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Maternal Use of Traditional Eye Medicines in Children Attending Immunization Clinics in Onitsha, Nigeria: A Cross-Sectional Study

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ABSTRACT

Background: Mothers have significant roles in children's health. A mother's eye-care choices may significantly influence her child's ocular health outcomes. Traditional Eye Medicines (TEM) are unorthodox medications administered for desired ocular therapeutic effect. The objective of this study was to determine the prevalence and factors associated with TEM use among mothers attending immunization clinics in Onitsha, Nigeria

Methodology: A descriptive cross-sectional study of 320 mothers attending immunization clinics at two secondary health centers in Onitsha from April-May 2025, selected by multistage sampling. Information on socio-demographics and TEM use was obtained using a structured interviewer-administered questionnaire. Data was analysed and presented using frequency tables. Logistic regression was used to identify factors associated with TEM use with significance at <0.05.

Results: Response rate was 90.8%. A total of 320 mothers with a mean age of 29.8 ± 5.3 years were studied. Participants' children were aged between 1 week and 676 weeks with a median age of 12 weeks. The prevalence of TEM use was 43.4% (139/320) (95%CI: 0.379-0.491). Among the 320 participants, breast milk 84(26.3%) and local antimony granules (otangele) 81 (25.3%) were the most commonly used TEM. The most common indication for use of TEM was eye discharge, 48 (34.5%). TEM use was associated with lower educational attainment (AOR =2.276, 95% CI =1.397 -3.707, p = 0.01).

Conclusion: The results show that 43.4% of the mothers used TEM. Integration of eye health education into immunization program with sensitization of mothers on the dangers of TEM use on children is recommended.

Key words: Traditional eye medicine, Children, Mother, Immunization clinic.

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INTRODUCTION

The eyes are very important for many aspects of a child's development. It plays a key role in motor skills, learning, social interactions, psychological and general wellbeing. Maintenance of good eye health in children is important to ensure optimal child development and benefits for the child, family, and society.

Eye medicines are instilled for eye problems with the expectation of therapeutic effect. Traditional eye medicine (TEM) refers to biologically based or inorganic therapies that can be administered to obtain the desired ocular therapeutic effect[1] They could be formulated as solution, powder, gels or solids. They are mostly unorthodox medicines whose pharmacological ingredients and therapeutic efficacy are not scientifically established. Their use frequently stems from knowledge and practices, based on past experiences, handed down through generations.[1] They are used by many, especially in developing countries as first care for eye conditions even before orthodox eye care which is frequently driven by factors such as ease of access, affordability, ignorance, low socioeconomic status, rural residence, cultural beliefs, poor access to orthodox eye care, lack of satisfaction with orthodox care and other factors.[2],[3] Some commonly used TEM are breast milk, herbal extracts, honey, soil, human urine and saliva, milk, plant extracts and oils, animal excreta, kerosene and other petroleum products, holy water, seawater, dry gin, powdered charcoal.[1,4]

The use of unverified topical medication administered on the advice of relatives and non-medical personnel are common in our environment.[2] Some TEM could be harmful to ocular structures and may result in complications such as ocular surface irritations, burns and infections, corneal ulcers, corneal opacity, corneal perforation, endophthalmitis, conjunctival cicatrization, symblepharon formation and obliteration of the fornices, some of which may be sight-threatening.[5]

Mothers play a significant role in the eye health of a child.[6] The health of a child is heavily dependent on the mother's health-seeking behavior as she decides if her child's eye condition is serious enough to require medical attention.[7,8] Mothers also play a crucial role in choice of and adherence to treatment for their children's eye problems. Given the long expected life years of a child, a mother's wrong eye care choice could have dire, long term consequences on visual function, development and quality of life of the child.[9]

The prevalence of TEM use in Nigeria reported in a review is 15.5%.[2] Other studies across Nigeria have reported varying prevalence of TEM use including those done in Benin (1.6%),[10] Ado-Ekiti (4.4%),[11] Mangu, Plateau State (4.3%),[12] Enugu (5.9%),[10] Onitsha (13.2%),[13] Owerri (15.8%),[14] and Northeast (68.5%).[15] Though prevalence of TEM use has been widely studied in various populations, no study has focused on maternal populations with a view to obtaining information on TEM use for children in Onitsha.[1–3,15] There is also limited immunization-clinic-based maternal data in Southeast Nigeria.

This study is thus important to determine the use of TEM among mothers of children presenting for immunization. Children in immunization clinics could be at risk of vaccine-preventable infections some of which could affect the eyes such as measles and use of TEM could portend negative outcomes. The immunization clinic is a well-known avenue for transmission of health information concerning children to their mothers. The aim of this study is to determine the prevalence of TEM use among children attending immunization clinics in Onitsha, to identify the types of traditional eye medicines commonly used, to assess the sociodemographic factors associated with traditional eye medicine use and to describe the reasons cited by mothers for using traditional eye medicines. The findings of this study will be invaluable in planning for eye health education of mothers of children, especially at the immunization clinics, which will contribute greatly to the fight against the use of harmful tradition eye medicines and the protection of the eye health of children.

METHODOLOGY

***Study design and Setting*:** This was a descriptive cross-sectional study of mothers attending immunization clinics for their children at two selected private secondary health facilities in Onitsha, Nigeria. Data collection was conducted over a two-month period, between 1st April 2025 and 31st May 2025. Onitsha is a major commercial city located in Southeast, Nigeria with a population of about 1.84 million. The immunization clinics selected provide routine childhood immunization services one day per week with an average attendance of 180 patients per week.

***Study population*:** The study population consisted of mothers/caregivers of children aged 0-14 years attending the selected immunization clinics during the

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study period. Inclusion criteria were (1) mothers or primary care givers of children aged between 0 and 14 years (2) presenting for immunization at the immunization clinics during the data collection period. The upper limit of 14 years was chosen to accommodate children receiving the recently introduced Human Papilloma virus immunization and those for catch-up immunization. (3) Willingness to give consent. Exclusion criteria (1) mothers who were too ill to participate, (2) mother who were not the primary care givers of the children (3) mother who had been previously enrolled in the study.

Sample size determination

The sample size was calculated using the Cochran formula for sample size for proportions[16] as follows:

$n = Z2pq/d2$

Where:

n = minimum sample size

Z = the normal deviation at 95% confidence interval (1.96)

p = expected proportion (40.5%) based on a previous study of mothers TEM use on their children.[15]

$q = 1 – p$

d = absolute error or precision (was set at 5% or 0.05)

To calculate n

$= (1.962 \times 0.405 \times 0.595)/0.052$

$= 0.9257/0.0025$

$n = 370.28 \approx 370$

Information obtained from the clinic records showed an average weekly clinic attendance of 100 and 80 respectively for both facilities giving a combined average attendance of 180. Eight clinics days were run during the study period, giving an estimated total population of 1440.

Cochran correction for a small population was applied (since sample size >5% of the population) using the following formula: [16]

$nf = n/[1+ (n/N)]$

Where:

nf = adjusted sample size for small population

n = minimum sample size as calculated above

N = population size

$= 370/ 1+ (370/1440)$

$=370/1 +0.2570$

$=370/1.2570$

$= 294.35 \approx 294$

Adjustment was made for non-response by adding 10% of the sample size as follows 294 +29, giving a sample size of 323

Sampling Technique: Multistage sampling technique was used to select participants. In the first stage, two secondary health facilities were randomly selected by ballot method out of 14. Then sample size (323) was shared proportionately in the ratio of 100:80 between the selected facilities, based on their population sizes, giving 179 and 144 respectively for both facilities. The next stage involved systematic random sampling. A sampling interval of 4 obtained by dividing the total population (1440) by the sample size (323) was used to select participants from the immunization clinics at the health facilities. The sampling frame from which participants were selected was made from the list of patients for each immunization clinic day over the two-month period. The sampling frame was verified by crosschecking the list with patients present. The list was numbered consecutively from the number 1. The first participant was selected by randomly selecting a number between 1 and 4 using the ballot method and subsequent participants were selected by successively adding the number 4 to this number picked and participants with the corresponding numbers on the list were selected. Ineligible participants were replaced by selecting the next number. Hospital cards of enrolled participants were marked to avoid double enrolment.

Although the calculated sample size was 323, 360 questionnaires were used, to enhance precision, coverage and accommodate non-response.

***Study collection instrument*:** Data collection was done using a structured, pre-tested, interviewer-administered questionnaire. The questionnaire was developed based on review of relevant literature and consisted of two sections:

Section A: Sociodemographic characteristics such as mother's age, occupation, highest educational attainment, child's age and birth order.

Section B: The use of TEM for their children, type of TEM used, indications and reasons for TEM use, source of advice and practice of donation of breast milk for eye problems. An Igbo (local language) version of the question was used for those that could not communicate in English. The questionnaire was translated and back-translated by a linguist to ensure retention of meaning. Pretesting was done with 30 mothers from an immunization clinic in a secondary health facility that was not involved in the study. The questionnaire was modified for clarity and comprehensibility before data collection.

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Definition of key variables: Traditional Eye Medicine (TEM) use was defined as the administration of any herbal, mineral, or chemical substance not prescribed by a qualified healthcare professional into a child's eye for therapeutic purposes. TEMs include plant products (herbal extracts, roots, leaves), animal products (breast milk, urine, saliva), and chemical substances (kerosene, battery water, salt solutions). TEM use was assessed by asking: 'Have you ever used any traditional/herbal remedy in your child's eyes?

Data Collection Procedure: Data were collected by two trained research assistants who were health professionals. Mothers were approached after their children had received immunization services. The purpose of the study was explained, and written informed consent was obtained. Interviews were conducted in a private area to ensure confidentiality. Each interview lasted approximately 15 minutes.

Data Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences version 23 (SPSS, Inc., IBM Corp Chicago Illinois, USA). Descriptive statistics were computed: categorical variables were presented as frequencies and percentages, while continuous variables were presented as mean ± standard deviation or median with interquartile range based on distribution. The prevalence of TEM use was calculated as the proportion of mothers reporting TEM use divided by the total number of respondents. Factors previously identified in the literature, such as maternal education, child's age and parity were included as potential confounders. Bivariate analysis using chi-square test (or Fisher's exact test where expected cells <5) was conducted to test associations between TEM use and independent variables. Multivariate analysis was done using logistic regression. Variables with $p<0.05$ were considered statistically significant.

Ethical Consideration: The study adhered to the principles of the Declaration of Helsinki.[17] Ethical approval for this study was obtained from the Anambra State Ministry of Health Research Ethics Committee Awka (ASMOHREC /2025/16012025/31; 16th January 2025). Permission was also obtained from the management of the participating immunization clinics. Written informed consent was obtained from all participating mothers after explaining the purpose, procedures, benefits, and risks of the study. Participation was voluntary, and mothers were assured of confidentiality and their right to withdraw at any time without affecting the services their children received.

Variables

Outcome variable: TEM use (yes/no)

Exposure variables: Education, Age, Birth order, Donation of breast milk

Expected bias: There could be recall bias in remembering past events, social desirability bias due to self-reported method used and fear of stigma. The participants were interviewed in a room that offered privacy, were assured that their responses were completely anonymous and were allowed time to respond adequately to help reduce these. There was potential for interviewer bias due to the interviewer-administered method used. However, this was mitigated by use of a structured questionnaire and training of the interviewer.

RESULTS

Participant flow and Response rate: Of the 360 mothers approached, 327 agreed to participate, giving a response rate of 90.8%. Seven questionnaires were incomplete and were excluded, leaving 320 questionnaires for final analysis.

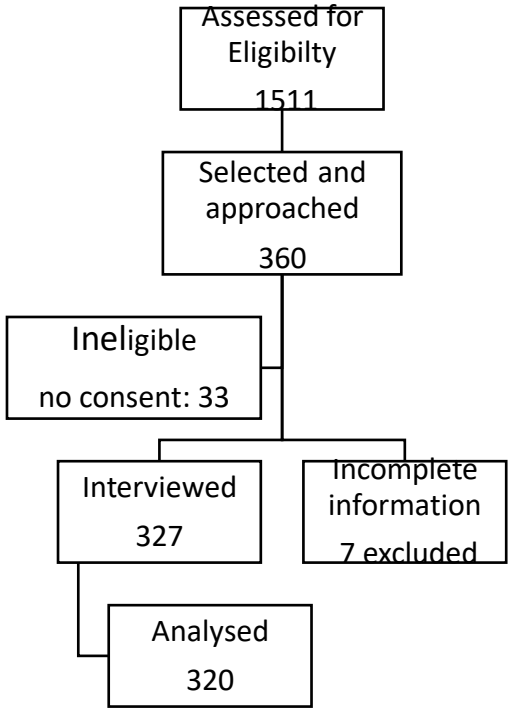

Figure 1: Flow Chart for Data Collection

A total of 320 mothers were studied with a mean age of 29.8 ± 5.3 years. Up to 206 (64.4%) had tertiary education and 101 (31.6%) were traders. The children of the participants were aged between 1 week and 676

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weeks with a median age of 12 weeks. The highest proportion of mothers 154 (48.1%), had their children in the 1 to 3-month age group. One hundred and twelve (35%) were first born children while 105(32.8%) were second born children. (Table 1)

Table 1: Sociodemographic Characteristics

Characteristic	No	%
Mothers' Age		
<20	2	0.6
20-29	161	50.3
30-39	135	42.2
40 and above	22	6.9
Total	320	100.0
Highest Educational Attainment		
Primary Education	4	1.3
Secondary Education	107	33.4
Tertiary Education	206	64.4
No Formal Education	3	0.9
Total	320	100.0
Occupation		
Homemaker	78	24.4
Trader	101	31.6
Teacher	36	11.3
Artisan	33	10.3
Civil servant	65	20.3
Others	7	2.2
Total	320	100.0
Child's age		
<1 month	30	9.4
1-3 months	154	48.1
4-6 months	44	13.8
7 -9 months	51	15.9
10-12 months	25	7.8
>12 months	16	5.0
Total	320	100.0
Child's birth order		
First	112	35.0
Second	105	32.8
Third	59	18.4
Fourth	28	8.8
Fifth and above	16	5.0
Total	320	100.0

One hundred and thirty-nine (43.4%) reported that they had used TEM on the eyes of their children. The prevalence of TEM use was 43.4% (139/320)(95%CI: 0.379-0.491). Breast milk 84(26.3%) was the most commonly used TEM followed by antimony granules "otangele". (Table 2) The mean number of TEM used per participant was 1.3 ± 0.5; range was 1 to 3. Up to 32 (10.0%) participants used two or more TEM while 107 (33.4%) used only one.

Table 2: Type of Traditional Eye Medicines Used

TEM* Type	Yes no (%)**	No no (%)
Breast Milk	84 (26.2)	236 (73.8)
Antimony granules (otangele)	81 (25.3)	239 (74.7)
Holy water	6 (1.9)	314 (98.1)
Urine	2 (0.6)	318 (99.4)
Olive oil	2 (0.6)	318 (99.4)
Plant extract	1 (0.3)	319 (99.7)
Human Saliva	1 (0.3)	319 (99.7)

*TEM =Traditional Eye Medicine; **% based on 320 participants. Some participants used multiple items

The most common indication for use of TEM was for eye discharge by 48 (34.5%). Up to 35 (25.2%) mothers used TEM for multiple problems. (Table 3). Majority of the recommendation for TEM use was made to these mothers by the children's grandmothers 86 (61.9%), other sources were friends, 28 (20.1%); birth attendant or chemist 12(8.6%); traditional/spiritual healer 3 (2.2%); self-motivated 3 (2.2%) and others 7 (5.0%).The most common reason for using TEM was because the mothers thought they were effective, 69 (49.6%). Seventeen (12.2%) mothers used TEM on their children because they were available, 15 (10.8%) because of trust in the person that recommended the TEM, 13 (9.4%) because they were cheap while 25 (18.0%) had multiple reasons for using TEM on their children's eyes.

Table 3: Indications for TEM Use

Indication	No	%
Eye discharge	48	34.5
To make eyes appear clearer	34	24.5
Red eyes	14	10.1
Itching	4	2.9
Vision loss	2	1.4

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Prevention of eye disease	2	1.4
Multiple indications	35	25.2
Total	139	100.0

Eighteen (5.6%) of the mothers had donated breastmilk to others for treatment of an eye problem. All mothers that reported donating breast milk for use by others for their eye problems had used TEM on their children's eyes ($X^2(1) = 24.836$; p =0.001). Out of these, 15 (83.3%) reported instilling breast milk in their children's eye while 3 (16.7%) did not. ($X^2(1) = 32.103$; p =0.001) More mothers who attained secondary school education or lower, 64 (56.1%) tended to use TEM on their children more than those with higher education 75 (36.4%) ($X^2(1) =11.630$, p=0.001), (Table 4). However, no statistically significant association was found between use of TEM and mother's age, child's age or child's birth order using chi square test. (Table 5)

Table 4: Highest Educational Attainment vs TEM Use

TEM Use	Highest Educational Attainment		*X (df)² (p-value)*
	Secondary and below no (%)	Above secondary no (%)	
Yes	64 (56.1)	75 (36.4)	11.630(1)
No	50 (43.9)	131 (63.6)	(0.001)
Total	114 (100.0)	206 (100.0)	

Table 5: Association between Participant Characteristics and TEM Use

Characteristic	TEM Use		X^2(df) *(p-value)*
	Yes no (%)	No no (%)	
Mothers' Age			
< 30	70 (50.4)	93 (51.4)	
≥ 30	69 (49.6)	88 (48.6)	0.033(1)
Total	139 (100.0)	181 (100.0)	(0.856)
Child's Age			
<6 months	79 (56.8)	116 (64.1)	
≥ 6months	69 (43.2)	65 (35.9)	1.738(1)
Total	139 (100.0)	181 (100.0)	(0.187)
Child's birth Order			
First	49 (35.3)	63 (34.8)	0.007(1)
Others	90 (64.7)	118 (65.2)	(0.934)
Total	139 (100.0)	181 (100.0)	

Logistic regression analysis of TEM use and associated factors showed that only education had a statistically significant association with TEM use with mothers who had secondary education or lower being 2.276 times more likely to use TEM on their children than those with higher education (AOR =2.276, 95% CI =1.397 -3.707, p = 0.01) (Table 6)

Table 6: Logistic Regression analysis of TEM Use and Associated Factors

Variable	AOR (95% CI)	*p*-value
Mothers Age group		
<30 years	0.914 (0.569-1.740)	0.538
≥30 years	Reference (1)	
Child's Age Group		
<6 months	1.283 (0.792 - 2.080)	0.311
≥6 months	Reference (1)	
Mother's Educational Attainment		
secondary and below	2.276(1.397 -3.707)	0.01*
Above secondary	Reference (1)	
Birth order		
First	0.937 (0.560-1.567)	0.803
Others	Reference (1)	

*statistically significant

DISCUSSION

The results of this study suggest that the use of TEM in children by mothers is common practice as up to 43.4% of the mothers interviewed used TEM. This suggests the need for increased awareness and education of mothers about the dangers of TEM use for their children. It could be beneficial to have eye health education activities such as talks and use of infographic posters included in the counselling given to mothers attending immunization clinics. Also, education of community health workers and immunization clinic staff would be helpful in equipping them to better integrate eye health education into immunization clinic education activities. The prevalence of TEM use in this study is higher than earlier studies in different populations in Nigeria (1.6% - 13.8%)[10–14,18] However, it is similar to what was reported in a similar study in the Northeast, Nigeria[15] where 40.5% of nursing mothers reported using TEM on their children.

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In our study, those who donated breast milk also used TEM on their children. This is not unexpected as one would usually encourage and enable others to use what they too have used or experienced. A similar finding of high use of breast milk on the eyes among nursing mothers was reported in Northeast Nigeria on mothers who used on themselves and their children.[15] Breast milk is the gold standard food in infants necessary for healthy growth and development of an infant. Breastmilk, especially, colostrum is known to boost immune system and decrease infections in babies.[19] Generations of mothers have been encouraged to establish and sustain breastfeeding as early as possible to ensure these benefits for their babies. It is probable that this thinking could encourage the use of breastmilk on children's eyes, ostensibly to secure the same benefit for the eyes. However, its use as an agent to treat eye conditions is strongly discouraged by eye care practitioners. The information on harmful effects of breast milk to the eyes may not be as widespread among mothers. In addition, cultural and traditional beliefs which could sometimes be strongly held, are known drivers of maternal practices for their children's health.[20] Instillation of breast milk to infected or traumatic eyes is known to cause or worsen infection and may lead to endophthalmitis and panophthalmitis.[3,21] In the present study, the mothers' understanding of the infection risk of breastmilk was not explored. Eye discharge was the commonest indication for use of TEM in this study. This practice can have grave consequences on an already infected eye. The use of antimony granules" otangele" is also high in this group. Antimony granules known locally as otangele or kohl in Arabic is known to contain toxic elements which can lead to lead intoxication in children.[22,23] The most common indication reported by Nathaniel and Eze[2] was blurring of vision. Another study reported inflammatory symptoms as the commonest indication for TEM use.[1] These differences may be due to age differences of the participants studied and the occurrence of certain diseases more commonly among different age groups.

Low educational attainment has been identified as one of the determinants of use of TEM.[2,4,10,14] In this study, TEM use was also found more among mothers who had lower educational attainment. This suggests the importance of female education and its positive influence on child eye health and eye health choices. It is known that more educated mothers tend to have better knowledge, attitudes, and adherence to good eye health information and understanding of eye conditions of their children, as well as a higher likelihood of seeking eye care services for their children.[6,24]

In this study grandmothers were a prominent source of advice to mothers on for TEM use on children. In a study in Pakistan, grandmothers were also reported to exert strong influence on eye care practices.[25] This probably suggests that these practices are cultural and get handed down through successive family generations. Mothers and also grandmothers have key influence over children's eye health and that of the community.[6] The role and influence of grandmothers on mothers could be harnessed for promotion of positive child eye health practices by involving grandmothers in eye health education and promotion strategies. Having eye health education on debunking of cultural myths, safe eye practices and eye health that is targeted at different generations of women could be beneficial.

The most common reason for TEM use among the mothers for their children was belief in their effectiveness. Up to 84.3% of patients studied in the West Bank believed that TEM are beneficial.[1] This could be worrisome, considering that many of these substances have been found to have extreme PH levels and high microbial content which are dangerous to the eyes.[26] The effectiveness of these TEM have not been scientifically proven. However, it is probable that some conditions people use them for could be self-limiting and relief may not really be due to the TEM themselves. This use of these TEM could cause delay in seeking prompt medical attention and may worsen the existing eye condition. Also, many children of the mothers studied are preverbal who cannot express themselves on relief or otherwise, suggesting that the claim of effectiveness may not be fully reliable.

Limitations of the Study

The cross-sectional design of the study is limited by inability to establish causality between TEM use and other factors. The self-reported methods use may be affected by recall bias by participants due to passage of time. Considering that information being obtained is on a negative practice prone to stigma, there could also be social desirability bias where participants could probably attempt to understate their practice and respond in ways they deem acceptable to the researcher or to project a good self-image and avoid judgement. This could result in under-reporting. Furthermore, the study was conducted in only two secondary facilities in Onitsha,

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which could limit its generalizability. The study is also a hospital-based study and may not be extrapolated to the general population.

CONCLUSION

The use of traditional eye medicines on children appears to be a common practice among mothers at these immunization clinics in Onitsha with low educational attainment is a key determinant. Increased eye health education activities with emphasis on basic eye health and hygiene, causes of eye infection, safe eye practices, dangers of TEM use and importance of seeking prompt medical attention is crucial for mothers attending immunization clinics. Integration of eye health education into immunization clinic programs is hereby recommended. Future interventions should incorporate culturally sensitive education targeting mothers and influential family members, particularly grandmothers, within immunization settings. Future research could be directed at gaining insight into maternal knowledge of the harmful effects of TEM, qualitative studies to understand perceptions and cultural beliefs underlying TEM use and assessment of effectiveness maternal health educational intervention for child eye care.

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Declarations

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