Diabetes

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Type 2 diabetes mellitus is a global disease that involves the body's impaired ability to regulate blood sugar (glucose) due to malfunctioning insulin, a hormone produced in the pancreas which is responsible for transporting the glucose into the cells. Anthropologists have provided meaningful insights into the causes (aetiologies) and prevalence of diabetes, particularly focusing on the social, political, and economic factors that underlie the ways in which diabetes continues to afflict millions of people worldwide. As a chronic illness with no cure, diabetes poses unique challenges for people struggling to manage medications, food changes, and multiple medical appointments, particularly for those who are already suffering from other structural barriers to health. Furthermore, anthropologists have highlighted the importance of identifying the overlaps between diabetes and other chronic diseases in order to provide better treatment options and to understand the underlying structural conditions that contribute to diabetes, such as poverty and unemployment. The 'syndemics' framework is a useful tool for considering the multileveled approaches to diabetes aetiologies and preventions.

Introduction

Diabetes, a cluster of diseases that impact the body's ability to process insulin, is well-established as a chronic illness, having been described as such as early as 1500 BCE, when an Egyptian manuscript described a 'too great emptying of the urine', although Apollonius of Memphis was the first to call the disease 'diabetes' in 250 BCE (Trikkalinou et al. 2017). Several centuries later, an unnamed seventeenth-century English surgeon called diabetes 'the pissing evile' due to the frequent urination common to people with the disease (Karamanou et al. 2016; Kelleher 1988). Unfortunately, most diabetes itself is rather less colourful, albeit equally dangerous if left unchecked. Diabetes is a chronic disease characterised by high glucose due to the body's inability to produce and/or process insulin, a hormone that helps the body use energy (Carruth et al. 2019; Mendenhall et al. 2010; Schoenberg et al. 2005). People are clinically diagnosed with diabetes if their fasting glucose blood test levels are over 126 mg/L or have a three-month average hemoglobin (HbA1c) level of at least 6.0%.[1] The number of adults (ages 20-79) worldwide living with diabetes reached 537 million people in 2021 and researchers estimate that by 2045, 783 million individuals worldwide will have diabetes.[2]

Symptoms for diabetes include increased urination and thirst, unintentional weight loss, blurred vision, exhaustion, tingling hands and feet, and dry skin. Diabetes is sometimes called 'the silent killer' because these symptoms are so common that they are oftentimes attributed to other things, leading to worsening

disease outcomes and decreased quality of life before a diagnosis is even made. Untreated diabetes can lead to coronary artery disease, renal failure, and blindness, and is correlated with high blood pressure (hypertension), high cholesterol (dyslipidaemia), arthritis, and depression (Mendenhall 2019; Trikkalinou et al. 2017).

Healthcare providers generally diagnose individuals as having one of three broad types of diabetes: type 1, type 2, and gestational. All three types share the same general symptoms and basic cause (a cellular inability to absorb glucose for fuel due to a failure to recognise insulin) but differ in the physiological details and cultural paradigms of aetiology and treatment. This entry will begin by outlining the three general types of diabetes and then discuss how anthropologists shed light on interacting cultural models of diabetes diagnosis, treatment, and long-term care.

Types of diabetes

Type 1 diabetes mellitus is an autoimmune reaction wherein the body's defence system attacks the cells that create insulin, causing a severe insulin shortage in the body and allowing for a dangerous accumulation of glucose in the blood. Unchecked type 1 diabetes can contribute to nerve damage (neuropathy), kidney damage (nephropathy), eye damage (diabetic retinopathy), foot damage, heart disease, and skin infections.[3] It is linked to both genetic and environmental factors, although the exact causes are not yet known and there is no known cure. Type 1 typically develops in children and young adults and requires individuals to inject insulin daily to remain healthy.[4] Approximately 10% of people worldwide have type 1 diabetes as of July 2020.[5]

Gestational diabetes develops in pregnant women who did not already have diabetes prior to pregnancy. This type of diabetes physiologically resembles the other types in that the body struggles to recognise insulin, which leads to higher levels of glucose in the bloodstream. While glucose levels generally return to normal after giving birth, women who have gestational diabetes are at higher risk for developing type 2 diabetes later in life.[6] The precise origins of gestational diabetes are unknown, yet researchers suggest that the mother's pre-pregnancy weight, physical inactivity during pregnancy, being of certain races or ethnicities (such as Black, Hispanic, and American Indian), having a family history of diabetes, and having polycystic ovarian syndrome are all contributing factors.[7] Approximately 14% of women worldwide had gestational diabetes during pregnancy in 2021 (Wang et al. 2022).

Type 2 diabetes has become a pandemic, catching the attention of researchers and healthcare providers alike due to the urgent nature of its scope. Like the other diabetes types, type 2 involves high blood glucose levels, but unlike the other types, in type 2 the pancreas produces sufficient insulin. Instead, cells resist

insulin's efforts to transport glucose into the cells (insulin resistance), resulting in rising blood glucose levels and causing the pancreas to create more insulin. However, the cells continue to resist the insulin's efforts, resulting in even higher glucose levels which can cause major health problems, such as heart disease, liver and kidney failure, and vision loss.[8] Type 2 diabetes accounts for 95% of diabetes cases worldwide, with physical inactivity, being overweight or obese, and socioeconomic factors like poverty being major contributing factors.[9]

This entry focuses on type 2 diabetes due to its overwhelming global prevalence and due to the biomedical focus on solely individual behaviours. Diabetes is commonly known among biomedical healthcare providers as the 'lifestyle type' due to its association with overconsumption and sedentary behaviours, which are generally blamed on individual patients (Carruth et al. 2019; Yates-Doerr 2011). However, this framing ignores the social, economic, and political contexts that impact the diabetes experiences of many patients. While anthropologists acknowledge the different clinical diabetes types, they also recognise the limitations of clinical diagnosis in getting to the deeper causes of diabetes.

Structural roots and barriers to care

Diabetes is what medical anthropologists term a 'disease of modernisation' due to its association with structural factors, such as poverty, unemployment, and colonisation (Baglar 2013; Ely et al. 2011; Mendenhall et al. 2010; Singer 2020; Wiedman 2012). At the same time, diabetes management has become exponentially more expensive due to the rise in transportation, housing, healthcare, and food costs, which negatively impact many peoples' ability to consistently afford the many changes that are recommended by healthcare providers, particularly when many individuals are already struggling to pay for rent and other necessary living expenses (Mendenhall 2015; Thorsen et al. 2020; Vest et al. 2013; Weaver 2018). High costs of diagnosis and treatment contribute to diabetes being diagnosed later in its development and enable it to have more destructive effects.

Quality of life for people with diabetes depends on their financial resources, geographic proximity to healthcare services and social support networks, physical pain or discomfort levels, and dietary patterns. The uncertain, long-term benefits of living with minimal complications often conflict with the day-to-day difficulties of diabetes maintenance, which negatively impacts stress levels (Black et al. 2017; Speight et al. 2019). Anthropologists tend to note that not all populations experience the same quality of life in living with diabetes, as some communities face additional social, economic, and racial disparities on top of pre-existing health disparities that make a life of diabetes much harder (e.g. Rock 2003a; Wiedman 2021 and Weaver 2018). For example, Janet Page-Reeves and colleagues (2013) note that individual decisions and human agency is heavily constrained by social environments (structure) when it comes to diagnosing and treating diabetes. The social environment that Page-Reeves and others study is that of Hispanics in the state of New

Mexico. They incorporate specific conceptual models of illness such as emotional regulation of symptom experience and biomedical diabetes aetiology, and core cultural values such as religiosity and prioritising the family to understand and deal with the disease. Page-Reeves and colleagues observe that in situations with limited economic resources, deciding where to spend money can be a difficult choice, particularly if family members with diabetes need to buy healthier (and more expensive) foods on top of multiple visits to the doctor.

The structural nature of diabetes reflects community-level inequalities in access to different foods, healthcare, education, and other necessary resources. While diabetes is currently present in all populations worldwide, it disproportionately affects low-income populations due to multiple factors that intersect with poverty, such as unemployment, food insecurity, unaffordable healthcare, and non-existent social support (Ferzacca 2012; Lerman Ginzburg 2020; Mendenhall et al. 2017; Rock 2003a; Solomon 2016; Weaver 2018).

A significant ethnography on the structural experiences of vulnerable populations with diabetes is Carolyn Smith-Morris' 2006 ethnography of diabetes among the Akimel O'odham (colloquially known by outsiders as the Pima), a Native American tribe based by the Gila River in the state of Arizona and the northern Mexican desert. Smith-Morris found that the sweltering Arizona heat, unemployment, and poverty were all factors in the Akimel O'odham developing diabetes. Here, starkly high levels of unemployment and high reliance on government assistance coupled with limited economic resources, reduced physical exercise due to the heat, limited affordable healthy food options on the Pima reservation, and use of food as a comfort against daily struggles, were all contributing factors to developing diabetes. Although the Akimel O'odham have lived near the Gila River for centuries and are familiar with the high temperatures, their responses to it have changed in the past hundred years. As the Gila River has dried up, the Akimel O'odham lost their traditional farms and increasingly relied on government-subsidised foodstuffs (Smith-Morris 2006). Notably, the drying up of the Gila River was not a natural phenomenon, but resulted from the Arizona government's extensive irrigation efforts as well as damming by non-Native farmers. However, policies of the US Department of Agriculture (USDA), which extended into the 1980s, forbade the Akimel O'odham from receiving help from agricultural loans. Combined with the loss of traditional food pathways, these policies forced the Akimel O'odham to obtain sedentary jobs and rely on high-calorie, poor-nutrition governmental food handouts (Booth et al. 2017; Smith-Morris 2006). Indeed, diabetes is so ubiquitous in the Akimel O'odham that participants in Smith-Morris' research naturalised it more and more, observing, 'it's just how Pimas are' (2006: 33).

Smith-Morris's work with the Akimel O'odham highlights how political and economic factors contributed to diabetes aetiology in a population already facing racism and other abuses from the very government that was supposed to care for them. Recent work in Nepal supports these findings. Here, governmental inaction in the face of rigid social hierarchies and discrimination against the Dalits–members of the lowest social

caste–creates structural situations of high diabetes risk (Thapa 2014). While caste-based discrimination is officially illegal in Nepal, social hierarchies forbid Dalits from participating in many social, religious, educational, and employment opportunities, forcing them into poverty, food insecurity, and occupational and housing uncertainty—all of which elevate diabetes risk. Given that existing social hierarchies are deeply entrenched, the Nepalese government has found it difficult to enforce anti-discrimination laws; in doing so, the Nepalese government failed to take care of its most vulnerable members and reduce Dalit diabetes risk. In this example, it is government negligence, rather than active mismanagement, that increases diabetes risk.

Additionally, colonisation is a structural factor that boosts diabetes risk, particularly as its effects continue for generations after the dissolution of the original colonising state. Indigenous communities that have experienced colonisation face extremely high diabetes rates due to a loss of traditional lands and food sources, cycles of food insecurity, and mental distress from oppressive regimes. In Canada, the diabetes prevalence rate is four times higher among Indigenous communities than in the general population due to decades of the Canadian government enforcing starvation, stress, food insecurity, and the environmental degradation of traditional food sources such as fishing (Temblay et al. 2021). Similarly, high diabetes rates in the Marshall Islands have been linked to the World War II-era devastation of breadfruit trees, which were a traditional food source for Indigenous communities (Duke 2017). The US began distributing canned meat and white rice when it colonised the Marshall Islands after the war. This abrupt change in food acquisition and preparation negatively impacted the Marshallese's relationship with their environments and their bodies by increasing their reliance on imported canned foods, which are high in additives, rather than on fresh and local resources.

The geographic diversity of these case studies emphasises an urgent need for studying the complex historical, structural, and traumatic roots of diabetes in greater depth. Prolonged exposure to colonialism is associated with a profound loss of traditional food acquisition, preparation and consumption, and subsequently high levels of food insecurity and malnutrition even when a colonising regime no longer exists. The loss of traditional livelihoods and diminished community self-determination undermine socioeconomic development among oppressed communities. Particularly, it leaves rural communities in debilitating working conditions with only limited access to comprehensive primary care or physical activity options, like walking trails, that are weather-safe for year-round use (Rice et al. 2016; Tremblay et al. 2021).

The colonial roots of diabetes serve as a stark reminder that health is due as much to structural environments as it is to biology. As these and other ethnographies demonstrate, structural environments contribute to diabetes being a social disease as participants shared stories about their etiological foundations of diabetes and the ways in which adjusting to a new life required new perspectives.

Diabetes and biopower

Although, as the ethnographies above elucidate, anthropologists have studied diabetes susceptibility among different populations, anthropological literature has also cautioned against relying on rigid, overly simplistic ethnic categories to understand diabetes because they miss the nuanced biological human variations between and among ethnic groups that contribute to diabetes risk (Montoya 2007). Labelling individuals or entire populations as 'at risk' for diabetes based on easy single-gene categories risks 'naïve genetic determinism' that glosses over the need for deeper analysis of the social and environmental histories of different populations that shape their susceptibility to diabetes (Montoya 2007). Anthropologists have contributed valuable insight into the social, political, and environmental pressures that individuals and populations face, particularly by incorporating biopower—the regulation of human life at the population and individual body levels—and the politics of health, body image, illness metaphors, and explanatory models into the frameworks of diabetes aetiologies and lived experiences (Ferzacca 2012).

For example, research on the clinical encounters of diabetes highlights the difference between clinicians' perspectives on diabetes and the perspectives of patients with diabetes (Guell 2011; Hernandez 1995; Hunt et al. 1998). Cheri Hernandez (1995), in an ethnographic study on the clinical parameters of diabetes management, observed that while healthcare providers emphasise maintaining acceptable glucose levels and adhering to medication and weight loss regimens, patients prioritise learning how to live with diabetes. Patients with diabetes often found biomedical explanations for diabetes to be insufficient and attributed their diabetes to personally-relevant triggering events and behaviours. Those who believed that their own behaviours were causes of diabetes tended to be more involved in their treatment; the act of being involved in treatment was associated with long-term behaviour change (Hunt et al. 1998).

While Hernandez and Linda Hunt et al. focused on the individual's biomedical encounters for diabetes treatment, others have expanded this approach to the collective diabetes experience. Cornelia Guell (2011) draws attention to the conflicting hierarchies of diabetes knowledge in Germany that arose among Turkish migrants in Berlin. Tensions arose between Turkish healthcare providers and layperson self-help groups over conflicting values and knowledge hierarchies about diabetes. Along with fierce competition for limited funding for community diabetes clinics and health education classes, these differences in diabetes knowledge not only pitted the community and healthcare providers against one another but also created rifts in a community already facing severe marginalisation. Similarly, healthcare providers frequently place the responsibility for diabetes management squarely on the patient, making them 'morally liable for their own ill health', as Rebecca Seligman and colleagues have highlighted in their work on Mexican immigrants with diabetes in the city of Chicago (2015: 64). Many physicians believed that structural and social interventions were not part of their jobs, preferring to focus solely on clinical treatments without being concerned for the underlying social and structural roots of diabetes (Mendenhall et al. 2017). This arbitrary dividing of responsibility is harmful and perpetuates the deeper structures contributing to diabetes. It also

conflicts with how people living with diabetes view their own diabetes aetiologies. Many people who spoke with Seligman et al. (2015) attributed their diabetes to structural factors, such as interpersonal violence, poverty, and unemployment, indicating that the biomedical emphasis on individual patient responsibility overlooks patients' lived experiences with diabetes.

Diabetes management is complex and fraught with overlapping layers of meaning. A major theme in the anthropological literature on diabetes is that of responsibility and control over diabetic bodies. Biomedicine, in its fervent pursuit of individualised health, places the locus of control directly onto the patient to manage self-care; when diabetic bodies do not behave according to biomedically prescribed plans, the onus of responsibility falls squarely on the patient. Biopower, or the regulation of human life at the population and individual body levels, is used to discipline misbehaving bodies into docile conformity through state-controlled sites, such as schools, hospitals, and prisons (Foucault 1976). Bodies become political and economic battlegrounds between policymakers and healthcare providers as debates rage over the best ways to prevent and treat diabetes, while at the same time these forces exert control over the individuals who are inhabiting the very bodies at the centre of these debates (Gibson and Dempsey 2015).

One example of biopower in a colonisation framework is among Indigenous communities in Canada. Indigenous children at residential schools in Canada developed negative relationships with food due to malnourishment, abuse, punishment, and humiliation perpetuated in the residential school environment (Howard 2014). These collective traumas and negative lived experiences of residential school food were passed on to subsequent generations, where, aided by a loss of traditional food pathways due to aggressive colonisation by the Canadian government, they are embodied as diabetes among Canada's Indigenous communities. Indigenous interactions with contemporary healthcare systems in Canada have reinforced colonisation through racism, stereotyping, and discrimination (Jacklin et al. 2017). Patients reported being repeatedly ignored or patronised at medical appointments despite having travelled long distances for check-ups. Physician shortages and geographic isolation from clinics contributed to diabetes mismanagement, as patients sometimes waited for several months without seeing a physician or having their medications refilled. In both cases, colonialism reinforced the stereotype of misbehaving diabetic bodies and placed the blame firmly on Indigenous communities for their own diabetes while diffusing blame from the state-sanctioned violence of colonisation that is responsible for diabetes perpetuation.

One of the most fundamental contributing factors to biopower and diabetes is the question of control over the very parameters of health. US doctors who led medical missions to Belize taught the locals that diabetes was the individual's responsibility, rather than the doctor's liability (Moran-Thomas 2019). This biomedical focus on patient responsibility for diabetes maintenance absolved doctors of the obligation to consider the roles of broader social, economic, and political milieus in which their patients lived. Doctors did not spend much time helping patients identify the early warning signs of diabetes but simply told them to lose weight and get more physical activity, despite limited access to healthy, affordable foods, safe

infrastructure for outdoor activity, or disposable income for gym memberships. Amy Moran-Thomas notes that this lack of comprehensive medical care is notable because, as diabetes is not transmitted between people, there is less biomedical focus on the ways in which people's interactions propagate the disease and more on the individual's genetics and decisions that make someone more at risk for diabetes, despite the blatant social risk factors. As such, patients are blamed for noncompliance, frequently without evidence, despite the structural factors that exacerbate diabetes risk.

The physical body is also shaped by cultural metaphors of health and diabetes and naturalises certain cultural norms while stigmatising others (Martin 1987; Solomon 2016; Hardin 2018). This is evident in the ways in which diabetes is stigmatised due to its socially perceived associations with uncontrollable food consumption (Aghamohammadi-Kalkhoran and Valizadeh 2016; Broom and Whittaker 2004; Ferzacca 2012; Lee et al. 2015). For example, Amanda Willig and colleagues (2014) found that African American women with diabetes reported experiencing diabetes stigma when they were the only ones in their extended families with the disease, as they were perceived as having no self-control over their health and were treated as children without the ability to make decisions for themselves. Denise Bockwoldt and colleagues (2016) found that African Americans are less likely to adhere to insulin-based medication regimes due to a plethora of negative emotions associated with insulin, such as self-blame, frustration, fear of complications, and of being a burden on loved ones. Some study participants admitted to hiding their insulin from their loved ones so as to not be outed as insulin dependent. These results were replicated by Kryseana Harper et al. (2018), who found that family-based diabetes stigma was common in their mixed-gender African American cohort. This stigma both perpetuated a reduction in diabetes self-management and created resentment towards diabetes for the disruption it caused to peoples' personal lives.

Additionally, healthcare providers sometimes stigmatise people with diabetes if they do not lose weight or adhere to their prescribed medication regimens, which further discourages people from visiting a healthcare provider (McNaughton 2013; Shahab et al. 2019). People with diabetes who need to inject insulin may also be mistaken for and stigmatised as drug users should they need to inject insulin in public (Balfe and Jackson 2007; Bock 2012). In the United States, a country in which productivity is highly valued, any loss of individual productivity is devalued and stigmatised, particularly if the cause of that loss is concealed or is a manageable disease, as diabetes is commonly thought to be (Ferzacca 2012; Hopper 1981; Shahab et al. 2019). External stigma over perceived loss of productivity and lack of individual discipline that are thought to contribute to diabetes become internalised among those living with diabetes or are involved in its treatment, and perpetuate individual and biomedical diabetes mismanagement (Aghamohammadi-Kalkhoran and Valizadeh 2016; Ferzacca 2012; Seligman et al. 2015).

Anthropologists reject the overly simplistic categorisations of diabetes as a disease of racial and genetic determinism, preferring instead to trace the overlapping intersections between biological pathways and structural factors. In her work with the Native community in Chicago, Margaret Pollak (2018) notes that

anthropologists reject the thrifty genotype hypotheses, which speculates that people are biologically predisposed to diabetes, which is then triggered by social environments. Instead, the alarmingly high diabetes rates among certain communities are explored in relation to external influences, such as colonisation and land loss among American Indians in Chicago. Diabetes care is also a multigenerational, life-long social activity in Native communities, with friends and family helping one another inject insulin, manage medication schedules, and eat diabetes-friendly meals. In this way, diabetes is transformed from a biological disease into a form of social cohesion against colonial forces that attempt to destroy Native physical and collective bodies.

As these studies and ethnographies highlight, the biological and social spheres of diabetes consistently intersect, and these intersections manifest differently depending on the population and their social, psychological, and structural circumstances.

Syndemic interactions

In keeping with the anthropological emphasis on complex, multileveled interactions that underscore disease perpetuations, scholars have drawn attention to the ways in which structural factors exacerbate diabetes outcomes by focusing on parts of the world that have reported abrupt increases in diabetes prevalence (Mendenhall 2012; Weaver 2018).

The theory of syndemics has gained traction in anthropological diabetes research, as it provides a framework for understanding the social, political, and economic underpinnings of illness and disease interactions. Syndemics examines the concentration and deleterious interaction of two or more diseases or other health conditions in a population, particularly as a consequence of social inequality and the unjust exercise of power (Singer 2009: xv). Multiple anthropologists have observed that diabetes is a common component of syndemics research due to its increased incidence and prevalence (Everett and Wieland 2013; Lerman 2017, 2022; Mendenhall 2012; Ryan and Raja 2016; Weaver 2018; Weaver and Mendenhall 2014). Specifically, diabetes interacts synergistically with two other common occurrences: depression and food insecurity.

Research indicates that slightly over one-third of individuals with diabetes will develop depression and vice versa, and that individuals with diabetes are twice as likely as individuals without diabetes to develop depression (Gask et al. 2011; Katon et al. 2010; McSharry et al. 2013; Mendenhall 2012). While some evidence implicates depression as a precursor and major contributor to diabetes (Joseph and Golden 2017; Mendenhall 2015; Vrshek-Schallhorn et al. 2013), diabetes also increases the risk for developing depression (Katon 2010; Gask et al. 2011; Nash 2013). Depression, in turn, contributes to decreased diabetes self-care and access to healthcare, including decreased glucose monitoring, missed medical appointments, and increased likelihood of diabetes complications through diabetes mismanagement (Nash

2013; Weaver and Hadley 2011). Conversely, diabetes contributes to depression by deteriorating social networks, draining financial resources, and changing dietary patterns (Katon et al. 2010; McSharry et al. 2013). Food is a cohesive force: holidays, meetings, family meals, and casual gatherings often include food sharing (Lerman Ginzburg 2022b). When an individual cannot partake due to diabetes-related dietary limitations, the ensuing feelings of guilt or shame may provoke reluctance to attend the event, adding to social isolation. This is particularly true of women, who tend to be the primary cooks in their families and do not always receive support from their families to prepare healthier meals (Lerman Ginzburg 2022b).

The relationship between food insecurity and diabetes is rooted in structural factors. For example, Olayinka Shiyanbola and colleagues (2018) found that African Americans with diabetes attributed their disease outcomes to eating habits that were rooted in slavery and an ensuing consistent lack of healthy foods. Shiyanbola and colleagues' work adds on to Lisa Sumlin and Sharon Brown (2017), who found that African American women attributed their diabetes rates to dietary patterns and cultural culinary practices that are grounded in slavery and expounded by centuries of poverty. Populations that have been abruptly introduced to and adopted Westernised dietary patterns, such as the Pima Native Americans in Arizona and the Nauruan Islanders in Micronesia, are exceptionally vulnerable to developing diabetes due to rapid changes in nutrition, through increased consumption of highly processed foods that are high in sodium, fats, and carbohydrates (Hardin 2015; Smith-Morris 2006; Solomon 2016; Weaver 2018). Western eating patterns were oftentimes forcibly imposed on unwilling communities, and these forced eating patterns went hand-in-hand with overlapping structural factors that accentuated the incidence of diabetes among the affected communities (Hardin 2015; Smith-Morris 2006).

Diabetes and food insecurity are also correlated with poverty, particularly in combination with the absence of affordable healthcare and housing (McNaughton 2013; Mendenhall 2015; Vest et al. 2013). In their study on diabetes among Canadians living in poverty, Dennis Raphael and colleagues (2012) found that since the government's public policy dictates the incidence and experience of poverty, and that poverty and ensuing material deprivation are contributors to increased rates of diabetes, mitigating diabetes levels require changes at the government level, and not merely at the individual level. Studies such as these serve as a reminder that food insecurity cannot be attributed merely to individual-level food decisions, but also depends on government policies that impact access to financial assistance for low-income families. For example, my research in Puerto Rico explores participants' experiences of eating whichever food was most easily economically and geographically accessible due to an influx of food taxes, high-end supermarkets in gated communities, and economic and political instability (Lerman Ginzburg 2022a). Thus, merely turning health and treatment into easy formulae ignores the agricultural, historical, social, and political specificities that are interwoven into food consumption (Emily Yates-Doerr 2015). This critical scholarship underscores the need for ethnographic research that situates food insecurity and diabetes not merely within biomedical milieus, but also as products of social, political, and economic forces.

Just as structural factors, such as interpersonal violence and poverty, are critical syndemic perpetuators, similarly community responsibility and collective care play a role in diabetes management. Jessica Hardin (2018), in her ethnographic work on cardiometabolic disorders in Samoa, highlights how healing is both individualistic and collective that both 'transform individual bodies while impacting the broader community, making evident the problems of the collective in the bodies of individual Christians', a process which she calls 'embodied critique' (5-6). Hardin found that her Samoan participants encouraged one another to link illness events with the state of their relationships. Concepts such as embodied critique move beyond individual bodies to encompass the broader community and the structural factors that underlie diabetes aetiology. While part of the responsibility was on the individual to manage their diabetes, including taking medications, structural factors like poverty and unemployment also contributed to diabetes, which made it harder for study participants to make the necessary changes.

In Puerto Rico too, the participants I worked with linked diabetes with broader socio-political problems, such as Puerto Rico's status as a US territory (Lerman Ginzburg 2017, 2022a). The 1917 Jones Act forced food shipped to Puerto Rico to be marked up in price to compensate for the shipping, but this cost is borne by Puerto Ricans. Their experiences of eating whichever foods were most easily economically and geographically accessible connected food insecurity and diabetes with US colonisation and political nepotism. People developed depression because of the high unemployment and crime rates, ate large quantities of cheap high-fat food because of food insecurity and food apartheid, and developed diabetes. Similarly, in tracing the syndemic underpinnings of diabetes and COVID-19, anthropologists like Merrill Singer (2020) have commented that NAFTA created 'diabetes-inducing' environments in Mexico by triggering a growing dependence on unhealthy food imports, mostly from the US, amid a national agricultural deficit that limited Mexicans' access to the fresh produce grown in their own backyards. The rapid change in agricultural output and ensuing urbanisation created situations of stress, identity loss, and profound changes in dietary practices that contributed to diabetes risk.

Corporate influences on diabetes

Most of this entry has focused on the structural factors that impact the lived experiences of diabetes. However, there is also a corporate component to diabetes that impacts the quality of care. Medical anthropologists studying diabetes in the United States have argued that clinical care in the country is increasingly driven by large corporations, with a mounting emphasis on financial and managerial logics that reduce diabetes care to a narrow set of quantifiable metrics (Hunt et al. 2019). Healthcare providers measure successful diabetes management by monitoring glucose and HbA1c levels, medication regimen adherence, and significant weight loss, all of which are easily enumerated but difficult to achieve due to the multiple structural barriers associated with diabetes. Health insurance plans in the US use these quantitative parameters to determine approval of healthcare expenses while ignoring the underlying

structural and social barriers that might prevent patients from managing their diabetes. Scholars also argue that screening, diagnosis, and treatment guidelines over the past forty years have changed under pressure from the pharmaceutical industry despite weak evidence of efficacy in order to benefit from promoting expensive medications to unsuspecting patients (Hunt et al. 2019). Additionally, easing the diagnostic criteria for diabetes means that more people are diagnosed with the illness, and therefore required to take medications. In tracing these linkages, scholars have recommended that individual vigilance over diabetes management be augmented with systemic surveillance by healthcare providers and by policymakers who are at the forefront of medical innovations, healthcare funding, and institutional policies (Rock 2003b). Such recommendations reiterate that structural factors that impact underserved populations with high diabetes rates are rooted in unjust policies that can only be remedied at a higher political level.

Conclusion

Diabetes continues to be a globally pervasive disease, particularly in low- and middle-income countries which are facing rapid changes in the mechanisation of labour, political stability, economic independence, and profound social unrest. Despite the advances in biomedical treatment options, diabetes continues to afflict millions of people around the world, which indicates that there is a pressing need for accessible treatment options. For example, the price of insulin is ten times more expensive in the US than in any other developed country, leading many people with diabetes to ration their insulin and risk their health if their health insurance doesn't cover the cost (Rajkumar 2020). This travesty highlights the need for thorough healthcare reform in the US in particular. Furthermore, it is imperative that the structural factors underlying diabetes in societies throughout the world be considered during treatment. Multiple, overlapping factors, such as colonisation, poverty, and unemployment are inexorably linked to diabetes, and it is those factors which we must address as we move forward with diabetes treatment options. Thinking of syndemics is a useful way for digging more deeply into the aetiologies of diabetes, so that culturally-specific and affordable preventions might be developed and rapidly implemented.

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