AWARENESS AND KNOWLEDGE OF RHESUS FACTOR INCOMPATIBILITY AMONG PREGNANT WOMEN IN ANAMBRA STATE

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Abstract
Rhesus incompatibility is a red blood cell mismatch between a Rhesus negative mother and her unborn child which can lead to series of miscarriages or still births as a result of what is known as the Heamolytic Disease of the Newborn. This disease can be avoided with treatment if there is proper awareness. Anchored on the Bullseye theory of communication, this study aimed at finding out the awareness and knowledge of Rhesus factor incompatibility among pregnant women in Anambra state. Survey method was considered appropriate for the study and data was collected from a sample of 300 pregnant women selected from three general hospitals chosen purposively from the three senatorial zones in the state. Pregnant women were targeted for this study because they seem to be mostly at risk and ignorance at this point could lead to serious consequences. Out of the 300 copies of questionnaire distributed, 300 were duly returned and these were analyzed accordingly. The study established a significant level (56.7%) of awareness. Television and radio being the most accessible media in these communities only contributed 6.3% and 0.7% respectively as the source of awareness on Rhesus incompatibility. Majority of the respondents agreed to the knowledge based questions with percentages higher than those who are aware of Rhesus incompatibility. This indicates a strong possibility that many may have agreed based on their belief in the correctness of the statements and not knowledge alone. Awareness was found to be significantly associated with age, education and place of residence of respondents. Based on these findings, the study recommended the use of television and radio for more awareness and knowledge based campaigns as they are the most accessible media in communities in Anambra state as established by this study.

Introduction
Generally, awareness of a potential health problem will make reasonable individuals take steps to avoid them. Rhesus (Rh) incompatibility is one among many medical conditions that could be controlled with early knowledge. Rh incompatibility is a situation that arises when a Rhesus (RhD) negative mother is exposed to the RhD positive red cells (usually as transplacental haemorrhage which means a leakage from the fetal circulation into the maternal circulation), she develops allo-anti-D which cross the placenta and results in the destruction of fetal red cells (Nasim, Mustufa & Shahid, 2011). This primary exposure of Rh-

positive blood into the maternal circulation leads to sensitization, which results in the maternal production of Rh-positive antibodies called Rh immunoglobin G (IgG). The mother's IgG antibodies may pass through the placenta and attack the fetal red blood cells inside the fetus leading to Hemolytic Disease of the Fetus and Newborn (HDFN) (Antonios, 2011).

Information about a health condition is an important element in healthy living. Exposure to health information about Rh factor incompatibility can be accessed from print, broadcast, new media and interpersonal communication. It is pertinent to know that this health condition has been in existence for a considerable long time but emphasis on awareness and knowledge seem to be limited to sickle cell diseases and genotype whose complications are more evident than Rh factor incompatibility. The importance of Rhesus factor incompatibility has been under-emphasized over the years as attention has always been given to blood genotype and its role in marriage compatibility (Famusiwa, 2019). Would be married couples are encouraged to check their blood genotype, HIV status and even hepatitis B status with very little or no mention made to their Rhesus factor compatibility. This is as a result of lack of awareness on the health implications of Rh incompatibility. Some women who eventually get to know about it do so when they are already sensitized or at risk. In a recent report by Adepoju (2019), she recounted the real life experience of an Rh-negative woman who had aborted two pregnancies in her youth before getting married. She had her first child successfully because the child was Rh negative just like her. She experienced a difficult pregnancy afterwards that led to a still birth. It was then that the doctor informed her of her Rh status. Subsequently her husband was tested positive and her daughter negative. She experienced several miscarriages and lots of religious abuse until she gave up on having children and her husband remarried.

Mass media play crucial role in disseminating health information and increasing awareness about health education. It is the role of the media to make people know what Rhesus incompatibility is and how to avoid its harmful consequences. Media not only create awareness, but also inform and educate people over time. This ultimately helps in the change of attitude and behavior of audience for achieving better health outcomes.

Research Questions
1. What is the awareness of information on Rhesus factor incompatibility among pregnant women in Anambra State?
2. What is the knowledge of Rhesus factor incompatibility among pregnant women in Anambra State?
3. What is the main source of information on Rhesus incompatibility among pregnant women in Anambra State?

Heamolytic Disease of the Fetus and Newborn (HDFN)
Hemolytic disease of the fetus and newborn is a red blood cell mismatch between mothers and their fetus that can cause significant morbidity and mortality (Hall, 2021). Hemolytic disease of the fetus and newborn (HDFN) is an immune-mediated red blood cell (RBC) disorder in which maternal antibodies attack fetal or newborn RBCs. HDFN can cause significant morbidity and mortality, especially in healthcare limited resource settings (Basu, Kaur & Kaur, 2011). The underlying cause of hemolytic disease of the newborn is incompatibility between the maternal and fetal blood. This incompatibility results in the formation of antibodies in the maternal blood, which attacks the fetal Red Blood Cells (RBCs) (Esan, 2016). During pregnancy, maternal antibodies are transported across the placenta and enter the fetal circulation and attack the red blood cells in the fetal circulation; the red cells are broken down and the fetus can develop reticulocytosis (an elevation in the number of young red blood cells), hyperbilirubinemia (too much bilirubin in a baby's blood) and anemia (Esan, 2016). This fetal disease ranges from mild to very severe and fetal death from heart failure (hydrops fetalis) can occur.

Media and Awareness Creation

Media is the reflection of our society and it depicts what and how society works. Media, either it is printed, electronic or the web is the only medium, which helps in making people informed. It also helps in entertaining the public, educate and make people aware of the current happenings (Nity & Singh, 2017). Media has today become the voice of our society. There is a variety of media platform that has stimulated the thoughts of the young generation and other sections of our society, more eloquently

Mass Media as an Instrument of Health Awareness

Health education is an important constituent of public health & health promotion. Health education aims for positively influencing the health behavior of people by informing & instructing common populace about health & hygiene and other health related issues. Across the globe public health promotion activities focus on health education to influence heath behavior of the target audiences. Being an important social organization mass media has wide reach and access that can influence the public by improving their health education (Sharma & Gupta, 2017). Mass media has a prominent role to play in modern society. The mass media are regarded as channels of communication that are capable of reaching heterogeneous audiences simultaneously with uniform messages (Okorie, 2013).

Electronic media: The radio and television can spearhead the campaign on rhesus incompatibility awareness. In broadcast media, program type and time of airing must be given due consideration if the campaign must be effective. In other words, radio and television use for rhesus incompatibility awareness must be targeted at peak periods or "primetime," when most audience members stay tuned to their sets.

Print media: the print media can serve as an effective way to create awareness, or to remind the public of critical information about rhesus incompatibility.

Social media: The use of social networks in the society is becoming popular and widely celebrated amidst criticisms. This is because, these social networks change the way people communicate, interact, investigate, and socialize (Musa, Azmi and Ismail, 2015). Social media can be used for academic purpose, self-expression, and establishing a global friendship.

Community media: Community media are any form of media that serves a community. In order words, it is creating local alternatives to mainstream broadcasting, like local community newspapers, radio stations or magazines. Having international and national newspapers and magazines does not erase the need for rural community newspapers. A rural/community newspaper functions as an agenda setter for the rural communities. It serves as a symbol of progress by using illustrative pictures of spokepersons, chiefs, and groups etc. to instigate understanding of the contents of the newspaper (Amadi & Enyindah, 2017).

Community radio is a medium of expressing and sharing views, thoughts, ideas, problems and prospects of rural, disadvantaged, vulnerable and hard to reach population with the mainstream population (Khan, Khan, Hassan, Ahmed & Haque, 2017).

Interpersonal Communication as a Strategy for Rh Incompatibility Awareness

Interpersonal communication is communication that takes place when two or more individuals are involved. It is a communication that goes on between persons, mostly in a face to face situation (Okunna & Omenugha, 2012). This kind of communication can take place between two persons, among a small number of people or a large number of people but usually in a face to face situation. This is the type of communication that takes place during antenatal clinics when a health care worker talks directly to a patient or group of patients. Interpersonal communication can be very effective in creating awareness on Rhesus incompatibility. Information can be passed from a health worker to a patient or patients, from a patient to another and from a patient to friends and family.

Effective interpersonal communication between health care provider and a patient is one of the most important elements for improving client satisfaction, compliance and health outcomes. Patients who understand the nature of their illness and its treatment, and who believe the provider is concerned about their well-being, show greater satisfaction with the care received and are more likely to comply with treatment plans.

A patient who has a good understanding of particular health information can educate family and friends on it. This becomes a continuous process going from one person to another. Getting health information from trusted family members could go a long way in bringing about behavioural change.

 A study conducted in Pakistan by Nasim, Mustufa and Shahid (2011) aimed to assess the knowledge of primiparous (women with first pregnancies) and females with first child regarding Rh incompatibility and its risk to mother and child and create awareness amongst them about the importance of blood grouping during pregnancy. The study concluded that knowledge about blood groups, Rh incompatibility and its complications during pregnancy and after child birth was very low and needs to be addressed through public education. Mokaya (2014) conducted a study to assess knowledge, attitude and practices of Rhesus incompatibility among women attending antenatal care in Kampala International University Teaching Hospital, Uganda. The study concluded that knowledge about Rhesus incompatibility is still very low and that women attending antenatal services in KIU-TH need to be educated about it, its complications and prevention.

Yahia, Miskeen, Sohail, Algak and Aljadran (2020) conducted a study aimed to assess the awareness of pregnant women toward the clinical importance of blood group RhD-negativity and anti-D immunoglobulin and to determine the prevalence of blood group RhD-negativity among them. The study recommended structured health education programs by hematologists and obstetricians to increase awareness and to address women at reproductive age.

In a similar study conducted among secondary school students in Nigeria, Ogbenna, Oyedeji, Onifade and Adewoyin (2016) observe that the level of awareness/knowledge regarding Rh D antigen among female secondary school students in Ikorodu, Lagos was low, despite, the prevalence of sexual activity among teenagers which vary between 5.7% and 25.7% with a 100% abortion rate reported among this age group.

The Bullseye Theory
Joe Palmer and Dave Halls developed the bull's eye communication method based on two decade's experience practicing communication consulting for corporate companies and entrepreneurs and teaching people how to improve their communication (Palmer, 2003). The Bullseye theory was then propounded by Joe Palmer in 2003 in the book, "The Bullseye Theory: discovery of self – Challenge of being"

This theory is a one way communication based on action view whereby right words are used to convey the right message. It reflects what you want to do and how you want to do it, and how you want to behave towards your friends, your family, your self, your environment your work etc. influencing others through engaging and persuasive communication.

The survey method was considered appropriate for the study and the sample for the survey was determined by referring to the scale of sample size adequacy as suggested by Comrey and Lee (1992). The scale is as presented in Table 3.1 below:

Table .1

S/N	Sample Size	Adequacy
1	100	Poor
2	200	Fair
3	300	Good
4	500	Very Good

Scale of sampling adequacy according to Comrey and Lee (1992)

The researcher chose 300 as the sample size as it was rated "Good" by Comrey and Lee (1992), thus; a total of 300 pregnant women aged between 15 and 49 years who came for routine antenatal visits were recruited by voluntary participation from December 2022 to March 2023 from the three selected general hospitals located in the three senatorial zones in the state. Multi-stage procedure was employed for sample selection. The three general hospitals in the selected towns were written out for the survey namely; General Hospital Onitsha, General Hospital Ekwulobia and General Hospital Enugwu- ukwu.

The average weekly antenatal attendance for each of the hospitals is as shown below.

Table .2 The average weekly antenatal attendance for each of the hospitals

S/N	Hospital	Ave. Antenatal Attendance
1	General Hospital Onitsha	60
2	General Hospital Ekwuluobia	38
3	General Hospital Enugwu-Ukwu	32
Total		130

The sample from each of the hospitals was drawn according to their population (attendance).
Total = 138+88+74 =300=Sample size
Table .3: Respondents' Highest Educational Qualification

	Frequency	Percent (%)
No formal education	10	3.3
First school leaving certificate	41	13.6
SSCE/Equivalent	89	29.6
NCE/OND	78	26
First Degree/HND	70	23.3
Postgraduate degrees	12	4
Total	300	100

Table .3 presents data on respondents' level of formal education. The table shows that majority (29.6%) stated that they have a senior school certificate (SSCE) or its equivalent followed closely by those who stated that they have NCE/OND (26%) and those who stated that they have First degree/HND (23.3%). Only 3.3% stated that they do not have any formal education. This shows that up to 96% percent of the respondents have at least basic education. This means that if information about rhesus compatibility is introduced at that basic level many will be aware of it.

Table .4: Respondents' Occupation

	Frequency	Percent (%)
Government worker	60	20
Self employed professional	29	9.6
Professional employed in private firm	19	6.3
Artisan	0	0
Trader	92	30.6
Student	30	10
Housewife	59	19.6
Others	11	3.6
Total	300	100

As shown on table .4, majority of the respondents are traders (30.6%) and followed by government workers (20%). Others belonging to the working class are self employed professionals (9.6%), professionals employed in private firm (6.3%) and others (3.6%). The data shows that more than 60% of the respondents are working and maybe financially responsible.
Table .5: Respondents' Position of Pregnancy (1st, 2nd, 3rd, etc.)

	Frequency	Percent (%)
First	110	36.7
Second	40	13.3
Third	52	17.3
More	98	32.7
Total	300	100

Table .5 shows respondents' position of pregnancy. From the data, 36.7% of the respondents are in their first pregnancy while about 63% percent of the respondents are in their 2nd pregnancy or more. The Rh-negative women in the second group, without proper awareness may already be at risk of being sensitized while the 36.7% of the respondents who are in their first pregnancy still have the opportunity to know what Rhesus factor is and how to avoid rhesus incompatibility complications.

Table .6: Respondents' Monthly Income Level

	Frequency	Percent (%)
Below 20,000	37	12.3
N20,000-N30,000	50	16.7
N31,000-N60,000	71	23.7
N61,000-N100,000	43	14.3
N110,000 or more	12	4
None	87	29
Total	300	100

Table .6 is closely related to table 4 as it points towards financial aspect of treating or preventing Rhesus incompatibility. The table shows the respondents' monthly income. From the data, 29% of the respondents stated none for the monthly income options.

Table .7: Respondents' Place of Residence

	Frequency	Percent (%)
Urban	104	34.7
Rural	196	65.3
Total	300	100

Table 7 shows respondents' place of residence. A greater percentage (65.3%) of the respondents stated that they reside in a rural area while 34.7% stated that they live in the urban area. The high percentage of respondents living in the rural area may be because the research covers the three senatorial zones in Anambra state.

Table .8: Respondents' Age Distribution

	Frequency	Percent (%)
15-24 years	61	20.3
25-30 years	53	17.7
31-39 years	77	25.7
40 and above	109	36.3
Total	300	100

Table .8 shows that the majority of women sampled are between 15 and 39 years being the most productive years for women. A good percentage of those between 15 and 30 years may be in their first pregnancy making information about rhesus incompatibility a timely one for them. This is about 38 percent of the population. This percentage is in agreement with the figures in table 5 stating that 36.7% of the respondents are in their first pregnancy.

Table .9: Respondents' exposure to Information on Rhesus Incompatibility

	Frequency	Percent (%)
Yes	167	56.7
No	133	43.3
Total	300	100

As seen on table .9, 56.7% of the respondents stated that they are exposed to information on Rhesus incompatibility. This is quite high compared to what was discovered in a study by Mokaya (2014) in Uganda which shows that only 17.5% know what rhesus incompatibility is while Yahia et al (2020) recorded 41.7% awareness in Saudi Arabia.

Table .10: Respondents' Source of Awareness on Rhesus Incompatibility

	Frequency	Percent (%)
Radio	2	0.7
Television	19	6.3
Newspaper	0	0
Magazine	0	0
Books	8	2.7
Internet	59	19.7
Hospitals	160	53.3
Health Workers	11	3.7
Friends and Family	21	7
None	20	6.7
Total	300	100

On table .10, we can see respondents source of awareness on rhesus incompatibility. Majority (53.3) stated hospitals as their source of awareness.

Table .11: Respondents' community accessible media

	Frequency	Percent (%)
Radio	57	19
Television	145	48.3
Newspaper	0	0
Magazine	0	0
Books	13	4.3
Internet	50	16.67
Hospitals	35	11.7
Health Workers	0	0
Friends and Family	0	0
None	0	0
Total	300	100

Table .11 shows media accessible in respondents' community. Majority (48.3) stated television as the most accessible media in their community. This is followed by those who chose the radio (19%) and the internet (16.67) as the most accessible media.

Table .12: Respondent's knowledge that Rh-negative women are at risk of Rhesus Incompatibility

	Frequency	Percent (%)
Strongly disagree	0	0
Disagree	0	0
Agree	102	34
Strongly agree	108	36
N/A	90	30
Total	300	100

Table .12 shows respondents' knowledge that Rh-negative women are at risk of Rhesus Incompatibility. Most of the respondents (70%), including some who stated that they were not aware of rhesus incompatibility agreed that Rh-negative women are at risk of rhesus incompatibility.

Table .13: Respondent's knowledge that taking precautions can reduce chances of Rhesus Incompatibility

	Frequency	Percent (%)
Strongly disagree	0	0
Disagree	0	0
Agree	129	43
Strongly agree	110	36.7
N/A	61	20.3
Total	300	100

Table .13 shows respondents' knowledge that taking precautions can reduce chances of Rhesus Incompatibility. Thirty six percent of the respondents indicated that they strongly agree and this actually means certainty. Quite a good number (43%) also agreed and even though none of the respondents disagreed, 20.3% gave no answer.

Table .14: Respondent's knowledge that Rhesus Incompatibility can result to miscarriages and stillbirths

	Frequency	Percent (%)
Strongly disagree	5	1.7
Disagree	15	5
Agree	122	40.7
Strongly agree	88	29.3
N/A	70	23.3
Total	300	100

Table .14 shows respondents' knowledge that Rhesus Incompatibility can result to miscarriages and stillbirths. Most of the respondents (80%) indicated their agreement to this statement. Less than two percent disagreed strongly, 5% disagreed while 23.3% gave no answer. Those that provided no answer are quite substantial. This may either be because of lack of knowledge or uncertainty.

Table .15: Respondent's knowledge that Heamolytic Disease of the Newborn is a red blood cell mismatch between mothers and their unborn child that can harm the child

	Frequency	Percent (%)
Strongly disagree	3	1
Disagree	10	3.3
Agree	152	50.7
Strongly agree	48	16
N/A	87	29
Total	300	100

Table .15 shows respondents' knowledge that Heamolytic Disease of the Newborn is a red blood cell mismatch between mothers and their unborn child that can harm the child. Many of the respondents (50.7%) agreed while 16% strongly agreed. Twenty nine percent gave no answer while the rest disagreed.

Table .16: Respondent's knowledge that Rh Negative women taking the preventive Anti-D immunoglobulin during pregnancy and immediately after delivery can prevent Heamolytic Disease of the Newborn

	Frequency	Percent (%)
Strongly disagree	3	1
Disagree	8	2.7
Agree	209	69.7
Strongly agree	61	20.3
N/A	19	6.3
Total	300	100

Table .16 shows Respondent's knowledge that Rh Negative women taking the preventive Anti-D immunoglobulin during pregnancy and immediately after delivery can prevent Heamolytic Disease of the Newborn. Majority of the respondents agreed to this, 69.7% agreed while 20.3% agreed strongly.

CROSS-TABULATION OF VARIABLES
Some variables were cross tabulated to find out their relationship. This was to provide richer insights and help any planned action especially with designing targeted messages which this study may elicit.
Table .17: Respondents' Exposure to Information on Rhesus Incompatibility and Age
This section tried to find the relationship between the respondents' age and exposure to information on rhesus incompatibility. This is in view of the possibility that older respondents may have had more opportunities to be exposed to information on rhesus incompatibility.

Age		15-24	25-30	31-39	40 and above	Total
Respondents' exposure to information on rhesus incompatibility	Yes	9	45	46	67	167
	No	52	8	31	42	133
Total		61	53	77	109	300

Table .17 shows that out of 61 respondents aged 15-24, only 9 answered "yes" to being aware of information on Rhesus incompatibility while 45 out of 53 respondents aged 25-30 also replied in the affirmative showing a drastic increase in awareness as age increased. Also 46 out of 77 respondents aged 31-39 and 67 out of 109 respondents aged 40 and above answered in affirmation.

Table .18 Respondents' Exposure to Information on Rhesus Incompatibility and Educational Qualification
This section tried to find the relationship between the respondents' educational qualification and exposure to information on rhesus incompatibility

Educational Qualification		No formal education	FSLC	SSCE	NCE/OND	First Degree/HND	Postgrad. Degree	Total
Respondents' exposure to information on rhesus incompatibility	Yes	0	6	27	58	65	11	167
	No	10	35	62	20	5	1	133
Total		10	41	89	78	70	12	300

Table .18 shows that none of the respondents with no formal education has heard of Rhesus incompatibility. This is followed by those with first school leaving certificate having 8 respondents answering in affirmation to being aware of rhesus incompatibility while 33 of the respondents in this category have no exposure to information on rhesus incompatibility. Among those with SSCE, we have 17 respondents being aware and 72 respondents not exposed to information on rhesus incompatibility. Also among those with NCE/OND, First Degree/HND and Postgraduate degree, we have 62, 66, and 11 respondents exposed to information on rhesus incompatibility and 16, 4, and 1 respondent not exposed to information on rhesus incompatibility respectively.

Table .19: Respondents' Exposure to Information on Rhesus Incompatibility and Place of Residence
This section tried to find the relationship between the respondents' place of residence and exposure to information on rhesus incompatibility. This is in view of the possibility that respondents who live in urban areas may have more opportunities to be exposed to information on rhesus incompatibility.

Place of residence		Rural	Urban	Total
Respondents' exposure to information on rhesus incompatibility	Yes	77	92	167
	No	119	22	133
Total		196	104	300

Table .19 shows that out of 196 respondents who live in the rural areas, 119 are not exposed to rhesus incompatibility (61%). On the other hand, only 22 out of 104 respondents (21%) who live in the urban areas are not exposed to information on rhesus incompatibility.

Table .20 Respondents' Place of Residence and Community Accessible Media
This section tried to find the relationship between the respondents' place of residence and community accessible media. This is in view of finding out what media is more appropriate in communicating information on rhesus incompatibility to rural and urban communities

Community accessible media		Radio	Television	News Paper	Maga Zine	Books	Inter Net	Hospitals	Friends & Family	none	Total
Respondents' place of residence	Urban	16	51	0	0	0	31	6	0	0	104
	Rural	41	94	0	0	13	19	29	0	0	196
Total		57	145	0	0	13	50	35	0	0	300

Table .20 shows that television is community most accessible media for 49% of the urban dwellers. This is followed by the internet for 30% and the radio for 15% of those who live in the urban area. Also, the television as well is community most accessible media for 48% of those who live in the rural area followed by radio for 21% and hospitals for 15% of the rural dwellers. The radio and television can spearhead the campaign on rhesus incompatibility awareness. In broadcast media, program type and time of airing must be given due consideration if the campaign must be effective. In other words, radio and television use for rhesus incompatibility awareness must be targeted at peak periods or primetime, when most audience members stay tuned to their sets. For example, television can be used to set an agenda by creating awareness of Rhesus incompatibility through scrolling messages on primetime news bulletins and programs. The radio can also be used to set an agenda by introducing musical commercials about Rhesus incompatibility during prime-time periods. Furthermore, the television can be used to create cues to action by showing documentaries that focus on the nature, causes, and consequences of Rhesus incompatibility Also, movies and television series storylines could include issues about Rhesus incompatibility.

Conclusion
Information about a health condition is an important element in healthy living. Exposure to health information about Rh factor incompatibility can be accessed from print, broadcast, new media and interpersonal communication with family and friends, at hospitals, schools etc. From findings, there is a fair level of awareness on Rhesus incompatibility among pregnant women in Anambra state. Majority (53.3%) had hospitals as their source of awareness despite television being their most accessible media. This may be the reason awareness seemed high among older women and the more educated ones who may have had more reasons to be at the hospital. The bullseye theory can be very helpful in promoting health awareness through the television as the most accessible media to get to the younger women because it advocates the use of right words to clearly and carefully communicate with the audience in order to achieve the required behavioural change.

Recommendations
Based on findings, the study recommends the following;
- Rhesus incompatibility should be taught at the primary level of education in Anambra state as only 14.6% of those with first school leaving certificate (FSLC) were aware of Rhesus incompatibility.

- The Bullseye theory of communication should be thoroughly applied in the design and planning of campaign messages in order to provide adequate knowledge.
- Electronic media (television and radio) should be used extensively in awareness and knowledge based campaigns on Rhesus incompatibility.
- Messages on Rhesus incompatibility should be designed in such a way that the audience will understand the need to spread the information and educate others.

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