The Effect of COVID-19 Pandemic on Glycemic Control and Its Associated Factors Among Patients with Type 2 Diabetes Mellitus Attending Primary Care Clinics in Johor, Malaysia

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Overview

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1. INTRODUCTION: BACKGROUND & JUSTIFICATION OF THE RESEARCH

Diabetes Type 2 (T2DM) Prevalence

Global: 537 million adults affected[1]
Malaysia: 3.9 million adults. Increase from 13.4% (2015) to 18.3% (2019)[2]
Johor: 228,166 registered patients (2019). The second-highest number in Malaysia[3]

COVID-19 Overview

Origin: Wuhan, late 2019. Declared pandemic: March 2020.
Malaysia: 5.1 million cases, 37 100 deaths.[4]
Movement Controlled Order: Implemented March 18, 2020.

Challenges During Pandemic

Restricted movement led to poor lifestyle.
Mental health: Stress and anxiety.
Poor medical outcomes.

Importance of this research

Reveals how pandemic disrupted diabetes outcomes by highlighting the gaps.
Provides data for shaping healthcare policies and effective resources allocation during health crises.

1. International Diabetes Federation. IDF Diabetes Atlas. 10th ed.
2.Institute for Public Health. (NHMS) 2019: Vol. 1: 2019.
3.Institute for Public Health. NDR 2013-2019. 2019.
4. https://data.moh.gov.my/dashboard/covid-19

2. OBJECTIVES

GENERAL

To determine the glycaemic control among adult patients with T2DM pre pandemic and 1 year after pandemic started in Johor, Malaysia.

SPECIFIC

1. To describe the sociodemographic and clinical factors of patients with T2DM in Johor, Malaysia.

2. To compare the glycaemic control among adult patients with T2DM pre pandemic and 1 year after pandemic started.

3. To investigate the association between sociodemographic and clinical factors with poor glycaemic control during Covid 19 pandemic

3. METHODOLOGY

DESIGN

Retrospective cross sectional study

SAMPLE SIZE ESTIMATION

934 samples needed* (20% dropout rate)

POPULATION

Patients with diabetes type 2 who fulfilled inclusion criteria in 4 primary health clinics in Johor

INCLUSION CRITERIA

- 18 years old above
- Registered T2DM patients in National Diabetic Registry
- Presence of recent HbA1c reading 1 year pre-pandemic & 1 year after pandemic was declared

EXCLUSION CRITERIA

- Lost follow up
- Pregnant
- Absence of HbA1c reading 1 year pre-pandemic & 1 year after pandemic was declared

3. METHODOLOGY (CON'T)

STUDY PROCEDURE

Patient distribution by clinic ratio

Based on number of active patients in each clinic

Sampling method

- Simple random sampling
- Microsoft Excel random numbers generated
- Data Source: National Diabetic Registry (NDR)
- Inclusion/Exclusion Criteria applied

Data collection

- Total patients selected: 876
- Data retrieval from computerized record system

PATIENTS ENROLLMENT

Total active patients in NDR, N= 7655

Simple random sampling

Total patients' card screened N= 934

Incomplete data, n= 58

Patients enrolled, N=876

3. METHODOLOGY (CON'T)

IMPORTANT DEFINITION

Glycaemic control
Good: HbA1c < 7%
Poor: HbA1c ≥ 7%

HbA1c record during pre-pandemic

HbA1c record 12 months during pandemic

3. METHODOLOGY (CON'T)

VARIABLES

SOCIO-DEMOGRAPHICS

- Age group
- Gender
- Ethnicity

CLINICAL FACTORS

- Diabetes duration
- Type of diabetic treatment
- Smoking
- Stroke
- Hypertension
- Dyslipidaemia
- Nephropathy
- Ischemic heart disease

STATISTICAL ANALYSIS

SPSS version 24

Descriptive Statistic
Socio-demographic & clinical factors: percentages, frequency, mean, standard deviation

Univariate Analysis
Chi Square

Multivariate Analysis
Multiple logistic regression

4.RESULTS

Sociodemographic and clinical factors of study participants (N=876)

Mean age

The mean age of the patients was 63.25 ± 10.8 years.

Mean HbA1C

- Before pandemic: 8.14 ± 1.96%
- 12 months after pandemic was declared : 8.40 ±2.07%

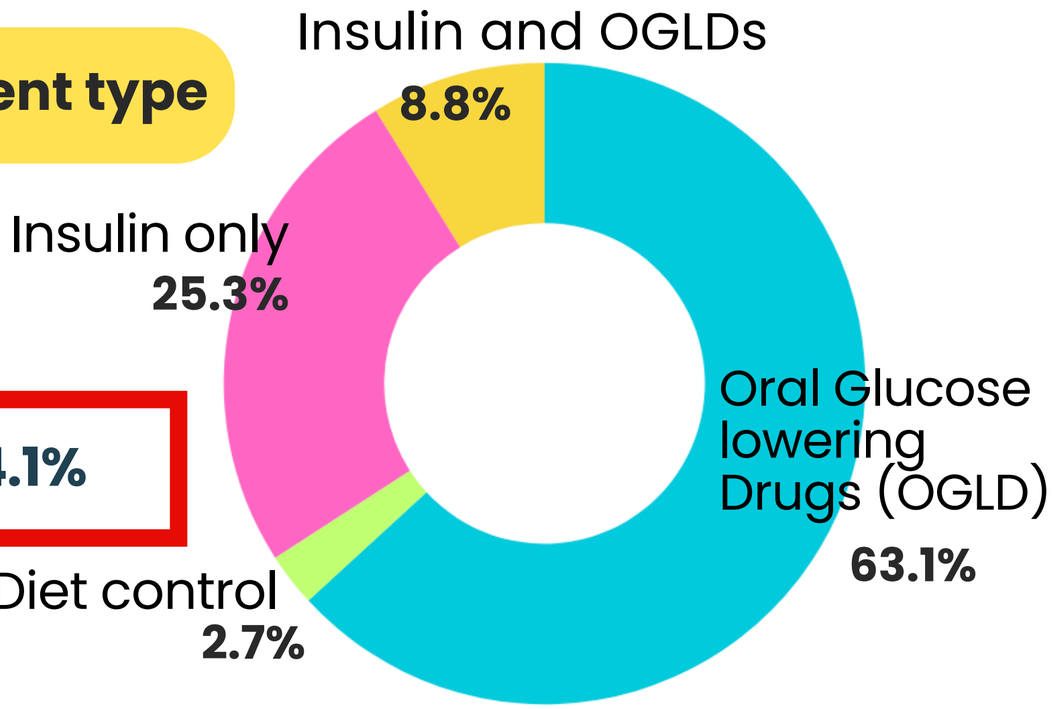
Predominant comorbidities include

- hypertension (89.5%)
- dyslipidemia (91.9%)

The study population were predominantly:

- Age group ≥ 60 years old (66.1%)
- Gender: Female (62. 6%)
- Ethnicity: Malay (66.8 %)

Treatment type



Total Insulin : 34.1%

4.RESULTS (CON'T)

Glycaemic Control Comparison at Pre-Pandemic & 12th Month During Pandemic, (N=876)

Glycaemic Control	Pre pandemic n (%)	During pandemic n (%)	P-value
Good HbA1c<7%	315 (36.0)	281 (32.5)	0.019
Poor HbA1c≥7%	561 (64.0)	595 (67.9)	

Increased 3.9%

4.RESULTS (CON'T)

Significant factors associated with poor glycaemic control at 12th month during pandemic, (p<0.01)

Univariate Analysis using Chi Square

Age group < 60 years old

77.1% HbA1c ≥7%

(p<0.001)

Diabetes ≥ 5 years

71.9% HbA1c ≥7%

(p<0.001)

Smokers

78.6 % HbA1c ≥7%

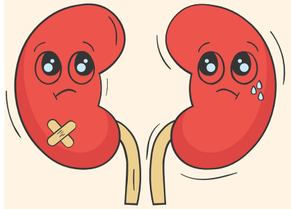
(p=0.016)

Indian ethnicity

81.8 % HbA1c ≥7%

(p=0.004)

Nephropathy



74.8 % HbA1c ≥7%

(p=0.005)

Treatment: Insulin only

92.3%HbA1c ≥7%

(p<0.001)

4.RESULTS (CON'T)

Factors Associated with Poor Glycaemic Control at 12th Month During the COVID-19 Pandemic, (p>0.05)

Multivariate Analysis using Multiple Logistic Regression

Smokers

1.78

95% CI: 1.02-3.09
p=0.041

Age group <60 years

1.81

95% CI : 1.26 - 2.62
p=0.010

Duration of T2DM ≥ 5 years

1.92

95% CI : 1.32-2.79
p=0.010

Combination insulin & oral drugs

7.8

95% CI :2.62-23.25
p<0.001

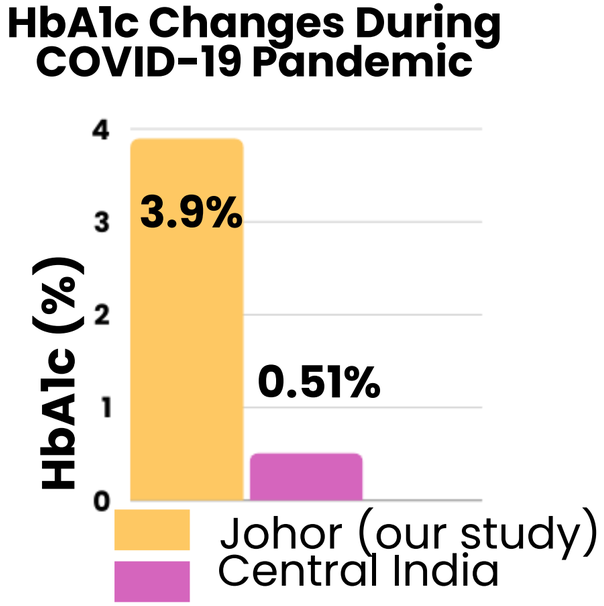
Insulin only

17.39

95% CI : 6.35-47.66
p<0.001

5.DISCUSSION

Impact of Covid 19 Pandemic on Glycaemic Control



Increase in HbA1c Levels During Pandemic

- Johor: More patients on insulin & no telemedicine support
- Central India: Did not specify insulin use and 47% of patients had regular telehealth follow-ups.[5]
- These factors contributed to poorer HbA1c outcomes in Johor

Age group < 60 years old showed poorer glycaemic control

Younger Age Group Had Poorer Glycaemic Control

- Influenced by unhealthy eating habits from social media during pandemic.[6]
- Social isolation caused increased stress and anxiety.[7]
- Led to poorer diabetic control during the pandemic

5. Khare J, Jindal S. Prim Care Diabetes. 2022 Dec;16(6):775-779
6. Czupryniak L, Dicker D, Lehmann R, et al. Cardiovasc Diabetol. 2021;20:198.
7.Khunti K, Valabhji J, Misra S.. Diabetologia. 2023;66(1):255-266.

5. DISCUSSION (CON'T)

Factors associated with poor Glycaemic Control

Longer Duration of Diabetes Associated with Poorer Glycaemic control

Consistent with Hong Kong study[8], likely due to long standing beta-cell failure and impaired insulin secretion[9].

Patients on insulin (with or without oral glycemic drugs) had poorer outcomes

Significant factors contributing to these deteriorations: Lack of availability of insulin and glucose monitoring supplies.[10]

Smokers had poorer glycaemic control

Significantly associated with increased insulin resistance and cardiovascular autonomic dysfunction in patients with type 2 diabetes.[11]

8. Tong PC, Ko GT, So WY, et al. The Hong Kong Diabetes Registry. Diabetes Res Clin Pract. 2008;82(3):346-352.
9. Eberle C, Stichling S. Impact of COVID-19 pandemic on diabetes management. Diabetol Metab Syndr. 2021;13:95.
10. UKPDS Group. Intensive blood glucose control with sulphonylurea or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). Lancet. 1998;352(9131):837-853.
11. Anan F, et al. Impact of smoking on glycemic control in patients with type 2 diabetes. Eur J Clin Investig. 2006;36(7):459-465.

5. DISCUSSION (CON'T)

Strength

Pioneer local study

- **One of the earliest research papers** in **Malaysia to take early initiative to evaluate the glycemic control** during the COVID-19 pandemic.

Limitations

Limited study centers

Limited to health clinics in **three districts** in Johor, Malaysia.

Limited investigated factors

Did not include other potentially important factors such as:

- **Treatment adherence**
- **Dietary intake**
- **Physical activities**
- **Psychological stress**

6. CONCLUSION

1. There is **worsening of glycaemic** control during COVID-19 pandemic.

2. **Younger age group, smoker, longer duration of diabetes and insulin user** found to have poorer glycaemic control during COVID-19 pandemic.

3. **Recommendation** for future preparedness of pandemic health care system:

Telehealth Emphasis:
Prioritize telehealth, especially for younger patients and those needing frequent monitoring, example: insulin users.

Enhanced Health Initiatives and Contingency Plans:
Use identified factors to develop better health strategies and comprehensive contingency plans by multiple agencies.

Thank you

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