



The Open Public Health Journal

Content list available at: <https://openpublichealthjournal.com>



LETTER TO THE EDITOR

Increased Severity of COVID-19 in Patients with Newly Diagnosed Diabetes: A Public Health Priority

Thirunavukkarasu Sathish^{1,*}

¹Department of Family and Preventive Medicine, School of Medicine, Emory Global Diabetes Research Center, Woodruff Health Sciences Center, Emory University, Atlanta, GA, USA

Article History

Received: January 03, 2023

Revised: May 16, 2023

Accepted: May 31, 2023

Dear Editor,

The recently published article by Maheshwari A *et al.* [1] adds to the existing body of evidence that coronavirus disease-2019 (COVID-19) patients with newly diagnosed diabetes (NDD) experience more severe illness than those with preexisting diabetes (PD) [2 - 5]. However, the mechanisms explaining this surprising observation have not yet been completely identified ever since it was first reported by Li H *et al.* [6] during the pandemic's very early phase (Jan to Mar 2020).

In the study by Maheshwari A *et al.* of 1630 adults (≥ 18 years), 958 (58.8%) had PD, 224 (13.7%) had NDD, and 448 (27.5%) had no diabetes. Compared with patients with NDD, those with PD had significantly higher levels of parameters that contribute to the increased severity of COVID-19: mean random blood glucose (240.4 mg/dl vs. 309.5 mg/dl), HbA1c (6.7% vs. 8.1%), and age (50.8 vs. 52.7 years), and males (59.8% vs. 63.6%) and ≥ 4 comorbidities (0.9% vs. 21.1%). On the contrary, patients with NDD were significantly more likely to be hospitalized for COVID-19 treatment (82.6% vs. 45.4%), have a high chest computed tomography severity score (47.6% vs. 15.1%), and require oxygen support (74.0% vs. 42.7%) and steroids (85.3% vs. 74.4%) compared to those with PD. The authors, however, did not provide data on inflammatory markers, coagulation indices, and the use of anti-diabetes medications during hospitalization. Guidelines recommend using dipeptidyl peptidase-4 (DPP4) inhibitors and glucagon-like peptide 1 (GLP1) analogues (although with caution of avoiding dehydration) [7], as these drugs may reduce COVID-19 severity by their anti-inflammatory actions [8].

Possible mechanisms explaining the increased risk of severe COVID-19 in NDD patients include stress hypergly-

cemia, modulation of immune and inflammatory responses by acute hyperglycemia, lack of protective effect from metformin (as in PD patients), upregulation of angiotensin-converting enzyme 2 (ACE2) receptors on cells due to acute hyperglycemia (thereby facilitating virus entry into the cells), and occult or masked multi-organ damage due to the undiagnosed nature of NDD [4 - 6, 9 - 14].

An estimated 240 million people live with undiagnosed diabetes globally, which translates to almost one-in-two adults with diabetes being unaware of their condition [15]. More worryingly, nearly 90% of people with undiagnosed diabetes live in low- and middle-income countries such as India. Undiagnosed diabetes, in addition, to causing several diabetes-related complications [15], results in increased severity and mortality from COVID-19. Thus, detecting people with undiagnosed diabetes and treating them early is now a public health priority more than ever.

LIST OF ABBREVIATIONS

NDD	= Newly Diagnosed Diabetes
COVID-19	= Coronavirus Disease-2019
PD	= Preexisting Diabetes
DPP4	= Dipeptidyl Peptidase-4
GLP1	= Glucagon-like Peptide 1
ACE2	= Angiotensin-converting Enzyme 2

CONFLICT OF INTEREST

The author declares no conflict of interest financial or otherwise.

ACKNOWLEDGMENTS

Declared none.

REFERENCES

- [1] Maheshwari A, Hasnani D, Bhattacharya M, *et al.* Assessment of determining factors for severity of NeoCOVIDiabetes in India: A pan India multicentric retrospective study. *Diabetes Metab Syndr* 2023;

* Address correspondence to this author at the Department of Family and Preventive Medicine, School of Medicine, Emory Global Diabetes Research Center, 100 Woodruff Health Sciences Center, Emory University, Atlanta, GA 30322, USA; E-mail: sathish.thirunavukkarasu@emory.edu

- 17(1): 102692.
[http://dx.doi.org/10.1016/j.dsx.2022.102692] [PMID: 36584552]
- [2] Sathish T, Mello GT, Cao Y. Is newly diagnosed diabetes a stronger risk factor than pre-existing diabetes for COVID-19 severity? *J Diabetes* 2021; 13(2): 177-8.
[http://dx.doi.org/10.1111/1753-0407.13125] [PMID: 33107708]
- [3] Sathish T. Risk of mortality in COVID-19 patients with newly diagnosed and pre-existing diabetes. *Prim Care Diabetes* 2022; 16(1): 214.
[http://dx.doi.org/10.1016/j.pcd.2021.12.002] [PMID: 34974995]
- [4] Vargas-Vázquez A, Bello-Chavolla OY, Ortiz-Brizuela E, *et al.* Impact of undiagnosed type 2 diabetes and pre-diabetes on severity and mortality for SARS-CoV-2 infection. *BMJ Open Diabetes Res Care* 2021; 9(1): e002026.
[http://dx.doi.org/10.1136/bmjdr-2020-002026] [PMID: 33593750]
- [5] Cromer SJ, Colling C, Schatoff D, *et al.* Newly diagnosed diabetes vs. pre-existing diabetes upon admission for COVID-19: Associated factors, short-term outcomes, and long-term glycemic phenotypes. *J Diabetes Complications* 2022; 36(4): 108145.
[http://dx.doi.org/10.1016/j.jdiacomp.2022.108145] [PMID: 35148936]
- [6] Li H, Tian S, Chen T, *et al.* Newly diagnosed diabetes is associated with a higher risk of mortality than known diabetes in hospitalized patients with COVID -19. *Diabetes Obes Metab* 2020; 22(10): 1897-906.
[http://dx.doi.org/10.1111/dom.14099] [PMID: 32469464]
- [7] Bornstein SR, Rubino F, Khunti K, *et al.* Practical recommendations for the management of diabetes in patients with COVID-19. *Lancet Diabetes Endocrinol* 2020; 8(6): 546-50.
[http://dx.doi.org/10.1016/S2213-8587(20)30152-2] [PMID: 32334646]
- [8] Lim S, Bae JH, Kwon HS, Nauck MA. COVID-19 and diabetes mellitus: From pathophysiology to clinical management. *Nat Rev Endocrinol* 2021; 17(1): 11-30.
[http://dx.doi.org/10.1038/s41574-020-00435-4] [PMID: 33188364]
- [9] Bode B, Garrett V, Messler J, *et al.* Glycemic characteristics and clinical outcomes of COVID-19 patients hospitalized in the United States. *J Diabetes Sci Technol* 2020; 14(4): 813-21.
[http://dx.doi.org/10.1177/1932296820924469] [PMID: 32389027]
- [10] Zhang Y, Li H, Zhang J, *et al.* The clinical characteristics and outcomes of patients with diabetes and secondary hyperglycaemia with coronavirus disease 2019: A single-centre, retrospective, observational study in Wuhan. *Diabetes Obes Metab* 2020; 22(8): 1443-54.
[http://dx.doi.org/10.1111/dom.14086] [PMID: 32406594]
- [11] Lampasona V, Secchi M, Scavini M, *et al.* Antibody response to multiple antigens of SARS-CoV-2 in patients with diabetes: An observational cohort study. *Diabetologia* 2020; 63(12): 2548-58.
[http://dx.doi.org/10.1007/s00125-020-05284-4] [PMID: 33029657]
- [12] Fadini GP, Morieri ML, Boscari F, *et al.* Newly-diagnosed diabetes and admission hyperglycemia predict COVID-19 severity by aggravating respiratory deterioration. *Diabetes Res Clin Pract* 2020; 168: 108374.
[http://dx.doi.org/10.1016/j.diabres.2020.108374] [PMID: 32805345]
- [13] Sathish T, Tapp RJ, Cooper ME, Zimmet P. Potential metabolic and inflammatory pathways between COVID-19 and new-onset diabetes. *Diabetes Metab* 2021; 47(2): 101204.
[http://dx.doi.org/10.1016/j.diabet.2020.10.002] [PMID: 33129968]
- [14] Sathish T, Kapoor N, Cao Y, Tapp RJ, Zimmet P. Proportion of newly diagnosed diabetes in COVID-19 patients: A systematic review and meta-analysis. *Diabetes Obes Metab* 2021; 23(3): 870-4.
[http://dx.doi.org/10.1111/dom.14269] [PMID: 33245182]
- [15] International Diabetes Federation. *IDF Diabetes Atlas. 10th ed.* Brussels, Belgium: International Diabetes Federation 2019.