Title: Magnifying the Importance of Collecting Race, Ethnicity, Industry and Occupation Data during COVID-19 Pandemic

Short title: Need for REIO data during COVID-19

Sai Krishna Gudi *B.Pharm., Pharm.D., M.Sc.*^{1,2}, Sophia M. George *Pharm.D*³, Komal Krishna

Tiwari *B.P.T., M.P.T*⁴

1- College of Pharmacy, Rady Faculty of Health Sciences, University of Manitoba, Winnipeg, Canada.

2- Information Management & Analytics, Epidemiology and Surveillance, Health, Seniors and Active Living, Winnipeg, Manitoba, Canada.

3- Department of Pharmacy Practice, NGSM Institute of Pharmaceutical Sciences, NITTE University (Deemed), Mangalore, India.

4- Department of Occupational Therapy, College of Rehabilitation Sciences, University of Manitoba, Winnipeg, Canada.

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Email address of authors:

Dr. Sai Krishna Gudi

Email: sknanu06@gmail.com; gudisk@myumanitoba.ca

Dr. Sophia M. George

Email: sophia@nitte.edu.in

Dr. Komal Krishna Tiwari

Email: komal.tiwari@umanitoba.ca

Corresponding Author:

Sai Krishna Gudi

College of Pharmacy, University of Manitoba, Winnipeg, Canada.

Email: sknanu06@gmail.com; gudisk@myumanitoba.ca

ORCID: [0000-0001-9576-9207](https://orcid.org/0000-0001-9576-9207)

Mailing address: 228 Notre Dame Avenue, Winnipeg R3B1N7, Canada.

Phone: +1 431-336(8099)

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Magnifying the importance of collecting race, ethnicity, industry and occupation data during covid-19 pandemic

ABSTRACT

The contagiousness of the Coronavirus disease-2019 (COVID-19) imposed historical lockdowns in countries, shut down industries and began a new era of leading, learning and working from home. No scientific mind could have made accurate projections of the tremendous impact that COVID-19 would have on nations, communities and the global-wide economy. On the other hand, millions of workers were losing their jobs while health care workers are overwhelmed and are reaching a state of mental and physical exhaustion. With the uncontrollable spread of the disease, researchers have been tirelessly working to point out factors that have a higher correlation with disease morbidity & mortality. In this regard, race, ethnicity, industry & occupation are interestingly found to be predominant factors. However, unfortunately, the unavailability of reliable data surrounding individuals' race, ethnicity, occupational and employment details has been a hard reality. Since race, ethnicity and employment are the essential social determinant of health and thus could serve as potential risk factors of COVID-19, collecting such information may offer important context in prioritizing the vulnerable groups. Thus, this perspective aims to highlight the importance and need for collecting the race, ethnicity and occupation-related data to track and treat the most affected racial/ethnic groups by the COVID-19 pandemic. Collecting such data will provide valuable insights and help public health officials pick out workplace-related outbreaks and evaluate the odds of various ethnic groups and professions contracting the infection.

Key Words: race, ethnicity, industry, occupation, COVID-19

INTRODUCTION

Scientific research revolving around the Coronavirus disease-2019 (COVID-19) pandemic has come up with preliminary evidence stating the higher vulnerability of certain races, socio-economic groups and occupations [1]. The racial disparities that have existed around the world over a long period of time have only become exaggerated during the pandemic. The scientific reports by the Centre for Disease Control and Prevention (CDC) suggests that the Black community, which encompasses around 13% of the United States (U.S.) population (*according to U.S. Census Bureau, 2018*), accounted for almost 30% of COVID-19 cases, where Latinos who constitute 18% of the nation's population accounts for only 17% of the registered COVID-19 cases [2]. This unequal distribution extends its influence even onto the hospitalization rates. According to the data obtained from the Kaiser Family Foundation, 2020, CDC, the percentage of mortality was also recorded to be the highest amongst the Blacks and Latinos [3]. With the surge in the current pandemic, in late 2020, the U.S. has started to stratify the data about COVID-19 cases based upon race and ethnicity, where there is a piece of emerging evidence that people of colour (POC), especially Black Americans, are at an increased risk for contracting the infection, being hospitalized and dying from COVID-19 [4].

Various reasons have been put forth to explain such disparities such as POC are likely to be more socio-economically underprivileged, reside in highly-dense populated areas, likely to have more comorbid health conditions, nature of their employment that cannot be performed remotely and other structural factors like discrimination and racism make these groups vulnerable to COVID-19 [5]. A vast majority of the black community is majorly employed in restaurants, retail, and hospitality setups that are particularly at risk for loss of income during the pandemic. In short, the Black community is commonly engaged in jobs that cannot be done from home and use public transportation that puts them at risk for exposure to COVID-19 [3]. Besides, disparities and discrimination within the healthcare system may also contribute to such worse outcomes within certain specific groups, occupations and industries, particularly those work in healthcare and other essential services [6-8]. It was also found that Black, Asian and Hispanic workers were more likely to be employed in the food processing and animal slaughtering industry and transportation (bus drivers and flight attendants), where frequent exposures to COVID-19 infection and significant outbreaks have been taken place [8].

The World Health Organization (WHO) states that the ease of transmission is enhanced in close-contact settings, crowded places, and enclosed spaces with poor ventilation [9]. Keeping that in mind, specific work settings and occupations are predisposed to be at a heightened risk of being infected. As one knows, certain occupations like the health care workers (HCWs), those employed with jobs that mandate mass interactions and those in the civil services have been on the front-line ever since the outbreak of COVID-19 [10]. They have been pitching in extra hours to manage the rampant increase in patient load and execute the orders issued by the administrative heads of every country. Such services come from many sacrifices as many of them got infected themselves and eventually lost their battle to the virus. The reasons for this disproportionate distribution of the virus amongst certain occupations slowly began gaining attention and precedence in the scientific community. As one of the most affected states in the U.S. with more than 4 million cases and 64,000 fatalities through late July 2021, California per-capita excess mortality is relatively high among Blacks and Latinos [11]. Investigations suggest that workplace settings have been hypothesized as a risk factor for noticing such mortality rates; however, whether excess mortality varies across race, ethnicity, occupation, and industry has not been fully examined. Hence, collecting such information could point to opportunities for intervention among certain vulnerable groups facing heightened transmission risks.

NEED FOR COLLECTING RACE, ETHNICITY & OCCUPATION DATA

According to the data reported by the CDC, a 33% morbidity rate has been identified among non-Hispanic Black individuals, where they comprise 18% of the total population. While, 45% morbidity rate has been identified among non-Hispanic White, where they comprise 59% of the total population [4]. There has been a significant difference between these racial groups, where Black individuals have been disproportionately affected by COVID-19 in hospitalizations compared to non-Hispanic Whites (**Table 1**). This is preliminary evidence of the fact that developed countries like the U.S. have begun realizing the importance of collecting race, ethnicity and occupational information after recognizing the clear scientific correlation between these risk factors and contracting a disease. The accurate recognition and documentation of individuals' occupational engagements and their racial information could prove very useful in identifying susceptible professions and populations, mitigating workplace breakouts, establishing safety measures and facilitating an in-depth study of such correlation with the COVID-19 incidence.

Table 1. Risk for COVID-19 Infection, Hospitalization, and Death by Race/Ethnicity in the US compared to White population [12]

The workplace is considered a possible venue for the transmission of infection, where various occupations face different risks for COVID- 19 exposure [13]. Such occupation-acquired exposures may contribute to racial and ethnic disparities in COVID- 19 cases, and fatalities [8, 14, 15]. Efforts to control the spread of COVID- 19 infection in the workplace can help to protect workers which further lead to reducing health disparities. Research conducted in different parts of the globe has undisputedly established that certain occupations and industries are at a heightened risk of testing positive for COVID-19, specifically those who are part of the medical fraternity and industries that perform essential roles in the community. A study published by Zhang M in late 2020 focused on calculating the differential risk of contracting COVID-19, utilizing the indicators obtained from the Occupational Information Network (O*NET) database, where they were used to tally with the total number of confirmed cases as published by the Washington State Department of Health [16]. In accordance with a study conducted amongst 120,000 residents of the United Kingdom (U.K.), individuals employed within healthcare settings were at a seven times higher risk of being infected [17]. A survey performed in mid-2020 at a U.K. teaching hospital confirmed that the highest rates were found amongst COVID-19 front-line workers (21%). It was also interesting to note that the odds of contracting COVID-19 amongst social servants was three times higher than the common working groups [18].

Food processing plants of various nations were identified as another hotspot for the COVID-19 outbreaks, with reports of greater than 500 confirmed cases from a single site as stated by the Wellcome Open Research COVID-19 working group [19]. As per the European Centre for Disease Prevention and Control, around 1,376 clusters of COVID-19 outbreaks in occupational settings were identified all across Europe during the period between March and early July 2020 [20]. It was compelling to note that officials from Colorado working with the CDC also came up with results that agree with the findings of the U.S., U.K. and other European nations. They concluded that those employed in the healthcare settings tested positive the highest (38%), followed by individuals working within office settings (17%). Public servants occupied third place accounting for 7% of the infected, and lastly, personnel actively involved with manufacturing, including meatpacking, were responsible for 6% of the total COVID-19

positive cases [21]. These findings reiterate that a thorough investigation of occupational risk factors can mitigate workplace outbreaks and play a significant role in preventing the virus's resurgence to points beyond national and economic control.

IMPACT OF EDUCATION AND INCOME LEVELS ON COVID-19

Certain studies looked at the potential risk of exposure to COVID-19 stratifying based on education and income levels [22]. Furthermore, these studies used occupational standing (OS), defined as the proportion of workers in each occupation with a certain level of educational qualification. Those with higher socioeconomic status (such as higher education and/or income levels) usually have access to a broad range of healthcare resources to protect themselves compared to other socioeconomic groups, which indicates the existence of health inequalities [23]. When it comes to workplace exposure to COVID-19 infection, higher education level workers are more likely to work for employers who maintain standards in practicing risk mitigation strategies, follow risk reduction measures and provide PPE kits to the workers [22]. Also, workers with higher education levels tend to put effort into understanding and learn about the ways of COVID-19 disease transmission and are willing to implement risk reduction strategies [24, 25].

It is evident that certain minority racial and ethnic groups with lower education and income levels are more likely to be working in occupations that are unable to engage in social isolation [26]. Socioeconomic status, usually derived based on the income level, plays a vital role in health outcomes as those with relatively low socioeconomic status may more likely be holding a minimum wage job or working in unsafe conditions that put them at more risk of being infected with COVID-19 [27]. Therefore, education and income levels seem to have a strong connection and great control over occupation conditions and disease transmission, where for instance, all healthcare professionals (clinicians, pharmacists and nurses) come under higher OS workers while those who work in transportation, retail stores, farms and meat processing factories come under lower OS workers [24, 28]. In states, regardless of the race/ethnicity, individuals with education level lower than high-school are at increased risk of death due to COVID-19 compared to those with higher education levels such as college and post-graduation (**Figure 1**). In terms of COVID-19 vaccination, although rapid and widespread vaccination rollouts are in place, those with lower education and income levels and Black/Latino by race are less likely to be fully vaccinated than their counterparts [29].

Figure 1. COVID-19 mortality rates by race/ethnicity and education in the US [30]

OPPORTUNITIES & STRATEGIES TOWARDS IMPROVEMENT

The ongoing gaps in collecting race, ethnicity and occupational information result from a dearth of coordinated efforts, inertia, insufficient analysis of market trends and a lack of pioneering leadership. This leads us to the fact that the existing databases have many loopholes and valuable data is missing, or available information is unreliable and thus not credible for analysis. In the midst of a pandemic of this scale that seems to have vastly distributed itself disproportionately among specific intensive and essential racial and occupational groups, it is mandatory to have reliable systems and epidemiological databases in place that are efficient in capturing such essential information. This would play a central role in efficiently tracking the affected, enabling occupational epidemiologists to collaborate with the government and frame central and state-specific policies to protect the targeted groups.

Developing active surveillance systems such as occupational health surveillance are needed in further understanding various factors contributing to disparities in fatalities across different races, ethnicities and occupations. Similarly, death certificates would act as an alternate approach to collect essential information related to one's race, ethnicity and occupation, which would allow for calculating more accurate mortality rates [31]. In ideal circumstances, race, ethnicity and occupational data should be collected for all individuals who test positive for COVID-19 because one's race and profession is an indispensable determinant of health that cannot be avoided in public surveillance systems. In an attempt to overcome this barrier and facilitate the reporting of COVID-19 cases, the National Institute of Occupational Safety and Health (NIOSH) surveillance program emphasized the significance of having a systematic procedure for collection, coding, analyses and reporting for both industry (employer's type of business) and occupation (type of job) data during the pandemic [32]. The NIOSH has developed a system known as NIOSH Industry and Occupation Computerized Coding System (NIOCCS) that automatically codes industry and occupation information, where it could be used to code occupation information from death certificates [33].

The Council of State and Territorial Epidemiologists Occupational Health Subcommittee's Recommended Interim Guidance for Collecting Employment Information about COVID-19 also gives recommendations to guide one towards the qualitative collection of employment information [34]. The U.S. utilizes either the Department of Commerce to

maintain the standard codes for industries in North America or the North American Industry Classification system (NAICS) or another method of categorization known as the Standard Occupational Classification system (SOC), maintained by the Bureau of Labour Statistics, which can also be taken advantage of to attain these standard codes. Thus, establishing race, ethnicity and occupational mortality surveillance systems can help to address various health policy-related issues, not just during the current pandemic but also future pandemics, which has the potential in identifying areas for intervention.

Therefore, identifying and safeguarding these highly susceptible groups is essential during this current crisis as most of these groups are involved in providing essential services to the community. The process of protecting these individuals include providing personal protective equipment (PPE) and vaccines to limit the exposure, providing stable health insurance and income support, offering sick leaves (including paid leaves) and compensation benefits if a worker becomes sick or shows signs and symptoms of the infection. In addition, such an approach may help to balance ethnic and racial disparities within the healthcare system. Although the Families First Coronavirus Act offered federally mandated paid sick leave for those unable to work due to the current pandemic and respective social distancing laws, 39% of workers who belong to POC are affected by exemptions in the law [35].

CONCLUSIONS

Due to the high level of uncertainty posed by the pandemic, race, ethnicity and occupation-related projections are yet to be released. It is essential to have a platform wherein race, ethnicity and occupational data of the infected are recorded in detail, which would efficiently supplement the execution of policies that protect vulnerable professions and susceptible ethnic groups. However, there is a very scarce data pool that accurately records such information. Thus, collecting and recording such information will provide valuable insights and help public health officials pick out workplace-related outbreaks and evaluate the odds of various ethnic groups and professions contracting the infection.

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