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Prevalence of Confirmed Cases of Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency in a Level 2 Hospital in Zamboanga City: A Retrospective Analysis

Ivy Joan B. Banguis, RMT[1], Professor Dr. Erwin M. Faller[2]

[1] St. Bernadette of Lourdes College, Graduate School, ibanguis@sblc.edu.ph
[2] St. Bernadette of Lourdes College, Graduate School, Adviser: efaller@sblc.edu.ph

A B S T R A C T

This quantitative research employed a retrospective study design to analyze the prevalence of G6PD deficiency among affected infants in Zamboanga City from 2023 to 2024. Data collected over the two years revealed that the majority of subjects handled by the confirmatory center of a Level 2 hospital underwent confirmatory testing within 1 to 6 months of life, with most being male and residing in urban areas. Analysis of 455 confirmed G6PD-deficient cases showed that 8.57% presented with jaundice during neonatal, while 5.71% had a family history of prolonged anemia. Further analysis indicated that the presence or absence of jaundice during neonatal screening was independent of the infant's gender, location, and age at the time of confirmatory testing. Similarly, a history of prolonged anemia and the age at which confirmatory testing was done, suggesting that awareness of the family history prompted earlier confirmatory testing.

The study views the high proportion of subjects undergoing testing within six months as a positive outcome, recommending that confirmatory testing ideally be conducted within the first month of life. The research advocates for strengthened stakeholder education and enhanced confirmatory testing efforts. One of the key proposals of the study is the development of a Continuity of Care Program for G6PD-Deficient Patients at a Level 2 Private Hospital in Zamboanga City, titled "Sustaining Care for Life." This program aims to provide comprehensive, patient-centered care through community engagement, digital communication, hospital-based interventions, and continuous education. Its goal is to reduce the risk of hemolytic crises and promote healthy living among patients with confirmed G6PD deficiency.

Keywords: Prevalence of G6PD Deficiency, Demographic Profile, period of jaundice during neonatal, and family history of prolonged anemia

1.0 Background of the Study

Despite medical advances in newborn care, one condition continued to silently affect millions of infants worldwide Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency. First identified in 1956 by Dr. Ernest Beutler through its association with favism, a severe reaction to fava beans, G6PD deficiency was a genetic disorder that affected red blood cells. It was most prevalent in populations historically exposed to malaria, such as those in Africa, the Mediterranean, the Middle East, and parts of Asia.

Globally, G6PD deficiency affected approximately 400 million individuals. In the United States, for example, prevalence was significantly higher among ethnically diverse populations and was often several-fold greater than other conditions included in state-mandated newborn screening panels. These high rates were compounded by the risk of severe neonatal hyperbilirubinemia and lifelong hemolysis. Experts recommended universal predischarge screening for both bilirubin and G6PD to support clinician decision-making, enhance parental education, and ensure close monitoring during the critical neonatal period (Vidavalur & Bhutani, 2024).

In the Philippines, based on data from the Newborn Screening Reference Center from 2004 to 2021, 1 in every 63 Filipino newborns was diagnosed with G6PD deficiency. The disorder remained one of the most commonly diagnosed enzyme deficiencies in Filipino newborns, particularly among males, due to its X-linked inheritance pattern.

In Zamboanga City, where this study was conducted, there were 13,868 live births in 2023, with a slightly higher proportion of males. This demographic pattern further reinforced the importance of G6PD screening in the area. Without early detection and management, affected newborns were at risk of complications such as hyperbilirubinemia, kernicterus, and acute hemolytic episodes triggered by infections, medications, or certain foods.

Despite its prevalence, several challenges persisted, including a lack of confirmatory testing, often due to financial limitations or minimal emphasis from healthcare workers. Inconsistencies in documentation, fragmented reporting systems, and poor inter-institutional referrals also contributed to data

inaccuracy and discontinuity of care. Particularly affected were mobile populations or families seeking care across different hospitals, who were often lost to follow-up.

Furthermore, a significant gap existed in educational interventions for both healthcare providers and caregivers, which were crucial for preventing complications and improving long-term outcomes. Most critically, although the researcher's institution served as a confirmatory center for G6PD for many years, it lacked a continuity-of-care program for confirmed cases. The facility's program focused solely on diagnostic testing, without any structured post-diagnosis monitoring, parental education, or follow-up care protocols. Given these challenges and the critical need to strengthen post-diagnostic care, the researcher aimed to determine the prevalence of G6PD deficiency among newborns in Zamboanga City for the period 2023–2024, adjusted for variables such as sex, age, location, period of neonatal jaundice, and family history of prolonged anemia. The findings of this study were envisioned to serve as a basis for policy formulation, the development of hospital-based interventions, and the design of a sustainable continuity-of-care program that could reduce health risks and improve quality of life for G6PD-deficient children in the region.

2.0. Methodology

2. 1 Research Design

This study employed a quantitative, retrospective design to assess the *Prevalence of Confirmed Cases of G6PD Deficiency in a Level 2 Hospital in Zamboanga City*. Guided by Creswell's (1994) definition, it tested variables using numerical data and statistical analysis. Purposive sampling was used to select relevant cases aligned with the research objectives.

2.2 Research Locale

The study was conducted at a Level 2 private hospital in Zamboanga City, the official G6PD Confirmatory Center for Region IX since 2013. The researcher had direct access to the patient records, ensuring reliability and comprehensiveness of the dataset.

2.3 Research Period

The study was conducted over three months following the research adviser's approval. This timeframe allowed for systematic data collection, chart review, and analysis, ensuring accuracy and meaningful interpretation.

2.4 Research Population

The study focused on all G6PD-deficient babies who had been screened from 2023 to 2024 in Zamboanga City. These newborns had been identified through the Newborn Screening Program in Mindanao, with Brent Hospital serving as the designated G6PD Confirmatory Center for the region. The research aimed to analyze the prevalence of G6PD deficiency among affected infants within the city.

Inclusion Criteria: To be included in the study, participants met the following criteria: they must have been screened for G6PD through the Newborn Screening Program in Mindanao, presented official screening results, been residents of Zamboanga City, and had complete demographic and medical records.

Exclusion Criteria: Newborns were excluded if they had no screening results, were non-residents of Zamboanga City, had incomplete data, or were older than one year at the time of data collection.

2.5 Research Instrument

The study utilized a quantitative approach and relied on existing recorded data as its primary research instrument. These data were sourced from Brent Hospital, Zamboanga City, which served as the G6PD Confirmatory Center for Region IX. The records included essential information such as the patient's age, gender, geographic location, period of neonatal jaundice, family history of prolonged anemia, and diagnostic results. This instrument enabled the researcher to analyze patterns and determine the prevalence of G6PD deficiency within the specified population.

2.6 Sample and Sampling Design

The study utilized purposive sampling, a non-probability sampling technique, to intentionally select participants who met specific inclusion criteria relevant to the research objectives. A total of 455 eligible newborns were identified between 2023 and 2024, meeting specific criteria. This sampling method ensured that only the most relevant cases were included, allowing for focused and meaningful analysis of the prevalence of G6PD deficiency within the target population.

2.7 Data Collection Procedure

Data collection began after the research proposal received approval from the adviser. A formal letter of intent was then submitted to the Medical Director through the Laboratory Director, requesting access to the necessary records. Upon approval, the data collection process was carried out under strict confidentiality to ensure the privacy and protection of patient information. The gathered data were then analyzed by a certified statistician, and the results served as the basis for the study's conclusions and recommendations.

3.0 Presentation, Analysis, and Interpretation of Data

This chapter deals with the presentation of results and discussion of the gathered data based on the research problem and hypothesis posited for the study. The presentation of data is in order, arranged according to the statements of the problem.

3.1 Problem No. 1: What is the demographic profile of the respondents from 2023-2024 in terms of age, gender, and geographic location?

Table 1 – Summary on the Profile of the Respondents from years 2023-2024 (n=455)

Variables	**Frequency**	**Percent (%)**
Age		
Less than 1 month old	213	46.81
1 – 6 months old	236	51.87
Above 6 months old	6	1.32
Gender		
Male	352	77.36
Female	103	22.64
Geographic Location		
Urban	437	96.04
Rural	18	3.96

Table 1 presented a summary of the combined profile of respondents from the years 2023 to 2024, encompassing a total of 455 confirmed cases of G6PD deficiency. The table highlighted the distribution of subjects by age, gender, and geographic location.

Regarding age, the majority of the respondents were between 1 to 6 months old, accounting for 51.87% (236 individuals), while 46.81% (213 individuals) were less than 1 month old at the time of confirmatory testing. Only a small fraction, 1.32% (6 individuals), were older than 6 months. This emphasized the importance of early detection within the first six months of life, which was critical for prompt management and prevention of complications associated with G6PD deficiency.

In terms of gender, males constituted a significant majority of 77.36% (352 individuals), while females made up 22.64% (103 individuals). This pattern reflected the X-linked recessive inheritance of G6PD deficiency, which resulted in a higher prevalence among males.

Geographically, most cases originated from urban areas, representing 96.04% (437 individuals), while only 3.96% (18 individuals) were from rural locations. This distribution suggested greater access to screening and diagnostic services in urban centers compared to rural areas.

The data underscored the critical need for early newborn screening, especially within the first six months, to identify and manage G6PD deficiency effectively. The predominance of males among confirmed cases highlighted the genetic basis of the condition and reinforced the need for targeted awareness and genetic counseling, particularly for families with male infants. The urban-rural disparity in detected cases suggested potential gaps in healthcare access for rural populations. This called for enhanced outreach, resource allocation, and capacity-building efforts in rural areas to ensure equitable screening and care for all newborns, ultimately improving health outcomes across the region.

Throughout 2023 to 2024, very few infants older than six months underwent G6PD deficiency confirmation, representing barely 2% of the subject proportion. This indicated that a majority of infants returned for confirmation within less than a year, a finding that aligned with the significance of early screening and confirmation of G6PD deficiency, a point repeatedly emphasized in the literature review (Taleb et al., 2025; Alangari et al., 2023; Kassahun et al., 2023; Silao et al., 2009). Early confirmation allowed families and caregivers to mitigate the risk of hemolytic crisis by avoiding triggers. Therefore, this paper recommended that a level 2 Hospital, or a similar institution conducting G6PD deficiency confirmation, should implement measures to

encourage the infants' families or caregivers to return as soon as possible and shift the proportion of confirmed cases towards the less than one month old group by increasing stakeholder education and streamlining the process or enhancing test accessibility, as suggested by Montilla & Herrera (2023).

Regarding gender, the table showed that the confirmed G6PD deficiency cases were predominantly male (80% in 2023, 75.29% in 2024, and 77.36% in 2023-2024). This observation was consistent with the understanding that G6PD deficiency was an X-linked genetic condition (Richardson & O'Malley, 2022; Ravikumar & Greenfield). Male infants were more susceptible due to possessing only one X-chromosome. In terms of geographic location, the confirmed cases were predominantly from urban areas across the three tables (98% in 2023, 94.51% in 2024, and 96.04% in 2023-2024). While this might, at face value, suggest a higher likelihood of G6PD deficiency in urban infants, the accessibility of testing sites was a crucial factor. Nascimento et al. (2022) found a notable 5.6% prevalence in rural municipalities within the Brazilian Amazon after making testing more accessible. In the context of this paper's data, where families and caregivers were responsible for returning to the testing site for confirmation, the low turnout from rural areas could have been attributed to lower attendance. As a result, there was insufficient data to definitively determine the underlying cause for the higher proportion of confirmed cases in urban areas compared to rural areas.

3.2 Problem No. 2: What is the level of prevalence of glucose 6 phosphate dehydrogenase (G6PD) deficiency in Zamboanga City in terms of: period of jaundice during neonatal, and history of prolonged anemia in the family?

Table 2 – Prevalence of Confirmed Cases of G6PD Deficiency in level 2 Hospital in Zamboanga City (n=455)

Variables	**Frequency**	**Percent (%)**
Period of Jaundice		
Presence/with	39	8.57
Absence/without	416	91.43
History of prolong Anemia in the Family		
Presence/with	26	5.71
Absence/without	429	94.3

In Table 2, it was revealed that most of the confirmed cases of G6PD deficiency at the Level 2 Hospital in Zamboanga City showed no history of jaundice (91.43%) and no family history of prolonged anemia (94.3%). Based on these results, the prevalence of jaundice among infants with G6PD deficiency at this hospital during the years 2023 and 2024 was 8.57%. Meanwhile, the prevalence of a family history of prolonged anemia over the same period was 5.71%.

Kassahun et al. (2023) and Silao et al. (2009), both cited in the literature review, investigated the prevalence of G6PD deficiency among infants with jaundice. Their studies found that the prevalence of G6PD deficiency among jaundiced infants was 24.06% in Sub-Saharan Africa and 16.7% in Manila, Philippines, respectively. These findings suggested that over three-fourths (75%) of infants with jaundice did not have G6PD deficiency, indicating that G6PD deficiency was just one of several possible causes of neonatal jaundice.Referring back to Table 2, the prevalence of jaundice among G6PD-deficient infants was relatively low at 8.57%. This small proportion aligned with findings from the literature (Richardson & O'Malley, 2022; Garcia et al., 2021; Luzzatto et al., 2020; Lee et al., 2022), which indicated that while G6PD deficiency can increase the risk of jaundice in infants, it does not invariably result in its development. Another contributing factor could have been the effective orientation and education provided by the Level 2 Hospital in Zamboanga City on how to care for infants with G6PD deficiency. Proper guidance may help avoid triggers that lead to jaundice, potentially explaining the relatively low prevalence reported in Table 2.

Regarding the family history of prolonged anemia, Table 2 reported a prevalence of 5.71%. Given that G6PD deficiency is an inherited disorder (Ravikumar & Greenfield, 2020; Luzzatto et al., 2024), a family history of prolonged anemia might be expected to increase the likelihood of an infant being born with G6PD deficiency. However, the low prevalence suggested that, within the context of this Level 2 Hospital, a prolonged family history of anemia was not a significant indicator for G6PD deficiency. Considering the multiple potential causes of anemia, this finding implied that a family history of anemia is not a primary factor contributing to the birth of G6PD-deficient infants in this specific hospital setting.

3.3 Problem No. 3: Is there a significant relationship between the demographic profile and the level of prevalence in the confirmed cases of Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency?

Table 3 – Prevalence of Confirmed Cases of G6PD Deficiency in Level 2 Hospital in Zamboanga City (n=455

Variables	**Presence of Jaundice**	**Absence of Jaundice**	**TOTAL**	**Chi-Square P-Value**
Less than 1 month old	17	196	**213**	0.730
1 – 6 months old	21	215	**236**	
Above 6 months old	1	5	**6**	
TOTAL:	**39**	**416**	**455**	
Gender				0.945
Male	30	322	**352**	
Female	9	94	**103**	
TOTAL:	**39**	**416**	**455**	
Geographic Location				0.641
Urban	38	399	**437**	
Rural	1	17	**18**	
TOTAL:	**39**	**416**	**455**	

Summary of Chi-Square result on Age, Gender, Geographic Location, and Level of Prevalence of Confirmed Cases of G6PD Deficiency in terms of Period of Jaundice

Table 3 presented the relationship between the respondents' age, gender, geographic location and the prevalence of confirmed cases of G6PD deficiency with respect to the period of jaundice at the Level 2 Hospital in Zamboanga City. In terms of age, the data indicated that only a few respondents (39 out of 455) had experienced a period of jaundice. Furthermore, the majority of respondents (236 out of 455) were aged 1 to 6 months and did not exhibit jaundice (416 out of 455).

With a chi-square p-value of 0.730, which was greater than the level of significance $\alpha = 0.05$, there was insufficient evidence to reject the null hypothesis stating, "There was no significant relationship between the respondents' age at confirmation and the prevalence of confirmed cases of Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency in terms of the period of jaundice at the Level 2 Hospital in Zamboanga City." This meant that the age at which the subjects returned for confirmation had no significant effect on the prevalence of jaundice among them.

A likely contributing factor was the low proportion of subjects who reported experiencing jaundice. Additionally, among the 39 subjects who had jaundice, there was insufficient data to determine whether the infants' families or caregivers had chosen to return for confirmation after jaundice had manifested.

On the other hand, the gender revealed that the majority of respondents (352 out of 455) were male and did not experience a period of jaundice (416 out of 455). With a chi-square p-value of 0.945, which was greater than the level of significance $\alpha = 0.05$, there was insufficient evidence to reject the null hypothesis, which stated, "There was no significant relationship between the respondents' gender and the prevalence of confirmed cases of Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency in terms of the period of jaundice at the Level 2 Hospital in Zamboanga City." Unlike G6PD deficiency, jaundice was not a genetic disorder linked to the sex chromosomes (Joseph & Samant, 2023; Richardson & O'Malley, 2022). Therefore, it was reasonable to hypothesize that there would be no significant relationship between gender and the presence of jaundice, especially given that the statistical test failed to reject this hypothesis.

Regarding geographical location, the table indicated that the majority of respondents (437 out of 455) resided in urban areas and did not experience jaundice (416 out of 455). With a chi-square p-value of 0.641, which was greater than the level of significance $\alpha = 0.05$, there was insufficient evidence to reject the null hypothesis, which stated, "There was no significant relationship between the respondents' geographical location and the prevalence of confirmed cases of Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency in terms of the period of jaundice at the Level 2 Hospital in Zamboanga City." This indicated that geographical location, at least within this sample, did not affect the occurrence of jaundice. Similar to how an infant was equally likely to inherit G6PD deficiency regardless of living in urban or rural areas (Nascimento et al., 2022), infants with G6PD deficiency were equally likely to develop jaundice regardless of their residence. However, it was important to note the large disparity in representation between urban and rural subjects, with only 3.96% of the sample coming from rural areas. Therefore, it was not advisable to make definitive conclusions based solely on these results.

3.4 Problem No. 4: Based on the study, what recommendations could be proposed?

Based on the findings and identified gaps of this study, the researcher recommended the implementation of a program titled *"A Continuity of Care Program for G6PD Deficient Patients at a Level 2 Private Hospital in Zamboanga City: Sustaining Care for Life."* aimed at providing continuous, community-based, digitally supported, and hospital-led care for G6PD-deficient individuals, especially newborns and children. The program integrates health education, academic involvement, outreach activities, digital platforms**,** and public-private partnerships to reduce hemolytic crises and promote healthy living.

Brent Hospital, through its College of Nursing, Midwifery, and Caregiving, will mobilize students during fieldwork to act as G6PD health educators in barangay health centers. Under supervision, they will conduct campaigns on confirmatory testing and hemolysis prevention, assist in follow-ups, and encourage enrollment in the hospital's continuity of care registry. School visits will also be held to raise awareness, especially among students with undiagnosed or unmanaged G6PD deficiency.

To reach underserved areas, the program will organize an annual Continuity of Care Caravan in partnership with the Department of Health (DOH)**.** This mobile outreach will conduct G6PD confirmatory tests, distribute educational materials, and register identified patients for follow-up care. DOH's support will ensure coordination with local health units and logistical sustainability.

Digital tools such as a dedicated Facebook page and Messenger will serve as communication and education platforms. A secure digital registry will monitor confirmed cases, enable follow-ups, send alerts, and support individualized care planning.

Within the hospital**,** standardized medication safety protocols and automated pharmacy alerts will be implemented to prevent the prescription of contraindicated drugs. Institutional training for all hospital units will ensure consistent, informed care from ER to pharmacy and pediatrics.

Confirmed patients and their guardians will be enrolled in a tracking system for ongoing monitoring. An annual G6PD Family Day will also be held to provide updates, recognize volunteers, and strengthen family and community engagement.

Overall, the program seeks to close the gap between diagnosis and lifelong management, harnessing the hospital's dual role in healthcare and education. It aims to foster a culture of awareness, proactive care, and long-term support for G6PD-deficient patients in Zamboanga City, ensuring no patient is left behind.

4.0. Summary of Findings:

Based on the results of the findings presented in the previous chapter, these are the concise results;

- In the years 2023 and 2024, most of the confirmed cases of G6PD deficiency in a level 2 Hospital in Zamboanga City were babies aged 1- 6 months old, male, and living in a high population density.
- There was a low level of prevalence of confirmed cases of G6PD deficiency in the level 2 Hospital in Zamboanga City, with babies' skin and the whites of their eyes did not fade after two weeks in full-term and three weeks in premature babies.
- There was no significant relationship between the respondents' age, gender, and geographical location on the prevalence of confirmed cases of Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency in terms of period of jaundice in the level 2 Hospital in Zamboanga City.
- There was no significant relationship between the respondents' age, gender, and geographical location on the prevalence of confirmed cases of Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency in terms of history of prolonged Anemia in the family in the level 2 Hospital in Zamboanga City.
- The best program plan to be proposed by the researcher after the analysis of G6PDd is titled, "A Continuity of Care Program for G6PD Deficient Patients at a Level 2 Private Hospital in Zamboanga City: "Sustaining Care for Life", of which its goal is to offer a thorough, patient-centered continuity of care program to people with confirmed G6PD deficiency through community involvement, digital communication, hospital-based intervention, and continuing education to lower the risk of hemolytic crises and encourage healthy living. Patients with confirmed G6PD deficiency, particularly infants and young children, their guardians or parents, pediatricians, emergency room attendants, pharmacists, laboratory workers, barangay liaisons, outreach health workers, and associated school health coordinators, as well as hospital administrators, are the target beneficiaries.

4.1. Conclusions:

The study's findings over two consecutive years (2023–2024) revealed that G6PD-deficient patients in Level 2 hospitals in Zamboanga City were predominantly male infants aged 1–6 months and residing in urban areas**,** indicating a consistent demographic pattern. However, statistical analysis showed no significant association between age, gender, or location and the duration of neonatal jaundice, nor between G6PD deficiency and a family history of prolonged anemia. While these demographic factors were frequently observed among confirmed cases, they did not influence the course of the condition.

These insights emphasize the need for a proactive, structured response to G6PD deficiency in the Philippines. The proposed Continuity of Care Program aims to address this gap through prevention, education, digital tracking, and sustained healthcare collaboration. Ultimately, this initiative seeks to empower patients, families, and healthcare providers, while encouraging further research to improve early detection, risk management, and long-term care strategies for G6PD-deficient individuals. (1)

4.2. Recommendations:

In light of the findings and gaps identified in this study, it is recommended that Brent Hospital and similar institutions adopt and institutionalize a structured Continuity of Care Program for G6PD-deficient patients. This program should integrate academic participation, digital health innovations, community outreach, public-private partnerships, and hospital-based safety protocols to provide comprehensive and sustained care for all confirmed cases, particularly among newborns and children. The study showed that while most patients had no history of jaundice or prolonged anemia, the absence of consistent follow-up and public awareness presents significant risks. Moreover, the data revealed that only a small percentage of patients returned for confirmatory testing beyond six months of age, indicating the need for an efficient system to promote early follow-up and timely confirmation. The clear disparity in urban versus rural representation further highlights access issues that can be addressed through mobile outreach caravans in partnership with the Department of Health. Utilizing digital platforms such as Facebook, Messenger, and a secure patient registry will enable continuous education and monitoring, while mobilizing nursing, midwifery, and caregiving students as health educators during their fieldwork will help extend the hospital's reach into the community. Internally, standardized medication safety protocols and institutional staff training will ensure patient safety across all service areas. To promote family and patient engagement, activities such as an annual G6PD Family Day will help reinforce continuity of care and community support.

Furthermore, the retrospective analysis of confirmed G6PD deficiency cases within the hospital's Newborn Testing Center provides invaluable insights for improving healthcare practices. By reviewing data on affected newborns, researchers can identify patterns, risk factors, and the effectiveness of current screening and management protocols. This allows for the development of more targeted interventions, improves early detection strategies, and promotes better long-term care. For patients and families, this analysis fosters informed decision-making and personalized care, while also enhancing communication with healthcare providers. It also provides a sense of shared experience and support among affected families. For researchers and healthcare professionals, this analysis reveals knowledge gaps, informs future study directions such as the development of a "Continuing Care for Babies" initiative, and supports more efficient resource allocation. Notably, this study observed a link between population density and the local prevalence of G6PD, underscoring the importance of contextual research. The historical data generated also serves as a benchmark for future research, enabling the tracking of trends in prevalence, diagnosis, and treatment over time. Ultimately, this research can inform public health policies and guide the development of improved healthcare strategies for generations to come. Therefore, combining continuity of care with retrospective data utilization will ensure that no G6PD-deficient patient is left behind while also advancing the collective understanding and response to the condition.

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