Review

What Do We Know About Alcohol Consumption During Pregnancy and Foetal Alcohol Spectrum Disorder in Nigeria?

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What Do We Know About Alcohol Consumption During Pregnancy and Foetal Alcohol Spectrum Disorder in Nigeria?

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Abstract: Background/Objectives: Alcohol consumption during pregnancy poses notable risks to maternal and foetal health, yet its prevalence and impact in Nigeria remain understudied. This commentary article aims to review the current state of alcohol intake by expectant mothers in Nigeria and provide an overview of Foetal Alcohol Spectrum Disorder (FASD) and recommendations for addressing this public health issue. **Methods:** Drawing on existing literature, we highlight the prevalence of alcohol intake by expectant mothers in Nigeria and explore the socio-cultural factors influencing drinking behaviours during pregnancy. **Results:** Despite limited empirical evidence, anecdotal reports suggest that alcohol consumption during pregnancy is not uncommon in Nigeria, driven by factors such as social norms, lack of awareness, and limited access to prenatal care and education. The implications of prenatal alcohol exposure for maternal and child health are substantial, with potential consequences including FASD, birth defects, and mortality. **Conclusions:** We provide recommendations for policymakers, healthcare providers, and community stakeholders to enhance awareness, prevention, and support systems for pregnant women and their families. Key recommendations include implementing public health campaigns to raise awareness concerning the dangers of alcohol use by expectant mothers, integrating alcohol screening and counselling into routine prenatal care services, strengthening regulations on alcohol advertising and availability, and providing support services for women struggling with alcohol use disorders during pregnancy. By addressing the gaps in knowledge and practice surrounding alcohol consumption during pregnancy, Nigeria can take meaningful steps toward promoting maternal and child health and preventing the lifelong consequences of FASD and related conditions.

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1. Global Outlook on Alcohol Consumption During Pregnancy

Globally, assessing the rate of alcohol consumption by expectant mothers is challenging for several reasons. Some of the reasons include the absence of precise records documenting drinking habits during pregnancy, inaccuracies in self-report data, and stigmatisation [1,2]. Nevertheless, studies have aimed to evaluate alcohol consumption in pregnancy, and a systematic review of these in 2017 found that nearly 10% of pregnant people used alcohol during pregnancy globally [3]. Although the studies reveal alcohol consumption patterns in different contexts, these studies primarily depended on self-reported data and experimental designs susceptible to recall bias, selection bias, and attrition. Gilligan and colleagues suggest designing questionnaires with

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standardised beverage measurements to assess alcohol consumption rates instead of relying on participants' self-reported estimations [4]. However, methods that depend on participants' recall may be prone to selection bias. Therefore, it is essential to consider the use of biomarkers. Studies have shown that hair analysis is an accurate and reliable biomarker for detecting alcohol intake [5,6].

Alcohol consumption during pregnancy is linked to deprivation, as shown by Cannon and colleagues [7]. The study found that those who drank during pregnancy were often older, unemployed, unmarried, non-Hispanic ethnic minorities, and had lower educational levels. These findings align with several studies [8,9]. In contrast, findings from a British cohort indicated that individuals who consumed alcohol during pregnancy were more likely to have obtained a university degree and to have come from white, affluent backgrounds [10].

Rodriguez and his colleagues found a different social reaction in two Nordic countries that have contrasting societal policies regarding alcohol consumption by expectant mothers, particularly in the context of social adversity [11]. Finnish individuals tend to consume more significant amounts of alcohol when experiencing social adversity, even in light of Finland's conservative stance on alcohol. In contrast, Danish individuals, in comparable situations, consumed less alcohol despite Denmark's permissive stance on drinking. Additionally, research indicates that stressful life events are associated with alcohol consumption [12,13].

2. Alcohol Consumption During Pregnancy in Africa

Africa is an extensive continent with a population exceeding one billion individuals across 54 countries [14]. As per the latest Global Alcohol and Health Status Report [15], people aged 15 years and above residing in the African Region of the WHO (which encompasses all African countries except Tunisia, Egypt, Morocco, Djibouti, Libya, Somalia, and Sudan, classified under Eastern Mediterranean Region of the WHO) typically drink 6.0 L (consisting of 4.2 L documented and 1.8 L undocumented) of undiluted alcohol annually, or 16.4 ml per day. This corresponds to just over one internationally recognised standard drink (15.2 ml) of alcohol consumed daily, or 6.2 L/year, on a worldwide scale.

Research by the World Health Organisation identifies women in Uganda, Burundi, Rwanda, Gabon, Namibia, and Nigeria as the highest consumers of pure alcohol per capita (4.4–6.2 L per individual each year) [15]. However, the lowest percentages are seen in the Northern parts of Africa, where the predominant population is Muslim, resulting in long-time abstinence rates (> 88%) [15]. Chad, Namibia, Uganda, and Ethiopia have also observed high levels of alcohol consumption among women (varying between 17.7 to 24.5 L per person per annum), which is among the highest in the world [15].

A systematic review by Popova and colleagues estimated a pooled prevalence of alcohol consumption during pregnancy of 3.4% to 20.5% in Eastern Africa, 6.6% to 14.8% in Western Africa, 2.2% to 12.6% in Central Africa, ranging from 5.7% to 14.2% in Southern Africa, and 4.3% in Northern Africa [16]. Addila and colleagues, using a systematic review, reported a pooled prevalence estimate of alcohol by expectant mothers in Sub-Saharan Africa to be 20.8% [17].

Risk factors for alcohol intake during pregnancy have been recognised as poor social support and depression [18,19]. Alcohol use is 1.6 times higher in expectant mothers with depression than in those without depression [17]. Women who had an unanticipated pregnancy used alcohol twice as often as those who had a planned pregnancy [20–22]. According to these studies, alcohol use during pregnancy was encouraged by peers or friends who also drank. Pregnant individuals who knew that alcohol consumption negatively affects birth outcomes, however, were 64% less likely to drink during their pregnancy than their peers [17].

Research on alcohol use among expectant mothers is still lacking across various African nations, despite the World Health Organisation's worldwide strategy to decrease detrimental alcohol use, which was approved by the 63rd session of the World Health Assembly and places an emphasis on preventing and identifying alcohol use among expectant mothers and women of reproductive age [23]. The existing studies on alcohol use in pregnancy in the African region are limited by reliance on self-reported data, a lack of a biomarker approach, and inconsistent use of validated tools.

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Consequently, there exists the possibility of underreporting, recollection bias, or social desirability responses. Also, the majority of the systematic reviews on alcohol use by expectant mothers in the African region focused on identifying primary studies conducted in the English language. Publications in other languages, e.g., French, may have been missed, leading to reporting bias.

3. Alcohol Consumption During Pregnancy in Nigeria: Patterns, Predictors, and Socio-Cultural Factors

Alcohol consumption during pregnancy is significant in Nigeria, posing potential risks to both parents and unborn children [24]. Ordinioha and Brisibe employed a descriptive cross-sectional design with an interviewer-administered questionnaire to evaluate alcohol consumption among 221 pregnant women at the University of Port Harcourt Teaching Hospital in Nigeria. The study assessed the knowledge of the women's attitude towards alcohol use and actual alcohol consumption and found that 59.3% consumed alcohol during the index pregnancy [24]. Onwuka and his colleagues, using a cross-sectional design, determined the rate of alcohol consumption to be 22.6% among 380 pregnant women at the University of Nigeria Teaching Hospital in Nigeria [25]. Martinez and his colleagues, in a cross-sectional survey of 33,841 women in Africa, identified heavy drinking in 38% of Nigerian women [26]. Ordinioha and Brisibe revealed high rates of alcohol intake during pregnancy in Nigeria, with 39.4% regular and 25.8% binge drinking habits among respondents, reflecting a widespread issue across the country, particularly in the southern region [24]. The Ibadan Pregnancy Cohort Study (IbPCS) reveals a prevalence of alcohol consumption of 12.7% [27]. Popova and his colleague's meta-analysis combined the results of seven studies to arrive at an overall prevalence of consumption of alcohol during pregnancy of 8.1% (2.5%—15.4%) for Nigeria [16]. There exists a disparity in alcohol consumption between the northern and southern parts of Nigeria. Alcohol intake during pregnancy is lower in northern Nigeria, particularly among pregnant Muslims, due to the influence of religion, which significantly contributes to the overall reduced alcohol consumption in that region [24,27]. Despite these studies, the extent of alcohol use by expectant mothers in Nigeria remains underexplored in the literature.

Alcohol use during pregnancy in Nigeria is best understood within the bio-psycho-social paradigm, considering biological, psychological, and environmental factors [24]. Emotional states experienced by pregnant women, ranging from excitement to anxiety, can influence drinking behaviours [28]. Psychological factors, such as intimate partner violence, play a substantial role in alcohol use during pregnancy in Nigeria [29–31]. Marital distress predicts increased drinking among Nigerians during pregnancy, with lower levels of marital satisfaction reported among alcoholics and their spouses [27,28,32].

Sociodemographic factors such as age, education attainment, marital status, and household income play a crucial role in predicting alcohol consumption during pregnancy in Nigeria [27]. In Nigeria, individuals between 26 and 34 years old show the highest prevalence of alcohol consumption during pregnancy, while binge drinking is more common among those aged 18 to 25 [33]. Younger individuals, particularly teenagers, tend to be more involved in prenatal alcohol use, potentially due to unplanned pregnancies and associated stressors [34]. Pre-pregnancy alcohol use emerges as a significant predictor of alcohol consumption during pregnancy, highlighting the significance of early intervention and support for individuals with a record of alcohol use [27]. According to Onwuka and colleagues, individuals with less than tertiary education were significantly more prone to consume alcohol while pregnant. They suggested that limited knowledge or inadequate education might contribute to this behaviour, as those with lower education levels may be less knowledgeable about the dangers of consuming alcohol while pregnant [25].

4. Effects of Alcohol Consumption on Pregnancy

Alcohol, recognised as a teratogen, possesses the potential to induce numerous lifelong forms of damage to the foetus when consumed during pregnancy [35–37]. It disrupts foetal development and may lead to irreversible impairments, permanent organ damage, and morphological deformities [38–41]. The severity and complexity of the damage depend upon the dosage, frequency, and timing

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of alcohol exposure [42–44]. For instance, alcohol exposure can affect the brain at any stage of pregnancy. However, significant structural changes, such as brain damage and facial deformities, are more likely during the first trimester compared to development changes later [45–47].

In addition to the quantity and timing of alcohol exposure, there is a wide range of factors that influence the extent of alcohol-related damage, such as maternal nutrition [40,48], smoking [49], and genetic predisposition of the mother and foetus [50]. This means that the exact levels of alcohol necessary to cause harm are unknown and vary from individual to individual. Because of this variability in susceptibility to risk, epidemiological studies sometimes do not detect harm at low/moderate levels of alcohol consumption. Systematic reviews investigating the outcome of low to mid-level alcohol use during pregnancy have found that the evidence to confirm either harm or benefit at this level is inconclusive, although some studies included in the reviews reported birth complications [51—53] identified specific fatty acid concentrations (essential for foetal neural development) in individuals who consumed alcohol during pregnancy compared to control subjects, enhancing the understanding of alcohol's effects on neural development in those whose intake varied from 'moderate to heavy' amounts. Due to the potentially severe consequences of PAE and the unknown risk for each individual, current expert advice is abstinence from alcohol during pregnancy.

5. Overview of FASD

Foetal Alcohol Spectrum Disorder (FASD) encompasses various disorders resulting from PAE [54]. The spectrum includes four closely related conditions: Alcohol-Related Neurodevelopmental Disorder (ARND), Foetal Alcohol Syndrome (FAS), Alcohol-Related Birth Defects (ARBD), and Partial Foetal Alcohol Syndrome (PFAS) [55]. FAS is the most commonly identifiable form in the spectrum [56], although the four conditions described exhibit different degrees of associated impairments. Table 1 summarizes the characteristics associated with each condition in the spectrum as published by a study [57]:

Table 1. Diagnostic characteristics associated with Foetal Alcohol Spectrum Disorder.

Developmental prenatal alcohol exposure	Facial dysmorphology*	Growth deficiency ¥	Central nervous system dysfunction¤	Neurodevelopmental impairments₴	Diagnosis
+	+	+	+	+	Foetal alcohol syndrome
—	|	|	|	|	Foetal alcohol syndrome
+	+	+	—	+	Partial foetal alcohol syndrome
+	+	—	+	+	Partial foetal alcohol syndrome
+	+	—	—	+	Partial foetal alcohol syndrome
—	+	+	—	+	Partial foetal alcohol syndrome
—	+	—	+	+	Partial foetal alcohol syndrome
+	—	—	—	+‖	Alcohol-related

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	neurodevelop mental disorder§

*—Requires the presence of two or more of these features: a reduced palpebral fissure, a slender upper lip vermilion border, and a smooth philtrum. ¥—Can be identified prenatally or postnatally and encompasses height and/or weight at or below the 10th percentile on the relevant growth chart. ¤—At least one of the subsequent criteria must be present: head circumference at or below the 10th percentile on the relevant growth chart, structural abnormalities in the brain, or recurring nonfebrile seizures with no recognisable cause. ₴—Requires proof of widespread impairment or deficiencies in at least one neurobehavioural area that is 1.5 standard deviations or more below the average. ‖—Requires proof of widespread impairment or deficits in at least two neurobehavioural areas. §—A definitive diagnosis cannot be determined in children under the age of three years.Source: Hoyme et al. (2016) as cited by [57].

Table 1 focuses on diagnostic features of FASD, including neurobehavioural impairments, central nervous system dysfunction, growth deficiency , and facial dysmorphology. While the table identifies neurobehavioural impairments across the spectrum, it does not reflect the overlaps of specific impairments.

Globally, a systematic review and meta-analysis estimate that FASD affects more than 7 out of every 1000 births [58]. Over half of the countries analysed in the study showed an elevated FASD prevalence exceeding 1%, with South Africa reporting the highest (exceeding 100 cases per 1000 births), as corroborated by the meta-analysis conducted by Roozen and colleagues [59]. In the UK, Lange and colleagues reported an FASD rate of 3.24% through meta-analysis [58], while McQuire and colleagues, employing a screening algorithm within a UK birth cohort, identified FASD prevalence of 17% for singly imputed data, and 7.2% in complete case analysis [60]. Based on an annual cohort of close to 4 million live births in the United States, we can anticipate around 144,000 newly diagnosed FASD cases annually, which averages to about 394 cases daily, based on a midpoint prevalence rate of 3.6% [61]. A recent case ascertainment study using a cross-sectional design among 6,639 children in the United States suggested a prevalence rate ranging from 1.1% to 5.0% [62]. An increasing body of evidence from different settings highlights the substantial economic consequences of FASD. For example, a systematic review estimates that the yearly expenses associated with caring for individuals diagnosed with FASD in Canada range between CAD$300 million and CAD$6 billion, and in the US, between USD$ 150 million and $9 billion [63]. In the UK, FASD also exerts a significant economic burden, as parents of children with FASD are unable to work and claim additional benefits [64]. Moreover, it is estimated that it will cost GDP£100 million to educate these children in care, with support expenses exceeding GDP£3,000 per week [64]. These estimates encompass medical, diagnostic, social services, and correctional costs. Nonetheless, these expenses are underestimated because of the prevalence of undiagnosed or misdiagnosed FASD cases, along with a range of unconsidered factors that contribute to the overall costs related to FASD [65]. The financial strain that FASD places on society may be alleviated by acknowledging the specific requirements of individuals affected by FASD and by introducing timely interventions and appropriate social policies [66,67].

6. Prevalence of FASD in Africa and Nigeria

The prevalence of FASD in Africa, including in Nigeria, remains understudied, with limited literature available. South Africa stands as an exception, with most research publications on FASD originating from this region. There is a significant gap in knowledge and understanding of the prevalence of this condition across the continent. This is despite potential evidence of significant prevalence of alcohol use by expectant mothers in Africa [3].

For South Africa, May and colleagues reported an FASD prevalence of approximately 310 per 1,000, using population-based, active case ascertainment techniques among a school-based cohort that included 213 controls: 2 with FAS, 64 with PFAS, 77 with ARND, and 95 with ARBD [68]. The prevalence of FASD in South Africa is as high as 290 per 1,000 (or 29%) in the Winelands area, as reported by Olivier and colleagues, who employed active case ascertainment methods, including anthropometric screening, clinical evaluations, neurodevelopmental assessments of first-graders,

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dysmorphology exams, and interviews to estimate alcohol consumption during pregnancy [69]. Epidemiological studies conducted in high-risk communities within the Western Cape Province documented FASD rates between 17 and 23%, with FAS rates among school entry-aged children ranging from 5.9 to 7.9% [70]. Moreover, a review of studies assessing grade 1 school learners in various South African towns reported FASD rates ranging from 2.9 to 29% [70].

Despite the lack of comprehensive data on FASD prevalence in African countries, the presence of significant predisposing factors, such as high rates of alcohol use by expectant mothers in Nigeria, suggests a considerable burden of FASD. Modelling the impact of Nigeria's estimates for alcohol consumption leads to an estimated prevalence of FAS of 14.8 (95% CI 8.9–21.5) per 10,000 in Africa [3]. The overall predicted estimates may not reflect the accurate prevalence due to disparity in the acceptance of alcohol between the different regions of Nigeria. Further breakdown by region for Nigeria is not available, but it would be expected that where alcohol is culturally acceptable and widely consumed, e.g., the south, the prevalence of FASD will be a lot higher compared to regions (e.g., the North) where the majority are Muslims.

7. Impact of Lack of Knowledge About Alcohol Consumption During Pregnancy on the Health Sector in Nigeria

Despite the well-documented dangers of PAE, there remains a lack of awareness among the Nigerian population, particularly among pregnant women and women of reproductive age. The lack of knowledge of alcohol use by expectant mothers has profound implications for the Nigerian health sector. It poses significant risks to maternal and foetal health, leading to adverse birth outcomes and long-term developmental impairments [71]. This may result in increased demand for healthcare services related to pregnancy complications and developmental disorders, placing additional pressure on healthcare and necessitating increased resources for prenatal care, neonatal intensive care, and long-term interventions for affected individuals [72,73]. The lack of awareness among healthcare providers regarding the hazards linked to alcohol consumption during pregnancy results in missed chances for timely intervention and prevention [74]. Insufficient knowledge and training among healthcare professionals may lead to inadequate screening of alcohol use by expectant mothers or the provision of suitable counselling and support. This perpetuates a cycle of negative maternal and foetal consequences, exacerbating the strain on Nigeria's already burdened healthcare system [74].

Moreover, there is a transgenerational effect of PAE, with each episode of drinking during pregnancy exposing multiple generations to its hazardous effects [75]. Prenatal alcohol exposure has been correlated with elevated mortality rates among individuals diagnosed with FASD and their siblings, presenting a considerable burden on the healthcare system [76,77]. Individuals affected by FASD frequently need medical care for physical impairments and mental disorders, along with rehabilitation services, specialized education, and social support [74]. Furthermore, studies highlight the increased risks associated with prenatal alcohol exposure, such as cognitive and behavioural deficits, sudden infant death syndrome, neonatal death, prenatal and postnatal growth deficiencies, spontaneous abortion, stillbirth, as well as preterm delivery [78-80]. All these impacts may be detrimental to the Nigerian health sector.

8. Conclusions and Recommendations

Studies such as those by Brisibe and Ordinioha reveal alarming rates of alcohol intake during pregnancy in southern Nigeria (39% regular and 26% binge drinking habits) [24]. However, this is masked by abstinence in large parts of the population, leading to overall prevalence estimates of FASD of under 1%. In other regions of the world where drinking rates match those found in Nigerian studies [24,26], prevalence rates of FASD are found to be in excess of 2% of the total population of children [58,62,81]. Given that these children will have significant health and care needs and are susceptible to future adverse effects such as disengagement with school, legal issues, and mental well-being and addiction problems, it is highly likely that FASD presents a significant burden on society in Nigeria.

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Key recommendations for addressing alcohol consumption during pregnancy in Nigeria encompass a multifaceted approach aimed at raising awareness, enhancing healthcare services, and strengthening regulatory measures. One critical recommendation is the implementation of public health campaigns designed to increase awareness about the risks associated with alcohol intake during pregnancy. These campaigns should be strategically designed to reach women of childbearing age, their families, healthcare providers, and the broader community. By leveraging various communication channels such as community outreach programs, social media, television, and radio, these campaigns can disseminate accurate information about the consequences of prenatal alcohol exposure and promote the adoption of healthier behaviours. Additionally, ensuring universal access to reliable contraception, particularly hormonal methods, is crucial. This universal access to reliable contraception is especially important because a significant proportion of pregnancies are unplanned. Hormonal contraceptives offer a more consistent means of preventing unintended pregnancies compared to methods depending on behavioural changes, such as condoms or abstinence, thus reducing the risk of FASD.

Furthermore, the incorporation of alcohol screening and counselling into routine prenatal care services is vital for early detection and intervention. Healthcare professionals are pivotal in recognising women who might be susceptible to alcohol consumption during pregnancy and delivering suitable assistance and counselling. By incorporating standardised screening tools and counselling protocols into prenatal care visits, healthcare professionals can effectively assess alcohol consumption patterns, educate pregnant women about the risks, and offer interventions to reduce or abstain from alcohol use during pregnancy. This integrated approach ensures that women receive the necessary support and guidance to make educated choices about their alcohol intake and safeguard the health of their unborn children.

In addition to healthcare interventions, strengthening regulations on alcohol advertising and availability is paramount in curbing the prevalence of alcohol intake by expectant mothers. Nigeria should enact and enforce strict regulations to restrict the marketing, promotion, and sale of alcoholic beverages, particularly targeting pregnant women and young adults of childbearing age. This may involve implementing restrictions on alcohol advertising in media channels frequented by pregnant women, such as health-related magazines, prenatal clinics, and maternal health websites.

Women who are pregnant and who are known to be struggling with alcohol addiction should be given targeted specialist support to reduce alcohol consumption. Support services should be made available. These may include counselling, substance abuse treatment programs, and peer support groups tailored to the unique needs of pregnant women. By offering accessible and culturally sensitive support services, Nigeria can empower women to seek help, address their alcohol use disorders, and make healthier choices for themselves and their babies.

In conclusion, addressing the gaps in knowledge and practice surrounding alcohol consumption during pregnancy in Nigeria requires a comprehensive and coordinated effort from various stakeholders, including healthcare providers, civil society, community organisations, and government agencies. Furthermore, we recommend conducting prevalence studies that include surveys of pregnant women and biomarker testing, such as hair or meconium analysis. These efforts are essential for understanding the scope of the issue and developing targeted interventions, as they will provide valuable insights into drinking patterns and help quantify the burden of FASD. Without such data, implementing effective strategies becomes challenging. By implementing the key recommendations outlined above, Nigeria can take meaningful steps towards promoting maternal and child health, preventing the lifelong consequences of FASDs, and ensuring a healthier future for its population.

9. Declarations

Author Contributions: All authors contributed equally to all aspects of this review article. Stephen I. Azumara contributed to the conceptualisation, methodology, and literature review and was responsible for drafting the original manuscript and substantively revising it. He ensured the accuracy and integrity of the work and has given final approval for the version to be published. Elijah C. Arodiogbu contributed to the conceptualisation, methodology, and literature review and was responsible for drafting and substantively revising the original

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manuscript. He ensured the accuracy and integrity of the work and granted final approval for the version to be published. Penny A. Cook contributed to the conceptualisation, methodology, and literature review and was responsible for drafting and substantively revising the original manuscript. She ensured the work's accuracy and integrity and provided final approval for the version to be published. Raja A.S. Mukherjee contributed to the conceptualisation, methodology, and literature review and was responsible for drafting and substantively revising the original manuscript. He ensured the accuracy and integrity of the work and has given final approval for the version to be published. David J. Gilbert contributed to the conceptualisation, methodology, and literature review and was responsible for drafting and substantively revising the original manuscript. He ensured the work's accuracy and integrity and provided final approval for the version to be published.

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