risks/

- European Centre for Disease Prevention and Control. (2020). Clinical questions about COVID-19: Questions and answers. Retrieved from https://www.cdc.gov/coronavirus/2019ncov/hcp/faq.html#Transmission
- Haw, N., Uy, J., Sy, K., & Abrigo, M. (2020).
  Epidemiological profile and transmission dynamics of COVID-19 in the Philippines. *Epidemiology and Infection*, 148, e204. doi:10.1017/S0950268820002137
- Hostalek, U., Gwilt, M., & Hildemann, S. (2015). Therapeutic use of metformin in prediabetes and diabetes prevention. *Drugs*, 75(10), 1071–1094. doi:10.1007/s40265-015-0416-8
- Hussain, A., Bhowmik, B., & do Vale Moreira, N. C. (2020, April 6). COVID-19 and diabetes: Knowledge in progress. *Diabetes Research and Clinical Practice*. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/ PMC7144611/
- International Diabetes Federation. (2020, March 11). COVID-19 and diabetes. Retrieved from https://www.idf.org/aboutdiabetes/what-isdiabetes/covid-19-and-diabetes/1-covid-19and-diabetes.html
- International Diabetes Foundation. (2020, April 15). COVID-19 outbreak: Guidance for people with diabetes. Retrieved from https://www.idf.org/our-network/regionsmembers/europe/europe-news/196information-on-corona-virus-disease-2019covid-19-outbreak-and-guidance-forpeople-with-diabetes.html
- Lewnard, J. A., & Lo, N. C. (2020). Scientific and ethical basis for social-distancing interventions against COVID-19. *The Lancet Infectious Diseases*, 20(6), 631–633. doi:10.1016/S1473-3099(20)30190-0
- Maher. H. M., Abdelrahman, A. Е., Alzoman, N. Ζ., & Aljohar, Η. I. (2019). Stability-indicating capillary electrophoresis method for the simultaneous determination of metformin hydrochloride, saxagliptin hydrochloride, pharmaceutical dapagliflozin and in tablets. Journal of Liquid Chromatography æ Related Technologies, 42(5-6), 161-171.

- Mathew, T. K., & Tadi, P. (2020, August 14). Blood glucose monitoring. *StatPearls*. Treasure Island, FL: StatPearls Publishing. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK5 55976/
- Minnesota Department of Health. (2020, May 19). Staying active during the COVID-19 pandemic. Retrieved from https://www.health.state.mn.us/communiti es/physicalactivity/covid19.html
- O'Keefe Osborn, C. (2019, January 14). Type 1 and type 2 diabetes: What's the difference? Retrieved from https://www.healthline.com/health/differe nce-between-type-1-and-type-2diabetes#causes
- Peric, S., & Stulnig, T. M. (2020). Diabetes and COVID-19. Wiener Klinische Wochenschrift, 132(13), 356–361.
- Permanente, K. (2017, June 13). Importance of taking diabetes medications as prescribed, exercising and managing weight. Science Daily. Retrieved from https://www.sciencedaily.com/releases/201 7/06/170613102019.htm#:~:text=Summary %3A,according%20to%20a%20new%20stu dy
- Rhee, S. Y., Kim, H. J., Ko, S. H., Hur, K. Y., Kim, N. H., Moon, M. K., Committee of Clinical Practice Guideline of Korean Diabetes Association. (2017). Monotherapy in patients with type 2 diabetes mellitus. *Diabetes & Metabolism Journal*, 41(5), 349–356. doi:10.4093/dmj.2017.41.5.349
- Schütt, M., Kern, W., Krause, U., Busch, P., Dapp, A., Grziwotz, R.,...DPV Initiative.
  (2006). Is the frequency of self-monitoring of blood glucose related to long-term metabolic control? Multicenter analysis including 24,500 patients from 191 centers in Germany and Austria. Experimental and Clinical Endocrinology & Diabetes: Official Journal, German Society of Endocrinology [and] German Diabetes Association, 114(7), 384– 388. doi:10.1055/s-2006-924152
- Stoppler, M. C. & Ferry, R., Jr. (2019, August 27). Blood sugar levels in adults with type 1 or type 2 diabetes facts. *MedicineNet*. Retrieved from
  - https://www.medicinenet.com/normal\_blood\_ sugar\_levels\_in\_adults\_with\_diabetes/article .htm

The Global Diabetes Community. (2019, January 15). How often do I need to test my blood glucose? *Diabetes.co.uk*. Retrieved from

https://www.diabetes.co.uk/diabetes\_care/ how-often-should-i-blood-test.html

- *The Lancet.* (2020, March). COVID-19: Learning from experience. *The Lancet*, *365*, 1011. doi:10.1016/S0140-6736(20)30686-3
- Thompson, D., Jr. (2010, April 21). When should you test your blood sugar? *Everyday Health*. Retrieved from https://www.everydayhealth.com/diabetes/ type2/managing/when-to-check.aspx
- Woods, J. A., Hutchinson, N. T., Powers, S. K., Roberts, W. O., Gomez-Cabrera, M. C., Radak, Z.,...Ji, L. L. (2020). The COVID-19 pandemic and physical activity. Sports Medicine and Health Science, 2(2), 55–64. doi:10.1016/j.smhs.2020.05.006
- World Health Organization. (2017). *Global report on diabetes*. Geneva: World Health Organization, 2016.
- World Health Organization. (2020a, April 1). Coronavirus disease (COVID-19) situation report 13. Retrieved from https://www.yumpu.com/en/document/read /63190921/who-phl-sitrep-13-covid-19-1apr2020
- World Health Organization. (2020b, February WHO 13).supports the Philippine government in COVID-19 response? Retrieved from https://www.who.int/philippines/news/feat ure-stories/detail/who-supports-thephilippine-government-in-covid-19response
- World Health Organization. (n.d.). Naming the coronavirus disease (COVID-19) and the virus that causes it. Retrieved from https://www.who.int/emergencies/diseases/ novel-coronavirus-2019/technicalguidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it
- Yi Chi, W., Ching-Sung, C., & Yu-Jiun, C. (2020, March). The outbreak of COVID-19. Journal of the Chinese Medical Association, 83, 217–220. doi:10.1097/JCMA.00