Original Article

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Gestational Diabetes in Mid-trimester Pregnancy in South Asian Women Based on the Oral Glucose Challenge Test and Risk Factor Predictors: A Prospective Observational Study

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ABSTRACT

Introduction: Gestational Diabetes Mellitus (GDM) is a condition potentially occurring during pregnancy. It is associated with adverse foetal and maternal outcomes and is particularly prevalent in South Asian women who comprised this study sample.

Aim: To provide a critical analysis of the information on GDM risk that can be identified from screening using the Oral Glucose Challenge Test (OGCT-50 g).

Materials and Methods: A prospective cohort study was conducted over eight months. Purposive sampling was used to collect demographic and clinical data {age; Body mass Index (BMI); parity; history of Diabetes Mellitus (DM) in a first degree relative and histories of GDM, polyhydramnious, macrosomia, birth congenital abnormalities and still birth} from 300 South Asian women in mid-trimester pregnancy who consented to undertake an OGCT-50g. Excluded were primigravidas, women with DM or other medical conditions, and women who were unwilling or unable to give informed written consent. Descriptive, comparative and multivariate logistic analyses were used to investigate strengths of correlation between OGCT outcomes and clinical/historical risk factors.

Results: The OGCT were 107 (35.7%) positive and 193 (64.3%) negative. The threshold for body mass risk was identified as 27.5 kg/m^2. Women with two or more risk factors were OGCT positive on 72.9% occasions whereas women with one or no risk factor were OGCT negative on 81.9% occasions. Approximately, 50% of women had a family history of DM as their only risk factor and 24% of them were OGCT positive.

Conclusion: The BMI was the strongest determinant of a positive OGCT result. The logistic regression analysis demonstrated that using the lower BMI threshold of 27.5 compared to 30.0 [as per National Institute for Health and Care Excellence (NICE) guideline] improved agreement between risk factors profile was assessed and OGCT results.

Keywords: Body mass index in pregnancy, Glucose intolerance, Pre-eclampsia, Screening in pregnancy

INTRODUCTION

The GDM is defined as any degree of glucose intolerance which is identified for the first time during pregnancy [1,2]. GDM is one of the most frequent medical complications reported during pregnancy occurring in approximately 2-5% of Caucasian women and more frequently in South Asian women at a rate of 8.1% [3-7]. There are similar differences in the prevalence of type II diabetes [8]. Differences in prevalence rates may be due to differences in ethnicity [5,7,9], diagnostic criteria [10-12], screening strategies [6,13], and the different population's predisposition due to genetic [14] and lifestyle factors to metabolic syndrome, insulin resistance and glucose intolerance [15-17].

The GDM has been described as a "transient excursion into the metabolic syndrome" [18,19] with the occurrence of a spectrum of metabolic abnormalities associated with insulin resistance including relative hyperglycaemia, hyperlipidemia and in addition, disturbances of coagulation pathways [20]. Thus, pregnancy can unveil even slight defects in insulin secretion resulting in glucose intolerance and GDM [21]. The GDM carries risks for the mother, foetus and neonate [2]. The Hyperglycaemia and Adverse Pregnancy Outcome (HAPO) study [22], a large scale multinational cohort study completed by more than 23,000 pregnant women, demonstrated that the risk of adverse maternal, foetal and neonatal outcomes continuously increased as a function of maternal glycaemia at 24-28 weeks of gestation, even within ranges previously considered normal for pregnancy. The risk of most complications continue to increase as the severity of glycaemia increases. Kennelly MA and McAuliffe FA noted that impaired glucose tolerance in pregnancy and gestational diabetes are associated with increased maternal complications such as hypertension, pre-eclampsia and an increased likelihood of developing diabetes in later life [23,24]. Cesarean delivery for dystocia and foetal distress, unexplained intrauterine death, macrosomia and traumatic birth leading to nerve palsies and fractures are also significantly more likely to occur [25,26]. In the long term, such infants are at risk of glucose intolerance and obesity [27].

The prevalence of GDM in the population of South Asian women that has been sampled in this study is known to be elevated, yet nationally recommended screening and management strategies have been reported to be less effectively implemented in practice [28]. The early prediction of GDM allows for the implementations of potential interventions (lifestyle or pharmacological) to reduce the risk of adverse maternal and foetal outcomes.

Several guidelines have been published by various institutions, providing direction, for example, the National Institute for Health and Care Excellence (NICE) [29], the Society of Obstetricians and Gynaecologists of Canada (SOGC) [30] and the International Association of Diabetes and Pregnancy Study Groups (IADPSG) [31], although there is no universally agreed screening protocol for GDM. Many institutions employ either risk factor screening or universal screening. Screening for GDM typically uses either an Oral Glucose Tolerance Test (OGTT) or an Oral Glucose Challenge Test (OGCT) or a two staged process involving both tests [32].

The OGCT has the advantage of being a one stage procedure that does not require the patient to fast compared to the longer two hour fasting-based procedure for the OGTT. Some, however, report a lack of consensus on its reliability and specificity [33], whereas, a

systematic review of pooled data for the OGCT showed satisfactory sensitivity and specificity of 0.74 (95% CI 0.62-0.87) and 0.77 (95% CI 0.66-0.89) respectively (threshold value of 7.8 mmol/L) [27,34]. Based on this finding, these authors recommended routine screening for GDM at 24-28 weeks, unless patients are at low risk, (i.e., younger than 25 years, BMI less than 27 and no personal, family, or ethnic history of DM). They recommended screening high-risk patients (i.e., aged ≥35 years; BMI >30; Polycystic Ovary Syndrome (PCOS); acanthosis nigricans; corticosteroid use; and personal, family, or ethnic history of DM) at the first prenatal visit. The NICE guidelines in the UK and the American Diabetes Association have similar standards [29,31]. An unresolved issue in the accurate diagnosis of GDM is the discrepancy between using high risk GDM status for screening, which has been found to underestimate the true incidence by 50%, compared to the overestimation found in universal screening [27]. Therefore, the addition of the OGCT to the available screening tools could provide a better estimation of GDM risk than risk factors alone, and better identify patients who should take the OGTT [8]. However, the criteria includes no agreed plan of the implementation of screening.

Study objectives:

- To explore the relationship between the OGCT outcome in multiparous women and GDM risk and maternal and foetal risk factors linked to GDM.
- To determine the prevalence of positive/negative results for the study sample.
- To examine the relationship between OGCT results and GDM risk factor profiles, and thereafter recommend how the test might be incorporated within the management of GDM.

MATERIALS AND METHODS

A prospective observational study was conducted in Ziaduddin Medical University Hospital over a study period of eight months from January 2020 to August 2020. A purposive sampling technique was used to recruit 300 pregnant women from attendees at the antenatal clinic of the Ziauddin Medical University Hospital. Ethical approval was received from Dr Zahid Ali Faheem of Ziauddin Hospital, Karachi, Pakistan. A trained resident, who was part of the research team, was responsible for study recruitment, organising investigations, data collection and entering data into an electronic database. The clinic care adhered to the American guidelines. Each recruit to the study provided written informed consent.

Inclusion criteria: Included were multiparous women in mid-trimester who were undergoing an OGCT and who were able and willing to provide informed written consent for their participation in this study.

Exclusion criteria: Excluded were primigravidas, women with DM or other medical conditions, and women who were either unwilling or unable to give informed written consent.

Study Procedure

Obstetric and medical histories were recorded during a routine clinical appointment together with demographic information. Another appointment was arranged for each participant to undertake an OGCT. Risk factors for GDM according to NICE/SOGC guidelines and other known pregnancy-related diabetic risk factors were collected from each woman [Table/Fig-1].

Major risk factors for gestational diabetes	
• BMI ≥30.0; • History of gestational diabetes; • History of a macrosomic baby (weight ≥4.5 kg); • Diabetes in a first-degree relative;	• Maternal older age and parity; • Gestational age (LMP); • History of polyhydramnios; • History of congenital anomalies; • History of unexplained still birth or perinatal loss.

[Table/Fig-1]: Maternal risk factors associated with risk of GDM [29].
LMP: Last menstrual period

Trained technicians administered an OGCT to each participant using a glucose load of 50 gm without dietary preparation according to the standard protocol. A trained pathologist reviewed all results. A serum glucose value ≥140 mg/dL (7.8 mmol/L) but less than 200 mg/dL or equivalently 11.1 mmol/L one hour after drinking the glucose solution represented a positive OGCT result. Conversely, a serum glucose level below 140 mg/dL represented a negative OGCT result. Because these measurements were undertaken for research purposes, to ensure that best care was provided, an OGTT was administered to confirm/eliminate a GDM diagnosis.

Women with a glucose concentration exceeding 200 mg/dL (11.1 mmol/L) or a fasting glucose concentration exceeding 126 mg/dL (7.0 mmol/L) were diagnosed as having gestational diabetes without further testing, if these findings were confirmed on a subsequent day [35]. Women in these categories were excluded from this study.

Classification of BMI

The classification of BMI into normal, overweight and obese categories is a contentious issue for Asian communities. A World Health Organisation (WHO) publication in 2004 concluded that "The available data does not necessarily indicate one clear BMI cut-off for all Asian Indians for overweight and obesity" [36]. However, BMI classification was applied for analysis purposes as per NICE guidelines [29].

STATISTICAL ANALYSIS

Data were analysed using Statistical Package for the Social Sciences (SPSS) version 11.5. Associations between GDM risk factors and OGCT outcomes were tested using chi-squared statistics. Logistic regression was used to quantify the relative importance of significant risk factors in determining OGCT results, and to assess how well known GDM risk factors characterised OGCT outcomes [37,38].

RESULTS

For this study sample, it is clear from [Table/Fig-2] that associations between gestational age, maternal age and parity are not statistically significant.

Variables N=300	Demographics and risk factors	n (%)	OGCT +ve n (%)	OGCT -ve n (%)	Chi-squared (p-value)
Maternal age	18-25 years	102 (34)	33 (32.4)	69 (67.6)	3.59 (p=0.166)
	26-35 years	180 (60)	64 (35.6)	116 (64.4)	
	36-45 years	18 (6)	10 (55.6)	8 (44.4)	
NICE/ SOGC Measure of BMI Risk	Normal (BMI <25.0)	51 (17)	16 (31.4)	35 (68.6)	56.26 (**p<0.001**)
	Overweight (25.0≤BMI≤29.9)	232 (77.3)	74 (31.9)	158 (68.1)	
	Obese (BMI ≥30.0)	17 (5.7)	17 (100)	0	
Parity	1 and 2	237 (79)	80 (33.8)	157 (66.2)	1.89 (p=0.388)
	3 and 4	59 (19.7)	25 (42.4)	34 (57.6)	
	5 and 6	4 (1.3)	2 (50)	2 (50)	
Gestational age	24 weeks	40 (13.3)	10 (25)	30 (75)	8.12 (p=0.087)
	25 weeks	76 (25.3)	23 (30.3)	53 (69.7)	
	26 weeks	90 (30)	34 (37.8)	56 (62.2)	
	27 weeks	69 (23)	33 (47.8)	36 (52.2)	
	28 weeks	25 (8.3)	7 (28)	18 (72)	
Historical Maternal GDM Risk factors	Gestational diabetes	24 (8)	17 (70.8)	7 (29.2)	14.06 (**p<0.001**)
	Macrosomia	22 (7.3)	17 (77.3)	5 (22.7)	17.91 (**p<0.001**)
	Unexplained still birth	15 (5)	9 (60)	6 (40)	4.07 (p=0.043)
	Congenital anomalies	9 (3)	6 (66.7)	3 (33.3)	3.89 (p=0.049)
	Polyhydramnios	20 (6.7)	14 (70)	6 (30)	11.01 (**p<0.001**)
	Diabetes in first degree family member	224 (74.7)	92 (41.1)	132 (58.9)	11.26 (**p<0.001**)

[Table/Fig-2]: Risk factors for gestational diabetes, the frequencies of these risks and their association with OGCT positive/negative results are given based on chi-square tests.
Statistically significant p-values are indicated in a bold font; Also the sum of all historical maternal risk factors exceeds; 300 because some patients have more than one risk factor

Threshold for body mass risk: BMI in this sample ranged from 19.61 kg/m^2 to 42.19 kg/m^2 with median 26.29 kg/m^2 (IQR 25.53 to 27.18). The threshold for body mass risk was investigated by two independent analysis. The first approach identified this threshold as the BMI for which the mean BMI for women with positive or negative OGCT results were statistically closest. [Table/Fig-3] provides a comparison of these mean values for thresholds decreasing from BMI=30.0 to BMI=26.0 in units of 0.5. Numbers in brackets in this [Table/Fig-3] denote the number of patients with OGCT positive and OGCT negative results, but no body mass risk at that choice of threshold. The mean body mass indices for women with positive or negative OGCT results are seen to be statistically closest at threshold BMI=27.5.

Threshold for body mass risk	Mean body mass index for OGCT positive women	Mean body mass index for OGCT negative women	Comparison of mean body mass indices
30.0	26.54±1.92 (n=90)	25.87±1.23 (n=193)	p=0.0026
29.5	26.50±1.90 (n=89)	25.87±1.23 (n=193)	p=0.0042
29.0	26.34±1.83 (n=84)	25.87±1.23 (n=193)	p=0.0324
28.5	26.16±1.78 (n=78)	25.83±1.19 (n=190)	p=0.1279
28.0	25.96±1.74 (n=71)	25.80±1.17 (n=188)	p=0.4704
27.5	25.66±1.69 (n=61)	25.69±1.10 (n=178)	p=0.8883
27.0	25.34±1.67 (n=51)	25.61±1.07 (n=169)	p=0.2865
26.5	24.82±1.69 (n=37)	25.29±1.02 (n=130)	p=0.1084
26.0	24.34±1.68 (n=28)	25.05±0.99 (n=105)	p=0.0326

[Table/Fig-3]: Mean body mass indices are compared for women with positive and negative OGCT results for thresholds of body mass risk decreasing from BMI=30.0 to BMI=26.0 in units of 0.5.
Comparisons of mean body mass indices for OGCT +ve and OGCT -ve patients for each choice of threshold were based on t-tests

The second approach used logistic regression to identify how varying the threshold for body mass risk influenced the quality of fit between OGCT outcomes and maternal risk factors [37,38]. This threshold was decreased from BMI=30.0 to BMI=26.0 in units of 0.5 and the quality of each fit was measured by MacFadden's pseudo R^2 criterion which states that R^2=20% or higher should be interpreted as a good fit with higher values indicating better fits [39]. The results are reported in [Table/Fig-4].

Threshold for body mass risk	Mean negative log likelihood score	Mcfaddens estimate of the quality of fit
30.0	0.503766	22.67%
29.5	0.502013	22.94%
29.0	0.488625	25.00%
28.5	0.493270	24.28%
28.0	0.484205	25.68%
27.5	0.491501	24.56%
27.0	0.477522	26.70%
26.5	0.506973	22.18%
26.0	0.522044	19.87%

[Table/Fig-4]: Logistic regressions were used to assess the quality of the fit between maternal risk factors and OGCT outcomes for thresholds of body mass risk decreasing from BMI=30.0 to BMI=26.0 in units of 0.5.

The approach based on logistic regression therefore suggests that BMI=27.0 is the best threshold for body mass risk for this sample. Importantly, however, both investigations yield a quantitatively similar threshold for the presence of body mass risk in a South Asian population and support the notion that the NICE/SOGC threshold of BMI=30.0 may be inappropriate. The threshold BMI=27.5 also coincides with that proposed by an Expert Indian Consensus Group and is also advocated in a recent article suggesting that the threshold for body mass risk should be reduced to BMI=27.5 for South Asian populations [29,40-42]. Henceforth, subsequent analysis will also consider the threshold BMI=27.5 in addition to BMI=30.0. A WHO expert consultation public health document placed BMI=27.5 as the lower bound of the high to very high BMI range for Asian populations [2].

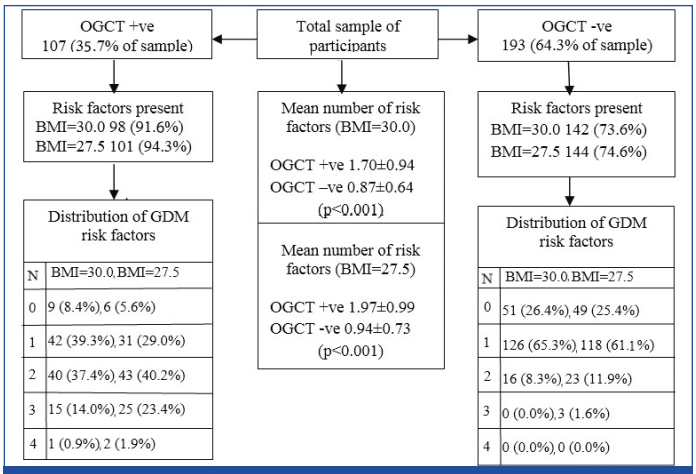
[Table/Fig 5] shows the weights, standard errors and odds ratios for the logistic regression of OGCT outcome with maternal risk factors when the threshold for body mass risk is BMI=30.0 or BMI=27.5. Risks are statistically significant when p≤0.05.

Maternal risk factor	Threshold for body mass risk BMI=30.0		Threshold for body mass risk BMI=27.5	
	Weight	Odds ratio	Weight	Odds ratio
Body mass	-------	∞	2.039±0.351 (p<0.001)	7.683
Macrosomia	2.072±0.624 (p<0.001)	7.941	1.962±0.712 (p=0.006)	7.114
Gestational diabetes	1.732±0.510 (p<0.001)	5.652	1.685±0.481 (p<0.001)	5.392
Family history diabetes	0.910±0.345 (p=0.008)	2.484	0.993±0.364 (p=0.006)	2.699
Polyhydramnios	1.513±0.563 (p=0.007)	4.540	1.592±0.567 (p=0.005)	4.914
Congenital abnormality+Unexplained still birth	1.579±0.528 (p=0.003)	4.850	1.355±0.544 (p=0.013)	3.877

[Table/Fig-5]: Logistic weights, odds ratios and standard errors are shown for logistic regressions of OGCT outcome versus GDM risk factors when the thresholds for body mass risk are BMI=30.0 and BMI=27.5.

OGCT Outcome and GDM Risk Factors

At the threshold BMI=30.0 the mean number of risk factors possessed by women with a positive/negative OGCT outcomes were 1.70±0.94 and 0.87±0.64, respectively (p<0.001). At the lower threshold BMI=27.5 the corresponding mean number of risk factors for positive/negative OGCT results were increased to 1.97±0.99 and 0.94±0.73, respectively (p<0.001). However, in both cases mothers with a positive OGCT result have significantly more risk factors than mothers with a negative OGCT result thereby supporting the sensitivity of the OGCT. At threshold BMI=30.0, GDM risk factors were present in 91.6% (98/107) of mothers with a positive OGCT result compared with 73.6% (142/193) for mothers with a negative OGCT (χ^2=14.56 p<0.001) [Table/Fig-6].

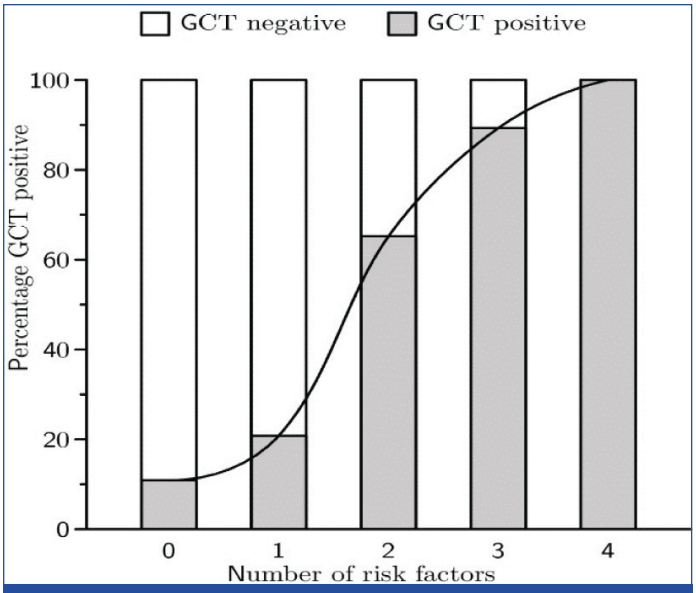


[Table/Fig-6]: Distributions of maternal risk factors are shown for women with positive/negative OGCT results for the thresholds BMI=30.0 and BMI=27.5 of body mass risk. Comparisons of mean numbers of risk factors between OGCT positive and negative groups were based on t-tests.
N: Number of risk factors

For the OGCT to be a useful screening tool, the likelihood of a positive OGCT result should increase as numbers of maternal risk factors increase. The data in [Table/Fig-7] and the solid curve plotted in [Table/Fig-8] illustrate how the prevalence of a positive OGCT result increases with the number of risk factors. In particular, this curve has largest gradient between one and two risk factors. Specifically the data in [Table/Fig-7] indicates that 96 (66+28+2) women have two or more risk factors and 70 (43+25+2) of them gave a positive OGCT result. The remaining 204 women had at most one risk factor and only 37 (18.1%) returned a positive result.

Prevalence of OGCT results by number of risk factors			Percent positive OGCT results
Number of risks	OGCT positive	OGCT Negative	
0	6	49	10.9
1	31	118	20.8
2	43	23	65.1
3	25	3	89.3
4	2	0	100

[Table/Fig-7]: The table shows the prevalence of a positive OGCT result with increasing number of maternal risk factors when the threshold for maternal body mass risk is BMI=27.5.



[Table/Fig-8]: The figure plots the data of Table/Fig 7 and demonstrates how the prevalence of a positive OGCT result rises most steeply between women having one and two risk factors.

DISCUSSION

This study has examined the manner in which the presence of GDM-related risk factors is associated with a positive OGCT result at approximately 24-28 weeks of pregnancy. Two independent approaches, one using a statistical analysis and the other a logistic analysis, both suggest a lower threshold for the presence of body mass risk in this population to approximately BMI=27.5 to identify patients at risk of GDM. These findings were in agreement with other research reporting significantly higher rates of GDM in South Asian and Chinese women [43]. These authors also note that the population BMI for this group is lower than that of women in a western population, and take the view that GDM prevention strategies should consider lower thresholds for BMI risk for Asian populations. The quantitative analysis of body mass risk in pregnant women undertaken in this study confirms this unsupported recommendation. A lower threshold for body mass risk should also help to improve the identification of pregnant women at risk of GDM and to provide new lower BMI thresholds for the initiation of screening.

The prevalence of positive OGCT results in this study at 35.6% is higher than incidences reported elsewhere. For example, Dudhbhai M et al., report a prevalence of positive OGCT results at 14.06% from Israel [44], although this lower incidence might be because their study group excluded women with chronic hypertension or any other maternal or foetal problems. A study in Bangkok reported a prevalence of positive OGCT results at 5.7% which is again much lower than this study result [45]. On the other hand, a study in the USA reported a prevalence of positive OGCT results at 29.3% which is comparable with this study, although their study sample size was small and included only singleton pregnancies [46].

This investigation found that parity was not significantly associated with a positive OGCT result [Table/Fig-2] contradicting studies from Argentina and the USA in which the presence of GDM was significantly associated with multiparity women [45,47]. The absence of this association here might stem from the small numbers of multiparity women in our sample. Similarly, no significant association was found in this study between maternal age and a positive OGCT result [Table/Fig-2] which again contradicts findings elsewhere and is probably also explained here by the small number of older mothers recruited to the study [46]. Intuitively, maternal age and parity are positively correlated. Therefore to properly investigate associations between maternal age (or parity) and a positive OGCT result would necessitate conditioning on parity (or maternal age) which in turn would require a volume of data and a level of detail not available to this study.

Studies by Akhter J, Abu-Heija A et al., and Akhtar T et al., all report that a positive OGCT result tends to overstate the likelihood of a positive OGTT result whereas a negative OGCT result is a reliable indicator of a negative OGTT result [25,47,48]. For example, in the study conducted by Akhter J et al., involving 416 women, 94 women gave a positive OGCT result and 73 of them (77.7%) also gave a positive result for the "gold-standard" OGTT [25]. The remaining 322 women were all OGCT negative, but on further testing only 12 (3.7%) tested positive for the OGTT. When these findings are applied to the women in this study, approximately 83 of the 107 women with a positive OGCT result can be expected to give a positive OGTT result for the presence of GDM whereas approximately 186 of the 193 women who gave a negative OGCT result can be expected to give a negative OGTT result. Thus, using the proposed testing strategy, approximately 7 women from the sample of 300 women might be wrongly misidentified as not at risk of GDM.

Risk factor information is known from the outset for each woman in subsequent pregnancies. Thus, previous maternal and foetal outcomes are known additions to the range of risk factors available to assess future risk. This information allows a decision to be taken on the most appropriate GDM test prior to the mid-trimester visit to the clinic. Logistic regression identified body mass risk as the strongest indicator of a positive OGCT result followed by histories of macrosomnia and gestational diabetes [Table/Fig-5]. These findings are consistent with evidence reported in the literature [44,49-52] and with the highly significant association between number of risk factors and the likelihood of a positive OGCT result ($p<0.001$). The presence of DM in a first degree family member had the weakest association with a positive OGCT result. This finding, while perhaps surprising, might here be explained by the fact that 75% of the women in this sample had a first degree family member with DM.

The recurrence rate for GDM in subsequent pregnancies is estimated to lie between 30% and 70% [53]. GDM also accounts for 90% of all pregnancies complicated by diabetes [54]. It could be argued that an OGTT should be the first line of investigation for the women in this study. However, a positive OGCT (an easier applied test) and the presence of elevated glucose levels could alone be sufficient to signal the monitoring of a woman for the presence of adverse glycaemic control and manage glycaemia care according to the GDM protocol without the need for an OGTT. Conversely, women with at most one risk factor are less than 20% likely to have a positive OGCT, but those positive cases could be followed up with fasting glucose monitoring and a repeat OGCT at 28 weeks [29].

The OGCT offers a specific response test to oral glucose intake at a single clinic visit making screening feasibility a greater reality. Knowing at an early stage of a pregnancy which women are at high risk of GDM has an additional advantage of providing greater impetus for patient engagement in enhanced lifestyle interventions in diet and exercise to ameliorate developing GDM. New approaches in interventions could provide further scope for new research particularly with the emerging digital technologies as motivational tools.

There is clear evidence that maternal and infant outcomes can be improved through identification and management of hyperglycaemia in pregnancy. Such screening for will not only help educate women identified as having GDM into opting a better lifestyle, but it will also help to delay the onset of type-II diabetes in later life. Support for women in opting for lifestyle changes can be managed through continuous counseling by General Physicians (GP) especially to women with previous GDM.

In view of the foregoing findings concluded through this study, it is recommended that measures for increasing awareness should be taken at all levels and an OGCT be made mandatory for all mothers with a known history of risk factors.

Limitation(s)

Poor local record keeping restricted the extent to which historical data could be retrieved. Also, the study sample contained few older mothers or mothers of high parity thereby limiting the efficacy with which some risk factors could be satisfactorily explored. Approximately, 75% of the mothers in the sample had a first degree relative with a history of diabetes, which correspondingly reduced the explanatory power of DM as a maternal risk factor for GDM. Associations between gestational age, maternal age and parity were not statistically significant in this study sample, but this may be unrepresentative of all mothers due to few older mothers or mothers with high parity in the study sample.

CONCLUSION(S)

The results of this study indicate that BMI is the strongest determinant of a positive OGCT outcome and a predisposition to GDM in mid-trimester South Asian women. Statistical and logistic analyses further suggested that the current guideline of BMI=30.0 [29] for the threshold for maternal body mass risk should be lowered to BMI=27.5. The number of GDM risk factors possessed by a mother was identified as an important indicator of which investigative test for GDM should be selected. A large majority (72.9%) of women with two or more risk factors were OGCT positive and should be directly offered an OGTT, whereas an even larger majority (81.9%) of women with zero or one risk factor were OGCT negative and could initially be offered an OGCT with a negative OGCT result being accepted as reliable evidence for the absence of GDM.

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