International Journal of Scientific Reports
Gbeinbo FD et al. Int J Sci Rep. 2023 Oct;9(10):309-313
http://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164
DOI: https://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20232909

Original Research Article

Gestational diabetes screening and management: the issues of GDM risk factors and phone number documentations

Fortunatus D. Gbeinbo[1], Phillip T. Bwititi[2], Ezekiel U. Nwose[1]*

[1]Department of Public and Community Health, Novena University, Nigeria
[2]School of Dentistry and Medical Sciences, CSU, Australia

Received: 30 August 2023
Accepted: 20 September 2023

***Correspondence:**
Ezekiel U. Nwose,
E-mail: Uba.Nwose@usq.edu.au

ABSTRACT

Background: Gestational diabetes mellitus (GDM) if unmanaged can complicate pregnancy outcomes. Selective screening of GDM is a common policy hence, the need for complete medical records of patients. The extent and pattern that documentation of patients' records can impact GDM screening-by-telehealth requires elucidation. The aim was to describe the effectiveness of phone contacts on medical records and GDM risk factors among a hospital-based antenatal clinic setting
Methods: This was an observational study in which previously reported antenatal records of patients screened for GDM were reviewed for effectiveness of phone contacts to do telehealth, and this was with simultaneous GDM risk assessment. Data were analysed by descriptive frequency counting.
Results: On effectiveness of phone details on medical records, 41/98 cases were reached, of which 31.7% have three or more GDM risk factors to fulfil selection criteria for laboratory screening of GDM. Prevalence of risk factors in initial routine data collection (24.9%), previous history assessment (21.3%) and at antenatal monitoring phase (37.8%), Among the 57/98 phone contacts that were unreached, 59.6% are switched off.
Conclusions: The observations highlight the need of concerted focus on policy and education, for both staff and patients, to improve documentation of correct and valid telephone details in medical records.

Keywords: GDM screening criteria, Health service delivery, Medical records documentation, Risk factor assessment, Screening-by-telehealth

INTRODUCTION

GDM is a serious pregnancy complication, in which women without previous diagnosis of diabetes develop chronic hyperglycaemia during pregnancy.[1] GDM arises due in part to the aberrations in insulin receptors and signalling and this can resolve after delivery, however, it is established that between 40-60% of GDM patients develop type 2 diabetes mellitus (T2DM) in ten to twenty years.[2,3] The various risk factors (RFs) for GDM include older age, overweight and obesity, previous GDM, excessive weight gain during pregnancy, a family history of diabetes, polycystic ovary syndrome, habitual smoking and a history of stillbirth or giving birth to an infant with a congenital abnormality.[4]

Studies have reported a wide range of prevalence values.[5] For instance, in Nigeria, three different studies that attempted two comparative measures each have reported varying levels of prevalence of GDM.[6-8] These wide variations show that the current understanding of GDM epidemiology require more controlled studies. Reasons for the variations have been highlighted to include some studies being limited to women with GDM RF.[9] This implies a problem with selective screening, which depends on availability of patients' data *vis-à-vis* complete documentation in medical records.

Focusing on documentation, it is pertinent to bring to the fore that a large percentage of GDM cases are undiagnosed and prevalence of postpartum T2DM is unknown, especially in developing countries such as Nigeria and Africa at large.[10]

Statement of the problems

So far, there is at least thirteen (13) RFs of GDM, excluding laboratory tests. The need for completeness of medical records to include all 13 RFs is important in patients' selection for laboratory screening of GDM. While lack of completeness of data is noted as a barrier, there is dearth of data on the extent and pattern that incomplete documentation of patients' phone numbers can help or prevent recall of antenatal clients in Nigeria is unknown hence the need for further elucidation.[11,12]

Research aim

The main aim was to progress discourse on GDM screening by evaluating phone contacts on medical records and assess levels of GDM RF in patients. Specific objectives included were to assess: the describe reasons for 'unreached' phone calls; and the prevalence of each of 13-RF among those reached and prevalence of each RF.

METHODS

Study design

It was a descriptive quantitative re-evaluation of previously published data.

Ethical approval

As it was previously published additional state-wide approval was obtained from the Delta State Ministry of Health (HM/596/T/197).

Data

In 2020, the files of initial 123 sample records of pregnant women were reviewed to ascertain if the phone numbers were effective for purpose. In the previous report, it was indicated that 98/123 of the patients were able to receive services via telehealth. Here, the n=98 was further audited and described.

The 98-patients were called on the phone number provided in their records. Those (n=41) who answered their phones were interviewed for GDM risk factors using the 'proposed gestational diabetes risk assessment and screening sheet' previously published. Here, the prevalence of the 13 GDM RFs were reviewed.

Statistics

The statistics used were descriptive frequency evaluation.

RESULTS

This re-evaluation shows that among the 123 files, 98 had telephone numbers recorded and these were segregated based on telehealth attempt whereby 41.8% (41/98) of the phone numbers were reached and 58.2% unreached. Among the n=41 pilot dataset, prevalence of number of risk factors assessed during 'telehealth' antenatal monitoring is shown in Figure 1.

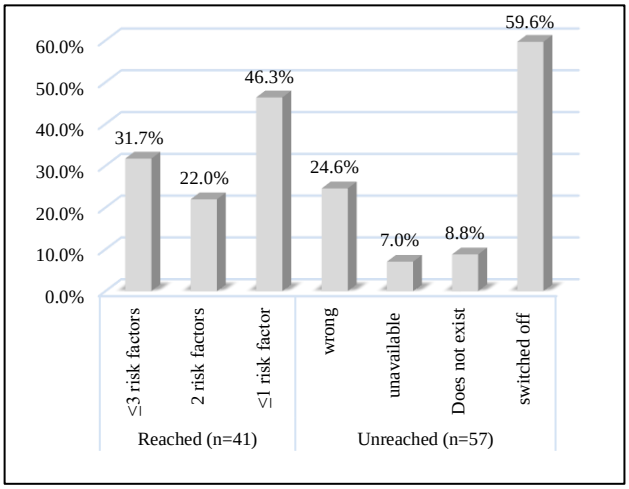

Figure 1: Effectiveness of phone calls on medical records (n=98).

Table 1: Prevalence of each of ×13 factors* in the COHORT that answered the phone (n=41).

Assessment stage	Factors	Yes	No
		N (%)	N (%)
Initial routine data	Age >35 years	4 (9.76)	37 (90.24)
	Overweight (BMI >25)	8 (19.50)	33 (80.50)
	Hypertension	2 (4.9)	39 (95.1)
	Sedentary lifestyle	24 (58.54)	17 (41.46)
	Family history of diabetes	13 (31.71)	28 (68.29)
Previous history	History of GDM	9 (21.95)	32 (78.05)
	Miscarriage	10 (24.39)	31 (75.61)
	Foetal/neonatal death	12 (29.27)	29 (70.73)
	Polycystic ovary syndrome	4 (9.76)	37 (90.24)
Antenatal monitoring	Presentation of GDM symptoms	13 (31.71)	28 (68.29)

Continued.

Assessment stage	Factors	Yes	No
		N (%)	N (%)
	Excess gestational weight gain	15 (36.59)	26 (63.41)
	Foetal growth	18 (43.90)	23 (56.1)
	Macrosomia	16 (39.02)	25 (60.98)
Laboratory tests	Glucosuria	-	-
	Blood glucose test	-	-

*GDM risk factors.

On further evaluation of the prevalence of GDM risk factors, results show that most of the mothers at 'initial routine data' were less than 35 years of age, lived a sedentary lifestyle, and did not have family history of diabetes. Approximately 30% has 'previous history' factor, while 44% had no risk factors observable at 'antenatal monitoring' (Table 1). On average, prevalence of risk factors assessed during the three stages of initial routine data collection, previous history assessment and at antenatal monitoring phase are approximately 25%, 21% and 38% respectively.

DISCUSSION

In this report, n=41 participants who answered their phones were interviewed on the risk factors for GDM using the screening form, which were entered in register-dataset. In addition to data in Figure 1, further details highlighted the prevalence of each risk factor among the n=41 dataset (Table 1).

Effectiveness of phone to follow-up ANC cases of incomplete data

Results on the effectiveness of phone calls showed that 31.7% of those who answered the phone have three or more GDM risk factors that could be picked up at ANC monitoring. This represented the proportion of that qualifies for GDM screening. When previous history and initial routine data were reviewed, as recommended for African populations, those showing ≥3 risk factors increase to 41.5%.[13-15] This observation showed that phone call vis-à-vis telehealth can be effective in identifying risk for GDM.

Among the 57/98 unanswered calls, nearly 60% were switched off, while answering machine gave different reasons for others. Although, this was beyond the control of the clinicians and medical records officers, it was presumable that some of those without phone and with unanswered calls have risk for GDM also. More discussions were necessary on how mobile phone these days were important tool not only for telehealth, but also for information (mass media) e.g., on lifestyles that mitigate several diseases such as DM and cardiovascular disease.[16-18] What this report expounds is the significance of phones in facilitating telehealth in ANC to follow-up clients for GDM management. Perhaps, lessons from eCommerce experience need to be drawn.

Implications of contact details on telehealth potentials

Common knowledge from the eCommerce sector indicates that assurance of clients' ability to receive calls is necessary, especially as physical home addresses are unreliable even in metropolitan cities.[19] Besides mobile phones registrations, eCommerce has recognized other digital identifiers including subscriber identity module (SIM) number.[20] Perhaps, it may be worth investigating if registration of SIM numbers besides telephone number could help improve the effectiveness of the latter in contacting patients.

In a consideration of telehealth in pathology service, it was concluded that no amount of telepathology support can meet all requirements but the education of local practitioners is imperative.[21] In this study on antenatal services for GDM management, the same point was hereby postulated that ANC providers and medical records personnel would need professional development education to improve on effectiveness of patients' phone numbers being collected.

There is no gain saying that in modern time, telephone is being used to remind patients about their appointments and for counselling. Even in the recent times of COVID-19, telephone has been the main modality of telehealth consultations. Further, mobile phones are a source of information inclusive of health updates. Therefore, the need to advance to telehealth and discuss the issue of phone numbers that are not reachable is imperative.

GDM risk factor analysis

GDM management has long been identified as one of new challenges in Africa.[22] It is associated with a variety of adverse pregnancy outcomes such as macrosomia, dystocia, birth trauma, and metabolic complications in both mother and the newborn.[15,23,24] Patients with GDM are known to be at increased risk of developing overt DM postpartum.[25] Consequently, it is important to identify and manage GDM as early as possible and such management can be through complete records and use of phone platforms. However, selective criteria for GDM screening have been advocated in preference to universal

approach for reason of affordability. Perhaps, it is pertinent to note the following points regarding selection criteria for laboratory test.

Assessment of risk factors are generally non-invasive and can be obtained during ANC registration and history taking.[13-15]

Risk scoring systems exist but unknown in ANC practices. However, a user-friendly algorithm or chart is yet to be developed.

Pending availability of user-friendly risk scoring chart, a pregnant woman with any ×3 of 13 RFs should qualify for laboratory screening of GDM (Table 1).

Studies in Tanzania reported that testing of blood glucose levels was a challenge due to limited resources and capacity in most healthcare facilities. Hence, a call for a simple, affordable, and practical non-invasive tool to predict undiagnosed GDM.[15] Further, a recent systematic review of "Barriers to screening, diagnosis and management of hyperglycaemia in pregnancy in Africa" had echoed that the limitations to GDM screening are multifaceted but including the healthcare systems and every facet requires its targeted intervention.[26]

What this paper contributed to the discourse was empirical and epidemiological data that could serve as evidence-base for retraining of healthcare professionals regarding patients' telephone numbers and telehealth potentials. The observations highlight behavioural change wheel issues on GDM screening and primary healthcare that need concerted focus on antenatal health services and policy improvement. The significance is the need for GDM management, postpartum follow-up and women's health.

CONCLUSION

GDM is one of the common medical complications of pregnancy. Selective screening for GDM is therefore important and to complement this there is need for complete medical records in the antenatal health services. This report describes reasons of patients' phone numbers being unreached for effective GDM management in antenatal care service. The COHORT of patients reached by use of mobile telephone for telehealth functionalities are also described to demonstrate feasibility and imperativeness of phone numbers. The healthcare providers need to utilize simple and effective tools such as the 'GDM risk assessment and screening sheet' questionnaire. Also, attention needs to be given to reasons why majority of patients are unreachable on their phones.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Delta State Ministry of Health (HM/596/T/197)

REFERENCES

1. McIntyre HD, Catalano P, Zhang C, Desoye G, Mathiesen ER, Damm P. Gestational diabetes mellitus. Nat Rev Dis Primer. 2019;5(1):47.
2. Herath H, Herath R, Wickremasinghe R. Gestational diabetes mellitus and risk of type 2 diabetes 10 years after the index pregnancy in Sri Lankan women-A community based retrospective cohort study. PLoS One. 2017;12(6):0179647.
3. Akinwaare MO, Ejimofor NO, Ojewale LY. Perception of risk and prevention of gestational diabetes mellitus among pregnant women in Ibadan, Nigeria. Afr J Midwif Women Health. 2020;14(1):1-9.
4. International Diabetes Federation. IDF Diabetes Atlas 9th Edition Brussels, Belgium: International Diabetes Federation; 2019. Available at: https://diabetesatlas.org/en/. Accessed on 14 August 2023.
5. Azeez TA, Abo-Briggs T, Adeyanju AS. A systematic review and meta-analysis of the prevalence and determinants of gestational diabetes mellitus in Nigeria. Ind J Endocrinol Metabol. 2021;25(3):182-90.
6. Fawole A, Ezeasor C, Bello F, Roberts A, Awoyinka B, Tongo O, et al. Effectiveness of a structured checklist of risk factors in identifying pregnant women at risk of gestational diabetes mellitus: A cross-sectional study. Niger J Clin Pract. 2014;17(4):495-501.
7. Orru MI, Nwose EU, Bwititi PT, Igumbor EO. Screening for gestational diabetes: evaluation of prevalence in age-stratified subgroups at Central hospital Warri Nigeria. Int J Reprod Contracept Obstet Gynecol. 2018;7(1):63-8.
8. Abbey M, Kasso T. First trimester fasting blood glucose as a screening tool for diabetes mellitus in a teaching hospital setting in Nigeria. Asian J Med Health. 2018;10(4):1-9.
9. Macaulay S, Dunger DB, Norris SA. Gestational diabetes mellitus in Africa: a systematic review. PLoS One. 2014;9(6):97871.
10. Mukuve A, Noorani M, Sendagire I, Mgonja M. Magnitude of screening for gestational diabetes mellitus in an urban setting in Tanzania; a cross-sectional analytic study. BMC Preg Childbirth. 2020;20(1):418.
11. Nwose EU, Mogbusiaghan M, Bwititi PT, Adoh G, Agofure O, Igumbor EO. Barriers in determining prevalence of type 2 diabetes mellitus among postpartum GDM: The research and retraining needs of healthcare professionals. Diabet Metabol Syndr. 2019;13(2019):2533-9.
12. Nwose EU, Bwititi PT, Agofure O, Oshionwu EJ, Young EE, Aganbi E, et al. Prediabetes and cardiovascular complications study: Highlights on gestational diabetes, self-management and primary health care. World J Meta-Anal. 2021;9(6):543-56.

13. Pons RS, Rockett FC, Rubin B, Oppermann MLR, Bosa VL. Risk factors for gestational diabetes mellitus in a sample of pregnant women diagnosed with the disease. Diabetol Metabol Syndr. 2015;7(1):80.
14. Phaloprakarn C, Tangjitgamol S, Manusirivithaya S. A risk score for selective screening for gestational diabetes mellitus. Eur J Obstet Gynecol Reprod Biol. 2009;145(1):71-5.
15. Nombo AP, Mwanri AW, Brouwer-Brolsma EM, Ramaiya KL, Feskens EJM. Gestational diabetes mellitus risk score: A practical tool to predict gestational diabetes mellitus risk in Tanzania. Diabetes Res Clin Pract. 2018;145:130-7.
16. de Jongh T, Gurol-Urganci I, Vodopivec-Jamsek V, Car J, Atun R. Mobile phone messaging for facilitating self-management of long-term illnesses. Coch Database Systemat Rev. 2012;12(12):007459.
17. Williams NJ, Jean-Louis G, Brown CD, McFarlane SI, Boutin-Foster C, Ogedegbe G. Telephone-delivered behavioral intervention among blacks with sleep apnea and metabolic syndrome: study protocol for a randomized controlled trial. Trials. 2014;15:225.
18. Roozbahani R, Geranmayeh M, Hantoushzadeh S, Mehran A. Effects of telephone follow-up on blood glucose levels and postpartum screening in mothers with Gestational Diabetes Mellitus. Med J Islam Repub Iran. 2015;29:249.
19. Inside the deep challenges of eCommerce and logistics in Nigeria 2020. Available at: https://techpoint.africa/2020/08/20/challenges-ecommerce-logistics-nigeria/. Accessed on 14 August 2023.
20. Inside Nigeria's 13-year-old quest for widespread digital identification 2020. Available at: https://techpoint.africa/2020/07/21/inside-nigerias-digital-identification/. Accessed on 14 August 2023.
21. Voelker HU, Poetzl L, Strehl A, Mueller-Hermelink HK, Stuefe A, Stauch G. Telepathological evaluation of paediatric histological specimens in support of a hospital in Tanzania. Afr Health Sci. 2020;20(3):1313-21.
22. Tumwine JK. New challenges and opportunities in health and development in Africa. Afr Health Sci. 2004;4(1):2.
23. Brown N, Critchley J, Bogowicz P, Mayige M, Unwin N. Risk scores based on self-reported or available clinical data to detect undiagnosed type 2 diabetes: a systematic review. Diabetes Res Clin Pract. 2012;98(3):369-85.
24. Odar E, Wandabwa J, Kiondo P. Maternal and fetal outcome of gestational diabetes mellitus in Mulago Hospital, Uganda. Afr Health Sci. 2004;4(1):9-14.
25. Karagoz H, Erden A, Ozer O, Esmeray K, Cetinkaya A, Avci D, et al. The role of blood groups in the development of diabetes mellitus after gestational diabetes mellitus. Ther Clin Risk Manag. 2015;11:1613-7.
26. Hinneh T, Jahn A, Agbozo F. Barriers to screening, diagnosis and management of hyperglycaemia in pregnancy in Africa: a systematic review. Int Health. 2022;14(3):211-21.

Cite this article as: Gbeinbo FD, Bwititi PT, Nwose EU. Gestational diabetes screening and management: the issues of GDM risk factors and phone number documentations. Int J Sci Rep 2023;9(10):309-13.