

The Management of GDM Patients by Telemedicine in Covid-19 Pandemic Situation in Bangladesh

Dr. Mir Rabaya Akter^{1*}, Dr. Sufia Khatun², Dr. Tayeeba Tanjin Mirza³, Dr. Mohammad Azizur Rahman⁴, Dr. Rabea Khatun⁵

¹Assistant Professor, Department of Endocrine and Metabolism, President Abdul Hamid Medical College Hospital, Karimganj Kishoreganj - Karimganj Rd, Bangladesh

²Professor and Head, Department of Obs and Gynae, President Abdul Hamid Medical College Hospital, Karimganj Kishoreganj - Karimganj Rd, Bangladesh

³Professor and Head, Department of Obs and Gynae, Mymensing Medical College Hospital, Mymensing, Bangladesh

⁴Assistant Professor and Head, Department of Physical Medicine and Rehabilitation, Mymensing Medical College and Hospital, Mymensing, Bangladesh

⁵Assistant Professor, Department of Obs and Gynae, Kumudiny Womens Medical College Hospital, Hospital Road Mirzapur, 1940, Bangladesh

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*Corresponding author: Dr. Mir Rabaya Akter

Assistant Professor, Department of Endocrine and Metabolism, President Abdul Hamid Medical College Hospital, Karimganj Kishoreganj - Karimganj Rd, Bangladesh

Abstract

Original Research Article

Background: Gestational diabetes (GDM) burden has been increasing progressively several years. Specially in pandemic days situation gets more tough as risk of getting infected is higher. However telemedicine approaches offers new hope to many. **Objective:** In this study our main goal is to evaluate the management of GDM patients by telemedicine in covid-19 pandemic situation in Bangladesh. **Method:** This prospective study was conducted at tertiary medical college and hospital from June 2020 to August 2021 where 100 women diagnosed as having GDM before 28 weeks of gestation were included as a sample population. **Results:** During the study, most of the patients belong to 31-40 years age group, 52% and 55% were housewife. In addition multigravida were 95.8% cases were noted. However, lower blood glucose level higher systolic, diastolic pressure and HbA1C % were noted GDM cases which gets lower after intervention approaches 180 ± 8.7 mg/dl, 99.9 ± 10.5 mmHG, 62.4 ± 8.6 mmHG. and 5.1 ± 0.4 . Moreover, 65% cases delivered normally and preterm birth seen in 5% cases. **Conclusion:** GDM is the most prevalent metabolic alteration diagnosed during pregnancy, where through artificial-intelligence-augmented telemedicine monitoring task getting easier as it offers a good alternative, saving resources while maintaining the standards of care proposed in the clinical guidelines. The data presented in this study show the feasibility and acceptance of the developed smart telemedicine system in covid-19 pandemic days.

Keywords: Gestational diabetes (GDM), telemedicine, pregnancy, covid-19 pandemic.

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INTRODUCTION

Gestational diabetes (GDM) is traditionally characterized as carbohydrate intolerance that begins or is first identified during pregnancy; however, in recent years, the recommended definition has been amended in an attempt to separate women with preexisting diabetes [1].

When beta cell activity is insufficient to overcome the insulin resistance caused by increases in diabetogenic hormones during pregnancy, GDM

develops. GDM has been linked to a number of negative consequences, including fetal macrosomia, delivery trauma, and postnatal problems.

Importantly, the risk of these events rises in lockstep with maternal fasting plasma glucose levels. However, due to pandemic covid-19 situation hospital may pose great risk for patients like GDM as timely checkup is needed in this situation. But in lockdown cases therapies like telemedicinal approach becoming increasingly popular for usage in pregnancy for issues such as gestational diabetes and blood pressure

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monitoring [2]. Telehealth has also been employed in studies in low- and middle-income nations, notably in rural regions where prenatal care is difficult to come by [3, 4].

However, due to Coronavirus disease (COVID-19) which is an infectious disease caused by the SARS-CoV-2 virus and most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. So the use of telemedicine which allows health care professionals to evaluate, diagnose and treat patients at a distance using telecommunications technology in prenatal care has come into sharp attention specially during lockdown.

Pregnant women are considered a susceptible category and are urged to use strict public health measures such as social distance and self-isolation to reduce their chance of viral infection. This guidance has resulted in suggestions to minimize face-to-face consultations and to establish remote access to prenatal care across the developing countries as soon as possible [5].

In this study our main goal is to evaluate the management of GDM patients by telemedicine in covid-19 pandemic situation in Bangladesh.

OBJECTIVE

To assess the management of GDM patients by telemedicine in covid-19 pandemic situation in Bangladesh.

METHODOLOGY

This prospective study was conducted at tertiary medical college and hospital from June 2020 to august 2021 where 100 women diagnosed as having GDM (Carpenter-Coustan criteria) before 28 weeks of gestation were included as a sample population. A

detailed clinical history and examination was done using social media like WhatsApp, messenger, viber, where all patients provided with a telemedicine system.

All collected data were coding and input in SPSS-25 for further analysis. Both descriptive and inferential statistics done. Descriptive statistics included frequency distribution, percent, mean, standard deviation; graph, tables, figures and inferential statistics.

In Table-1 shows age distribution of the patients where most of the patients belong to 31-40 years age group, 52%. The following table is given below in detail:

Table-1: Age distribution of the patients

| Age Group | Percent (%) |
|-------------|-------------|
| 21-30 years | 48 |
| 31-40 years | 52 |

In Table-2 shows demographic status of the patients where 28.3% just completed their graduation where as 55% were housewife. The following table is given below in detail:

Table-2: Demographic status of the patients

| Educational status | Percent % |
|--------------------|-----------|
| Primary | 12.5% |
| Secondary | 21.7% |
| SSC | 25% |
| HSC | 12.5% |
| Graduate | 28.3% |
| Occupation | |
| Housewife | 55% |
| Teacher | 25% |
| Service holder | 20% |

In Figure-1 shows parity distribution where primigravida were 4.2% and multigravida were 95.8% cases. The following figure is given below in detail:

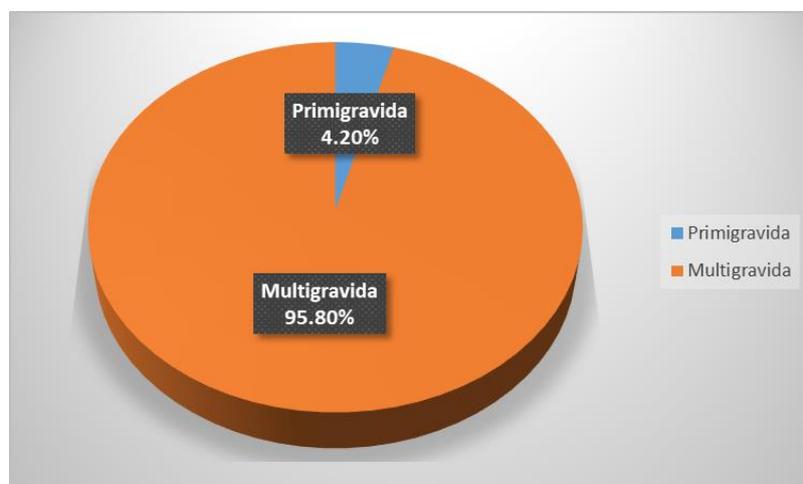


Figure-1: Parity distribution

In table-3 shows metabolic outcome of the GDM patients before and after intervention of telemedicine where major differences observed in blood glucose level, systolic and diastolic BP, which were

lower in the after telemedicine intervention; 180 ± 8.7 mg/dl, 99.9 ± 10.5 mmHG, 62.4 ± 8.6 mmHG. Besides that significant association were observed. The following table is given below in detail:

Table-3: Metabolic outcome of the GDM patients before and after intervention of telemedicine

| | Before intervention of telemedicine | After intervention of telemedicine | P value |
|------------------------------------|-------------------------------------|------------------------------------|---------|
| Blood glucose (mg/dl) | 190 ± 7.6 | 180 ± 8.7 | 0.025 |
| Systolic BP (mmHG) | 119.3 ± 12 | 99.9 ± 10.5 | 0.001 |
| Diastolic BP (mmHG) | 72.8 ± 9 | 62.4 ± 8.6 | 0.001 |
| HbA1c (%) | 5.4 ± 0.4 | 5.1 ± 0.4 | 0.021 |
| Albumin-to-creatinine Ratio (mg/g) | 5.1 ± 2.9 | 7.7 ± 5.3 | 0.001 |

In Table-4 shows new born and GMD patients' status after treatment where there is no complication has been noted besides that, 65% cases delivered normally and preterm birth seen in 5% cases. The following table is given below in detail:

Table-4: New born and GMD patients' status after treatment

| Delivery status | Percent (%) |
|------------------------------|----------------|
| Normal delivery | 65% |
| Cesarean delivery | 35% |
| Preterm birth | 5% |
| Mean birth weight of baby, g | 3233 ± 433 |

DISCUSSION

Our study results indicate that the developed smart telemedicine system is a feasible and well-accepted mobile DSS for guiding GDM. Furthermore, compliance with Blood glucose monitoring performance was clearly higher than that observed with usual care. Our interpretation is that immediate data analysis and feedback engage patients on performing Blood glucose measurements. In addition, compliance with BP regular measurement was very high considering our group of normotensive pregnant women. Another important contribution of the system was the automated plan of diet adjustments to correct either hyperglycemia or ketonuria. CIGs are usually applied to help professionals to make better decisions. Our smart telemedicine patient guidance system, helps patients through advice in accordance with the specific clinical guideline, where sufficient metabolic outcomes were noted which is similar to other studies [6, 7]. Very recently, a meta-analysis found a mild but significant effect of telemedicine solutions on HbA1c in comparison with usual practice (5.22 ± 0.7 % vs 5.37 ± 0.6 ; mean difference -0.14 % [95% CI -0.25 , -0.04 %]) [17]. Another previous meta-analysis found fewer unscheduled visits while maintaining quality of life, BG levels and rate of cesarean section [8]. Where as in our study after intervention of telemedicine HbA1C was noted to 5.1 ± 0.4 , which is again similar to other studies [9, 10].

Telemedicine interventions applied to GDM were based on data transmission with or without reminders but in all cases required expert analysis for giving asynchronous feedback to patients. The developed smart mobile telemedicine system is a new and unique system: incorporates CIG, integrates sensors, retrieves key data from the EMR, takes into account personal context variables, and proposes diet changes without medical supervision to correct hyperglycemia and/or ketonuria [11].

In addition after intervention with telemedicine and monitoring in our cases normal delivery were noted higher and preterm cases were noted in 5% where as in one studies there was no preterm cases were found [12].

CONCLUSION

GDM is the most prevalent metabolic alteration diagnosed during pregnancy in pandemic days, where through artificial-intelligence-augmented telemedicine monitoring task getting easier as it offers a good alternative, saving resources while maintaining the standards of care proposed in the clinical guidelines.

The data presented in this study show the feasibility and acceptance of the developed smart telemedicine system in covid-19 pandemic.

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