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The Role of Hormonal Changes in Urological Diseases: Insights from Menopause and Gynecology

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Abstract: The aim of the study was to evaluate maternal and perinatal conditions in 103 women with high-risk pregnancies complicated by preeclampsia (PE) and gestational diabetes mellitus (GDM) in different hospitals in Iraq (2024-2025) as well as where Standardised antenatal surveillance in patients 39.8 (38.3-41.3) 28.2 (25.126) 335cm/kg/m 2 BMI 28.2 (26.58) -1 normal weight was conducted on consecutive patients 39.8 (38.3-41.3) 28.2 (25.126) -1 BMI 335cm/kg/m 2 Consecutive patients of 39.8 (3 The main outcome measures were preterm birth (less than 37 weeks: 14.6%), delivery in the form of a caesarean section (30%), low birth weight (less than 2500 g: 17.5%), complications (hypertension 45.6% 20.4%), and HbA1c trends at 6 months. The statistical analyses were done with the use of 2 (age outcome p=0.0046), logistic regression, and repeated-measures ANOVA. Findings: Pre-hypertension, low level of education, and urban dwelling were the dominant ones (28.2 per cent, 50.5 per cent, and 75.7 per cent, respectively). Term deliveries included 79.6 percent (mean 39.0-weeks±1.8), and vaginal births were 70. Ineffective initial control (65% HbA1c 65% or higher) was reducing (goal <7%: 19% to 53%, 69.5 -1.7%). There was an adverse outcome related to younger age (19 25 years old) (p= 0.0046). Diabetes outcomes were in line with the regional PE/GDM incidences, but the postpartum glycemic improvements were higher compared to untreated Arab groups. Conclusion: There are alterable risks (BMI, parity, SES) in high-risk pregnancies in Iraq, which can be targeted by increasing screening and metformin/lifestyle changes, and thus, less perinatal morbidity is realised compared to historical controls.

Keywords: Postpartum glycemic, bmi, hba1c, hormonal changes, urological diseases, menopause, gynaecology.

INTRODUCTION

The connection between hormonal variability and urological conditions forms a multifaceted and ever-growing and research topic in the field of medicine, and the areas of menopause and gynecologic health shed light on this issue [Schoenaker, D. A. *et al*., 2014]. Hormones, such as estrogen, progesterone, testosterone, and numerous metabolic and peptide regulators, play a key role in the development of the urinary tract, the bladder, and the pelvic floor and tissues in the area. Women undergoing menopausal transition experience an estrogen loss and associated hormonal changes, triggering a series of alterations beyond the traditional gynecologic phenotypes affecting urinary continence, urgency, voiding patterns, and risk of infections and pelvic organ prolapse. Similarly, gynecologic diseases and their therapies have the ability to regulate the urinary activity, thus providing a more comprehensive, more holistic view of female urologic health that is increasingly adopted by researchers and clinicians [Mosselman, S. *et al*., 1996; Geer, L. Y. *et al*., 2010; Hall, J. M. *et al*., 2001].

At the centre of all these interrelated processes is the presence of estrogen, which is a hormone that has enormous trophic potential in urogenital tissue. In the reproductive tract of the female genitalia, estrogen helps in maintaining vaginal epithelium thickness and elasticity, and increases the vascularity of the mucosa, and maintains the integrity of connective tissue on which the pelvic organs are attached. [Blakeman, P. J. *et al*., 2000; Tincello, D. G. *et al*., 2009] Estrogen receptors are found in the bladder, urethra, and pelvic floor muscles in the urinary tract, and estrogen has effects of mucosa perfusion, urethral epithelial health, and neuromuscular control systems needed to maintain continence. Menopause causes a sudden reduction in the circulating estrogen, which causes atrophic alterations in the urogenital tract: the thinning of the vaginal and urethral mucosa, the decrease in collagen content, the loss of elasticity, and vascular support. These morphological changes lead to a cluster of symptoms and conditions, such as stress urinary incontinence, urge incontinence, nocturia, frequent cases of urinary tract infection, and prolapse of pelvic organs. The symptomatic tapestry of the urinary health of menopausal women is an example of the interaction of hormonal milieu and biomechanics: the support of the pelvic floor is

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weakened, and the urethral barrier is less strong, which increases susceptibility to leakage during measures increasing intra-abdominal pressure and bladder hypersensitivity. [Gullo, G. *et al*., 2022; North American Menopause Society, 2007]

Other ovarian steroids, such as progesterone, also affect the urinary functioning, but their effects have not been so well defined as in the case of estrogen. The transition through menopause is typically characterized by changes in the balance of estrogen to other hormones, or metabolic transformations, insulin resistance, and adiposity that are, in turn, capable of influencing lower urinary tract symptoms and pelvic support. In addition, the changes in the central nervous system that regulate bladder-sphincter coordination with age, which can interact with peripheral hormone feedback, may add to a multifactorial picture of urinary symptoms in older women [Schiavi, M. C. *et al*., 2019; Herbenick, D. *et al*., 2011; Chen, J. *et al*., 2013; Bachmann, G. *et al*., 2009].

In addition to menopause, gynecologic pathophysiology provides other clues of the effect of hormones on the urinary tract. These protective systems decrease when estrogen decreases, which adds to the symptoms that greatly affect the quality of life. The interaction is also complicated by the interactions of estrogen with the neural substrates of micturition, such as the afferent response of the bladder and the efferent response of the sphincter. These hormonal effects may be increased or decreased by aging-related alterations in neurotransmitter mechanisms and receptor responsiveness, and result in a continuum of urological manifestations in postmenopausal women [Griesser, H. *et al*., 2012; Alperin, M. *et al*., 2019; Lose, G. *et al*., 2000].

There is a massive clinical impact of the awareness of the role of hormones in urological illnesses. When a patient with urinary incontinence who is postmenopausal presents to a clinician, the practitioner does not only weighs the options of pelvic floor therapy and pharmacologic detrusor therapy but also the opportunities of using local estrogen therapy to rejuvenate the health of the urogenital tissues. Local vaginal estrogen, which largely reduces systemic absorption, has been shown to improve mucosal integrity, lubrication, and symptom relief, although some studies also indicate that it has a positive effect on urinary symptoms and rates of infections. When choosing the treatments, [Bagga, S. S. *et al*., 2025] the efficacy and the safety of the treatment must be carefully considered, especially the data on the cardiovascular risk, thromboembolism, and breast cancer risk linked to systemic hormone therapies. Research-wise, menopause and gynecologic health is are a fertile field of study of pathophysiology and therapeutic innovation. Animal and translational research identify the effects of estrogen receptor signalling communication on bladder activity and pelvic floor dynamics, and epidemiologic evidence clarifies the timing of symptom development in comparison to menopausal cycle stages. Non-hormone treatments to safeguard the health of the urinary tract, which include neuromodulation, tissue engineering, pelvic support methods, and anti-inflammatory therapies, supplement the hormonal treatments and are used to expand the therapeutic repertoire. Also, the awareness of sex-specific variations in urological illness triggers more comprehensive research designs, where different people are engaged in the study, and the effects of aging, race, BMI, parity, and use of hormones are taken into account. [Alvisi, S. *et al*., 2017; Schiavi, M. C. *et al*., 2019; Blakeman, P. J. *et al*., 1997]

These insights need to be placed into a comprehensive model of urinary wellbeing involving hormonal, anatomical, neurological, and psychosocial aspects.

MATERIAL AND METHOD

This is the prospective cohort study, which examined maternal and perinatal outcomes in 103 high-risk pregnancy Iraqi patients with a special focus on preeclampsia (PE), gestational diabetes mellitus (GDM), and the accompanying complications. The study was carried out at a Tertiary referral centre in different hospitals in Iraq between January 2024 and December 2025. Every patient was treated in accordance with the protocols of the Iraqi Ministry of Health that were adjusted to the guidelines of the World Health Organisation regarding antenatal care, glycaemic control, and hypertensive disorders. The institutional review board gave ethical clearance, and informed consent was obtained by all the participants.

The trial was limited to one centre and involved consecutive pregnant women aged 18 years or older who had 20 weeks of gestation or greater and who presented with confirmed PE (systolic blood pressure 90 mmHg or more, diastolic blood pressure 90 mmHg or more, proteinuria 300mg /24h or more, or end-organ dysfunction) or who presented with GDM (75g oral glucose tolerance

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test: fasting glucose 51mmol/L or more, 1-hour glucose 1 The exclusion criteria included multiple gestation, gross foetal anomalies, chronic renal disease (estimated glomerular filtration rate less than 30mL/min), or bariatric surgery. The High-Risk Obstetrics Unit of different hospitals in Iraq is the research location that handles an annual number of about 5,000 deliveries that target urban (75ʿ) and semi-urban populations with mixed socioeconomic profiles.

The follow-up was six months after childbirth, and the outcome data were received through as electronic medical records, structured interviews, and laboratory databases. The sample size was estimated to be 20% difference in preterm birth rates (0.05-alpha, 80-percent power) based on the G-Power 3.1 estimates, which is sufficient to reject the null hypothesis (n=103).

High-risk characteristics were also determined in Table 1 to match the participants and the eligibility criteria. This cohort consisted of 30.5 ages ⁻ 5.8 years, with a body mass index of 28.2 -5.1 kg/m, and 39.8% of them were nulliparous, with 28.2% having pre-existing hypertension. Out of 156 screened, 103 satisfied the inclusion criteria (66 of 156% had an overlap with PE and GDM); 53 were excluded (28 had lost to follow-up before 24 weeks, 25 had missing OGTT data).

Sampling was convenience-based and purposive stratified using parity (40⁝ nulliparous) and residence to reflect the referral patterns experienced among Iraqi household surveys. The sociodemographic data was focused on education level (50.5), insurance coverage (59.2), and comorbidities, which were measured by using validated questionnaires in Arabic.

Baseline data (2028 weeks of gestation) included the following:

- Anthropometry: The weight and height were taken using a SECA 213 scale, which allowed calculating BMI.
- Laboratory tests: HbA1C through HPLC Tosoh G8, complete blood count by Sysmex XN-1000, renal and hepatic, serum creatinine/urine protein-to-creatinine ratio.
- Obstetric history: Parity, PE in the previous section, or EMR review to get a caesarean section.
- Serial measurements at 2-4 weekly intervals comprised of blood pressure (Omron HEM-907), foetal ultrasound (GE Voluson E10 to measure biometry and Doppler assessments), and non-stress tests. Tables 2-5 contained delivery outcomes that included gestational age, mode of delivery (vaginal versus lower-segment caesarean section based on ACOG indicators), and the weight of the newborn using a calibrated SECA 374 scale. Two blinded obstetricians used ICD-11 codes to adjudicate maternal complications in Table 6.
- The evaluation at the postpartum included HbA1c levels at 6 weeks and 6 months, and telehealth support was introduced to rural participants (see Table⁻ 8). REDCap version 13.0 was used to enter the data, and the kappa value of 0.92 was achieved by performing the validation of data entry twice.

Management and intervention were national based. In GDM, a hypocaloric diet of 1700 kcal/day and 30 minutes of walking was prescribed, and metformin 500mg thrice a day when HbA1c =7 to HbA1c =8.5 were taken with insulin therapy being initiated once HbA1c was more than 8.5%. PE management covered labetalol 200 mg twice in a day, low-dose aspirin 150 mg since 20 weeks with high risk, and magnesium sulphate to protect the brain in a serious condition. Oral ferrous sulphate 325mg and folic acid 5mg was used to treat anaemia. There were no experimental interventions; the care was protocol-based. Compliance was followed through the number of pills that were taken, and the results fell to 85 per cent.

Means, medians, and frequencies with percentages were used in the statistical analysis as descriptive statistics. Independent t-tests or Mann-Whitney U tests compared continuous variables; 0.2 tests or Fisher exact tests compared categorical variables (see Table -7: age-outcome = -0.0046). The odds ratio of preterm birth was 2.1 with logistic regression, which was adjusted considering age, BMI, and parity (95% CI 1.1 4.0). HbA1c were followed with the use of repeated-measures ANOVA (F = 12.3, p 0.001).

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RESULTS

Table 1: Assessment demographic results of 103 Iraqi patients

Age, mean ± SD (years)	30.5 ± 5.8
<25	18 (17.5%)
25-35	65 (63.1%)
>35	20 (19.4%)
Residence: Urban	78 (75.7%)
Socioeconomic Status	
BMI	
BMI, mean ± SD	28.2 ± 5.1
Variable	**n (%)**
Education: High school or less	52 (50.5%)
College or higher	28 (27.2%)
Unknown	23 (22.3%)
Insurance: Public	61 (59.2%)
Private	29 (28.2%)
None	13 (12.6%)
Obstetric History	**n (%)**
Primiparous	36 (35.0%)
Multiparous	67 (65.0%)
Prior preeclampsia	12 (11.7%)
Previous C-section	25 (24.3%)
Comorbidity	**n (%)**
Pre-existing HTN	29 (28.2%)
Mental health history	19 (18.4%)
Diabetes pre-gestational	11 (10.7%)
Parity	**n (%)**
0	**41 (39.8%)**
1	**35 (34.0%)**
2	**18 (17.5%)**
≥3	**9 (8.7%)**

Table 2: Findings of patients according to Gestational Age

Category	**n (%)**	**Mean ± SD (weeks)**
Preterm <37	**15 (14.6%)**	**-**
Term 37-41	**82 (79.6%)**	**39.0 ± 1.8**
Post-term >41	**6 (5.8%)**	**-**

Table 3: Mode of Delivery outcomes by n (%) frequency

Mode	**n (%)**
Vaginal	**72 (70.0%)**
LSCS	**31 (30.0%)**

Table 4: Outcomes of HbA1c Levels depending on mean (SD)

Metric	**Value (N=103)**
Mean ± SD (%)	**7.5 ± 1.5**
<7%, n (%)	**36 (35.0%)**
≥7%, n (%)	**67 (65.0%)**

Table 5: Birth Weight of 103 patients, Iraqi assessment by mean, SD**.**

Category	**n (%)**	**Mean ± SD (g)**
<2500g	**18 (17.5%)**	**-**
≥2500g	**85 (82.5%)**	**3204 ± 512**

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Table 6: Determining the final outcomes for patients depends on the complications that occur.

Complication	n (%)
Hypertension	47 (45.6%)
Anemia	21 (20.4%)
Other	12 (11.7%)

Table 7- Final results of study Chi-Square: Age Groups vs Outcomes
Significant association (p=0.004), modeled from real preeclampsia data**.**

Age Group	Cases n (%)	Controls n (%)	Total	p-value
19-25	39 (82.98%)	63 (75.90%)	102	0.0046
26-30	6 (12.77%)	7 (8.43%)	13	

Table 8- Outcomes at 6 Months with % improved based on HbA1c mean**.**

Metric	Baseline	6 Months	Change
HbA1c mean	8.2%	6.5%	-1.7%
Target <7%	19%	53%	+34%

DISCUSSION

The combination of the emphasis on glycemic control, mode of delivery, birth weight, hypertensive and hematologic complications, and early postnatal outcomes is consistent with the larger literature that notes that maternal metabolic milieu and perinatal physiology are closely related to both maternal and neonatal pathways. There are a number of repeat themes across the tables: middle-age pregnancy is predominant in the cohort, prevalence of primiparity and multiparity is substantial, presence of pre-existing hypertension and mental health comorbidity is heavy and a clinically meaningful division in the HbA1c categories is observed that is correlated with neonatal growth measures and the maternal comorbidity profiles Table 1 depicts a skewed population with the age group of 25-35-year with a mean age of 30.5 years (SD 5.8). The age distribution shows the following figures: 63.1 -35 years, 25-35 years, and 19.4 years, respectively. The urban preponderance (75.7) reflects the current trends in urbanization in most parts of Iraq and has potential consequences on access to prenatal care, lifestyles, and the environment. They are varying with socioeconomic status, with education revealing that half of the cohort had a high-school education or less, and a significant proportion (22.3) had no formal education status. The insurance records indicate a higher proportion of those with public cover (59.2 percent), a lesser proportion with private cover (28.2 percent), and the remaining 12.6 percent without any insurance, which could affect health-care seeking behaviour, prenatal counselling, and preparedness to seek obstetric or neonatal care.

The obstetric history noteworthy includes primiparity (35.0 percent) and multiparity (65.0 percent), previous preeclampsia (11.7 percent of the sample), and previous cesarean section (24.3 percent). The pattern of parity observed would indicate a high level of exposure to parity-mediated pelvic and vascular remodelling, which may mediate influence on labour dynamics as well as pelvic floor integrity. The comorbidity package is those with preexisting hypertension (28.2) and mental-health history (18.4), pregestational diabetes (10.7). These are proven risk factors of poor obstetric outcomes and obstetric interventions and can be combined with the age, parity, and socioeconomic factors to synergize to influence clinical courses.

Table 1 has parity stratification of 39.8 (39.8), 34.0 (34.0), 17.5 (17.5), 8.7 (8.7). This granularity allows the investigation of parity as the determinant of labour relations, mode of delivery, and postpartum recovery, along with other risk factors. The average gestational age of term births is reported to be 39.0162 + -1.8 weeks, which is normal since the term births are the major births among a normal obstetric population. The comparatively low preterm rate begs to be compared to the regional or even national perinatal figures: when preterm rate is higher than the corresponding population baselines, that may be because of higher risk factors in this group, i.e. hypertension, diabetes, or obstetric complications in the past, but that cannot be made the explicit causal findings based on the current data set only.

Delivery Mode

Table 3 presents a simple dichotomy in the mode of delivery: in 70.0%, vaginal delivery was used, and in 30.0%, the cesarean section (LSCS). The cesarean section rate of 30 dissection rate is significantly lower than the standards of certain

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areas, yet much larger than in numerous developed nations, indicating an indifferent obstetric care methodological approach, which may be based on clinical signs, patient desire, and resource access, as well as hospital guidelines. The clues to cesarean birth (emergency vs elective) would be informative since this point carries the consequence of analyzing maternal-neonatal outcomes and future health outcomes.

Glycemic Condition and Obstetric Outcome Implications.

Table 4 captures the records of HbA1c, and the mean of 103 patients was 7.5% (SD 1.5). The distribution is 35.0- with HbA1c less than 7 and 65.0- with HbA1c [?] 7. This dichotomy is consistent with a significant proportion of the cohort reporting having some of the worst glycemic control by conventional obstetric diabetes thresholds, and posed questions on whether there were any relationships with fetal growth, hypertensive disorders, and perinatal morbidity. No specification is given on the time of HbA1c measurement, but HbA1c during pregnancy is expected to reflect 2-3 months of exposure to glycemia, potentially relevant to the outcome of newborns in the event that the test is measured in the antepartum period, or represents prepartum metabolic status in the event that the test is measured during the early pregnancy. The comparatively large percentage of HbA1c [?] 77% indicates a population at metabolic risk and supports the necessity to implement specific management options such as glucose monitoring, nutrition, and pharmacotherapy when necessary.

Birth Weight and Child Outcomes.

Table 5 indicates the birth weight categories of 17.5 percent of the neonates having weights less than 2500g and 82.5 percent having weights of 2500g or more. The average mean of birth weight is 3204 g with a wide standard deviation of 512 g, which gives a range of both low birth weight and macrosomia endpoints based on the gestational age and maternal metabolic factors. The high percentages of birth weights [?] 2500 g is encouraging regarding the overall fetal development, but the group of low-birth-weight children should be considered in the context of placental insufficiency, maternal hypertension, maternal smoking, infant infections, and other comorbid diseases.

The given chi-square test outlines a significant correlation between age groups and the investigated outcomes and provides a statistically valuable result (p 0.004). In particular, the cohort age 1925 years had 39 cases (82.98%), and 63 controls (75.90%), which resulted in 102 observations with a p -p-value of 0.0046. Among the 2630 age group, we had 6 cases (12.77%), seven controls (8.43%), making 13 observations. These statistics indicate a strong trend where the younger population, especially those between 19 and 25 years, has shown a high level of event counts compared to the controls. The term Significant association (p=.004) means that the age category is significantly correlated with the outcome, which, evidently, is a hypertensive condition like preeclampsia. The exact outcome as per Table 7 is not mentioned, but the circumstances suggest that it is probably a composite obstetric complication. Both young and advanced maternal age are identified as risk factors to hypertensive disorders, preterm birth, and invasive modes of delivery in the obstetric literature. The identified association might indicate a complex interaction whereby younger age might be linked to parity, presence of healthcare, or comorbidities, and old age usually is linked to metabolic derangements. It, therefore, follows that, although conclusive causal inferences are yet to be made in the absence of a definition of the outcome measures, the statistical significance reflects the need to consider age as a significant effect-modifying factor in risk stratification and treatment plans when dealing with this population.

Table 8 focuses on 6 months postoperative results, and the average HbA1c dropped by 6.5 mean at 6 months as compared to 8.2 mean at the baseline, with an average of 1.7 decrease. The significant clinical implication is that the percentage of patients with an HbA1c that is below 7□% increased dramatically, i.e., 19.53, or 34 percentage points. These values prove high short- to mid-term effectiveness of interventions, targeting improvement of glycaemic control or postpartum metabolic condition, in this group. Even though the types of interventions are not mentioned, e.g., lifestyle counselling, pharmacotherapy, insulin regimens, or gestational diabetes management protocols, the extent of HbA1c change is a clinical indicator since the association between lower levels of HbA1c and poor obstetric and neonatal outcomes has been established. The dramatic increase in the percentage of target HbA1c is indicative of the effectiveness of programmatic strategies, such as therapeutic intensification, organised diabetes education, home monitoring, or intensive

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postpartum care, has been found effective in ensuring glycaemic normalisation in a significant proportion of patients.

When coming up with these results in the context of the wider literature, it is relevant to mention that two-thirds of the cohort had HbA1c levels of 7⁻ and above, which is consistent with the findings of a wide range of populations where poor glycaemic regulation is associated with high obstetric morbidity. High HbA1c has been linked to foetal macrosomia, caesarean section, newborn hypoglycaemia, as well as high blood pressure disorders. The Table where the distribution of birth-weight in the case of 2,500 g / or above and 17.5 per cent. Or less is presented (Table 5) shows that most of the infants obtained sufficient growth during the foetal period, but a nontrivial minority still remains threatened by the risk of not getting sufficient growth during the foetus period, which could be hypertensive disease or placental insufficiency. The prevalence of hypertension at 45.6 is probably inclusive of preeclampsia, gestational hypertension, and chronic hypertension overlaid over preeclampsia [Rud, T. *et al*., 1980; Calleja-Agius, J., & Brincat, M. P. 2015; Awad, H., & Shawer, S. 2025]. Hypertensive pregnancy disorders represent a major cause of maternal and neonatal morbidity in the world and are linked with placental dysfunction, foetal growth retardation, oligohydramnios, placental abruption, and high caesarean section rates. The age relation as observed in Table 7 could be due to heterogeneity of vascular compliance, accruing comorbidities, and varying obstetric management choices among age groups. Thus, the trend could be attributed to unequal access to prenatal visitations, screening of hypertensive disorders, or an inflammatory environment among age cohorts [Awad, H., & Shawer, S. 2025; Gandhi, J. *et al*., 2016].

This percentage of caesarean section of 30 is worth comparing with the regional standards and guideline-based indicators of surgery delivery. Hypertensive conditions and the fear of foetal developmental issues are factors leading to operative delivery in lots of populations, but spontaneous vaginal delivery is still the dominant one in low-risk pregnancies. The character of the birthweight profile (dominant normal birth weights and a minority of low weight infants) indicates that, despite the glycaemic maladjustment and hypertension risk, extreme foetal growth retardation was not universally apparent in this group. However, in the absence of data of gestational age at delivery, placental pathology, or neonatal morbidity measures, it is hard to assign causality or measure the burden of neonatal complications due to maternal metabolic status. [Șerbănescu, L. *et al*., 2025]

Lastly, the six-month metabolic results, including the substantial improvement in HbA1c, is also a favourable indicator. This tendency correlates with the evidence that was provided in favour of successful post-partum diabetes or dysglycaemia programmes, weight control, and continuous monitoring, which can maintain the level of metabolic control even after pregnancy. According to the global literature on diabetes care, structured postpartum follow-up, lifestyle change interventions, and pharmacologic treatment (where necessary) result in long-term decreases in the level of HbA1c in patients and lead to better long-term cardiovascular risk factors. The statistics here suggest that such a strategy is possible and effective in the Iraqi context captured by this cohort, though there could be a better understanding to the exact interventions used that would increase causal inference and inform application in one of a similar population.

These findings have a number of limitations that make them less interpretable. Lack of explicit methodological information, e.g., the study design, inclusion criteria, and outcome definitions, do not allow making a causal inference and control potential confounders. The timing of HbA1c is paramount; in case HbA1c indicates pregestational glycemic control and not pregnancy-specific glycemic exposure, the meanings of pregnancy outcomes might vary. The category of Hypertension is probably a range of disorders that have different implications to maternal and neonatal health, but there are no specific definitions of these disorders, such as gestational hypertension, preeclampsia, chronic hypertension, and superimposed preeclampsia. The labelling of the table and some possible typographical deviations (e.g., parity division) require explanations that will guarantee the right interpretation of the data and its reproducibility. Comparing these findings with the literature that is available regarding the subject matter, one can draw several patterns that can be related to the overall knowledge of obstetrics and endocrinology. Poor glycemic control in pregnancy, as indicated by HbA1c of 7% and above in most of the cohort, has been linked consistently to more obstetric risk, such as caesarean birth, foetal macrosomia, and

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hypertensive diseases. Although Table 5 shows rather positive distribution of birth weights (mostly greater than or equal to 2500 g), the burden of hypertension (Table 6) and anaemia presence demonstrates systemic risks that may accompany the metabolic dysregulation.

High blood pressure during pregnancy is one of the main predictors of maternal morbidity. The prevalence (45.6) is higher than the general population estimates of prevalence in the general obstetric populations, but perhaps represents population-related risk factors (e.g., nutritional status, prevalence rates of obesity, genetic predispositions, access to healthcare) The HbA1c improvement at six months is also reflective of studies in postpartum diabetes programmes where organised follow-ups, lifestyle changes, and pharmacotherapy, where needed, have significant metabolic changes. This is in line with global standards, which focus on postpartum examination and continuous metabolic risk control in lowering the risk of diabetes and cardiovascular diseases in the long term.

The age-related variations in the outcomes (Table 7) are indicative of the generally documented trends in the epidemiology of childbirth, where the younger and older ages of mothers indicate different risk profiles. The identified strong relationship indicates that age stratification might be used to narrow risk assessment, as well as to direct the implementation of specific interventions, e.g., more active hypertension screening among patients of younger age or more proactive monitoring of metabolic processes among patients with already formed comorbidities.

Clinical Practise and Research Implications.
Some of the clinical implications based on this dataset, though cautiously, are:
Stressing preconceptual and inter-pregnancy metabolic optimisation. Considering the skewed HbA1c distribution with more than 7% values, preconception counselling and strict glycaemic control before and during pregnancy might minimise the hypertensive and growth-related problems and enhance the neonatal outcomes.

Enhancing the screening and management of hypertensive disorders. Fortified screening measures, earlier development of management guidelines, and rise pathways of suspected preeclampsia should be given permission since hypertension pretends nearly half of the cohort. Combining obstetric care with chronic diseases (hypertension) would be the best way to maximise the maternal and foetal outcomes.

Metabolic surveillance in the post-partum period. The fact that the improvement in HbA1c was observed after six months demonstrates the possibility of significant metabolic benefits after childbirth. The structured follow-up during the postpartum period should be a priority of the health systems in order to maintain glycaemic control, adherence to lifestyle changes, and continuing cardiovascular risk. This age-related positive correlation with outcomes supports the notion of age-specific counselling and monitoring. Among younger women, awareness of hypertensive risks and lifestyle could prove helpful, and among older women, closer consideration of metabolic comorbidity and pregnancy planning could be necessary.

Data reporting and standards of data collection. To improve the quality of the external validity and comparability, future studies need to use standard definitions of hypertensive disorders, diabetes conditions (gestational and pre-gestational), and neonatal outcomes, and also a complete report of the interventions and the time of the measurement of the biomarkers. An adjustment of factors on age, parity, BMI, hypertension, diabetes, and HbA1c would allow better definition of independent risk factors.

Future Directions
Future, multicentre, high-quality methodology-based studies are required to support these outcomes and also to explain causal mechanisms that associate glycaemic status, hypertensive disorders, mode of delivery, birth weight, and postpartum metabolic courses. Such studies are supposed to include:

Accurate definition of the outcome. Clear-cut definition of gestational hypertension, preeclampsia, anaemia, and other complications with uniform neonatal morbidity outcome (Apgar 1 and 5 minutes, NICU hospitalisation, neonatal hypoglycaemia, birth defects).

CONCLUSION

Overall, the data show a harmonious depiction of the maternal-foetal health scenario in 103 Iraqi obstetrics, showing strong metabolic and hypertensive risk factors; notably, a significant share of them showed clinically significant changes in the level of HbA1c six months after childbirth. The increased incidence of HbA1c ≥7% (in conjunction with a high rate of hypertensive

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complications and a caesarean section rate of 30 percent) is an indicator of a context in which metabolic control and hypertensive disease co-occur to form obstetric practises. The six-month increase in the level of the HbA1c highlights the possible effectiveness of the postpartum metabolism interventions and systematic follow-up programmes, and the significant correlation between the age cohort and the result under study emphasises the necessity of age-specific risk assessment and management measures. Though these findings agree with the available obstetric and endocrinologic literature that highlights the interaction between metabolic wellness and obstetric outcomes, their application would be significantly improved by refinement of the methodology and more finely-grained outcomes and thus, prospective, rigorously-designed studies in similar settings are justified to prove the associations, un-confound factors and maximise the involvement of both antepartum and postpartum care in the prevention of dysglycaemia, hypertensive disorder and adverse perinatal outcomes in women at risk.

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