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Exploring Gaps in Healthcare Workers Knowledge, Attitude, Perception and Practice of COVID-19 Prevention and Control in Rivers State Nigeria

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Abstract

Background Knowledge, attitude, perception, and practice of Covid-19 prevention affect the effectiveness of healthcare workers in the pandemic response. This study assessed gaps in awareness, knowledge, attitude, perception, and practice of Covid-19 prevention among healthcare workers in Rivers State, Nigeria. **Methods** This was a descriptive cross-sectional survey carried out six weeks into Rivers State response that commenced on February 20, 2020, in the 23 Local Government Areas (LGAs). State Disease Surveillance and Notification Officers used multistage sampling to recruit 555 healthcare workers for the survey. A self-designed structured interviewer-administered questionnaire built into the Open Data Kit application for android phones was used for data collection. Descriptive data analysis was done, and outputs presented as frequency and percentages. **Results** There was a total of 372 (67.0%) female respondents. Majority of study participants had tertiary education 453 (81.6%). The mean age of study participants was 40.6 years (Standard Deviation = 7.8 years). Furthermore, 285 (51.4%) were Community

Health Workers, and had over ten years practicing experience 393 (70.8%). Most healthcare workers 554 (99.8%) had heard about Covid-19, through radio 539 (97.1%), and television 445 (80.2%) yet 213 (38.4%) respondents did not know that it is caused by a virus. Most respondents 415 (74.8%) had good knowledge about Covid-19. However, only 148 (26.7%) would refer suspected cases to a facility and only 365 (65.8%) respondents demonstrated the correct hand washing technique. **Conclusion** There are some gaps in health worker knowledge, attitude, perception, and practice of Covid-19 prevention. Interventions to bridge these gaps are needed for effective containment of this pandemic.

Keywords

Knowledge, Attitude, Perception, Practice, Healthcare Workers, Covid-19

1. Introduction

A pandemic is the worldwide spread of a new disease. The last notable pandemic occurred in 1918 caused by an H1N1 virus with genes of avian origin [1]. It is estimated that about 500 million people or one-third of the world's population were infected with this virus. Although there is no specific record of the statistics of the health workers who were infected, but there are speculations that a lot of health workers would have been infected as the pandemic spanned for nearly a year (1918-1919) [1].

Coronavirus disease (COVID-19) caused by severe acute respiratory syndrome: coronavirus 2 (SARS-CoV-2) virus, which was initially considered a pneumonia of unknown cause broke out in Wuhan, China on the 31st of December 2019 [2]. The disease was later declared a Public Health Emergency of International Concern on the 30th of January 2020 and eventually a pandemic on the 11th of March 2020 due to the alarming levels of spread and severity [3]. Globally, a total of 152,888 COVID-19 infections and 1413 deaths had been reported as of August 2020. Infections were mainly in women (71.6%, n = 14,058) and nurses (38.6%, n = 10,706), but deaths were mainly in men (70.8%, n = 550) and doctors (51.4%, n = 525). Limited data suggested that general practitioners and mental health nurses were the highest risk specialties for deaths. In Africa, there are more than 10,000 health workers in the 40 countries which reported to have been infected with COVID-19 [4]. In Nigeria, as at August 2020, 2175 health workers had been infected with COVID-19, while in Rivers State, 122 health workers (97 in public and 25 in private facilities) had been infected with COVID-19. The 122 health workers infected in Rivers State are thus: 69 doctors, 31 nurses, 5 laboratory scientists, 2 health attendants and others 5 [5]. The State had her index case of COVID-19 on March 25, but as of 11th August 2020 had recorded 1972 confirmed cases of COVID-19 according to Nigerian Centre for Diseases Control (NCDC) [6].

Health workers are at the front line of the COVID-19 outbreak response and as such are exposed to hazards which include pathogen exposure, long working hours, psychological distress, fatigue, occupational burnout, stigma, and physical and psychological violence [7] [8]. These hazards predispose health workers to infection and contribute to the rising number of cases globally. In Rivers State as of 11th August 2020, a total of 106 health workers were infected with Covid-19 with three deaths. Knowledge is a prerequisite for establishing prevention beliefs, forming positive attitudes, and promoting positive behaviours. Individuals' cognition and attitudes towards disease affect the effectiveness of their coping strategies behaviour and practice [9].

Literature shows that there is available information on the findings from studies done in China, Pakistan and Nigeria on awareness, attitude, and other characteristics of COVID 19 [2] [7] [10] [11] [12] [13] [14]. However, few studies have been published in South-South Nigeria. Hence, this study was carried out six weeks into the pandemic response in Rivers State (which commenced on the 20th of February 2020) to assess the knowledge, attitude, perception, and practice of Covid-19 prevention among healthcare workers in Rivers State, Nigeria. Survey findings would identify gaps in the knowledge of COVID-19 transmission and symptoms among health workers across Rivers State as was seen in published studies outside Nigeria [14] [15].

2. Methodology

2.1. Study Area, Design and Population

Rivers State is in Southern Nigeria. It has a population of more than five million according to census data released in 2006. The state is economically significant as the centre of Nigeria's oil industry, bounded by the states of Anambra and Imo on the north, Abia and Akwa Ibom on the east, and Bayelsa and Delta on the west.

The survey took place in the 23 Local Government Areas (LGAs) of Rivers State. It was a descriptive cross-sectional survey that was carried out about six weeks into Rivers State pandemic response, that began on February 20, 2020. The study population consisted of healthcare workers at primary, secondary, and tertiary healthcare facilities in the public and private sectors of the state who were available at the facilities and gave informed consent for the survey. All health workers who were on leave were excluded from the survey.

2.2. Sample Size and Sampling Technique

The minimum sample size was calculated as 427 healthcare workers across Rivers State based on the sample size formula for single proportions [17] where the prevalence of good knowledge about Covid-19 was set at 50% (since there is no previously established prevalence), degree of accuracy set at 5% and 10% non-response rate. Multistage sampling technique was used. In the first stage, a list of all the wards that have health facilities in each LGA was prepared and

three wards were selected from each LGA by simple random sampling. In the second stage, one health facility was selected from each ward by simple random sampling. Forwards that had only one health facility, the health facility was automatically included into the study. In the third stage, six or ten healthcare workers were selected from health facilities with less than 30 and 30 or more health workers respectively, by simple random sampling, using the nominal roll as the sampling frame. A total of 555 healthcare workers were selected from 69 health facilities across the 23 LGAs in Rivers State.

2.3. Data Management

The data collection tool was a self-designed interviewer-administered four-page questionnaire that was built into the Open Data Kit (ODK) application for android phones with Global Positioning System (GPS) tracking. Data collection was done by the Disease Surveillance and Notification Officer (DSNO) of each of the LGAs in the state. The choice of this set of data collectors was informed by the restriction of movement during the lockdown phase of the pandemic. The DSNOs were also trained in data collection and are familiar with the terrain and the community. Data collectors were trained for one day on the administration of the tool before it was rolled out. The entered data was downloaded into an excel file, exported to IBM SPSS version 23, and analysed. Major outcome variables included knowledge of Covid-19, attitude towards Covid-19 prevention, perception of Covid-19 prevention, and practice of Covid-19 prevention methods. Descriptive statistics was done, and results were presented as tables. A total of six questions were used to assess knowledge. Some of the knowledge questions accommodated multiple responses, giving a total of 31 responses. To compute for knowledge score, all correct responses to knowledge questions were scored as one, while wrong responses were scored as zero thus maximum score was 31. The respondents' scores were summed up, divided by the maximum score of 31, and multiplied by 100 to express knowledge score as a percentage. Respondents who scored 0% - 49.9% were classified as having poor knowledge, those who scored 50% - 79.9% were classified as having good knowledge, while those who scored 80% and above were classified as having excellent knowledge. For handwashing practice, each respondent was asked to demonstrate how they washed their hands, while the interviewer observed to see if the respondent washed all six critical areas of the hands (between the fingers, washing the back of fingers, washing the back of the hand, washing the palm, washing base of the thumb, washing the fingernails), and ticked accordingly using an observational checklist built on the ODK platform. Those who demonstrated washing all six critical areas of the hands were scored 6/6 (100%) and classified as showing correct handwashing practice, while those who failed to demonstrate washing at least one of the six critical areas were classified as showing incorrect handwashing practice.

2.4. Ethical Considerations

Ethics approval was obtained from the Research Ethics Committee of the Rivers

State Ministry of Health (MH/PRS/391/VOL.2/675). Informed consent was built into the data collection tool such that the survey was truncated if any participant declined to provide verbal consent or withdrew consent at any time during the interview. Confidentiality was assured by anonymizing the data collection tool. In addition, filled forms were uploaded into a World Health Organization secured server with access restricted to the research team.

3. Results

3.1. Sociodemographic and Work Characteristics

A total of 555 healthcare workers gave consent and participated in the study. Among the 555 healthcare workers interviewed, 183 (33.0%) were males, had tertiary education 453 (81.6%), and were married 432 (77.8%). Their ages ranged between 20 and 65 years, with a mean age of 40.6 years (Standard Deviation = 7.8 years) Table 1.

Table 1. Socio-demographic characteristics of study participants.

Variables	Frequency (n = 555)	Percentage
Age group (years)		
<25	10	1.8
25 - 34	97	17.5
35 - 44	275	49.5
45 - 54	152	27.4
55 - 64	19	3.4
65 and above	2	0.4
Mean Age ± SD	40.60 ± 7.77	
Gender		
Male	183	33.0
Female	372	67.0
Religion		
Christian	553	99.6
Islam	1	0.2
Other	1	0.2
Educational level		
Primary	19	3.4
Secondary	48	8.6
Tertiary	453	81.6
Post Tertiary	35	6.3
Marital status		
Single	111	20.0
Married	432	77.8
Divorced/Separated	6	1.1
Widowed	6	1.1

SD = Standard Deviation.

The health workers were of different cadre, but more than half 285 (51.4%) of them were community health workers. Many 377 (67.9%) of the respondents were at the senior-level staff with 393 (70.8%) having over ten years of practicing experience. The median number of years of practice was 15 years with inter-quartile range of 10 years. Most of the respondents 525 (94.4%) worked in public health facilities, with 464 (83.6%) predominantly in primary health care centre Table 2.

Table 2. Work characteristics of study participants.

	Frequency (n = 555)	Percentage
Cadre of health worker		
Doctor/Dentist	27	4.9
Nurse/Midwife	73	13.2
Pharmacist	52	9.4
Medical Laboratory Scientist	78	14.1
Community Health Officer	285	51.4
Physiotherapist/Optometrist	1	0.2
Hospital Admin/Finance/Support Services	15	2.7
Others	24	4.3
Year in profession		
<5	35	6.3
5 - 10	127	22.9
11 - 20	256	46.1
Over 20	137	24.7
Median (IQR) (years)	15.0 (10.0)	
Professional level		
Entry level/Intern	3	0.5
Junior Staff	144	25.9
Mid-Level (Resident)	15	2.7
Senior Level (Senior Staff Position)	377	67.9
Management (Head of Department or Unit or Higher)	16	2.9
Ownership of health facility		
Public	524	94.4
Private	29	5.2
Public/Private Partnership	2	0.4
Level of health facility		
Primary	464	83.6
Secondary	72	13
Tertiary	19	3.4

Others (Biochemist, Microbiologist, Health Information Officer, Health Attendant, Volunteer, Security, Cleaner).

3.2. Awareness and Knowledge of Covid-19

Five hundred and fifty-four (99.8%) of the respondents had heard of COVID-19. The four most common sources of information about COVID-19 were radio 539 (97.1%), television 445 (80.2%), health facility 380 (68.5%), and social media 375 (67.6%) respectively Table 3.

Three hundred and forty-two (61.7%) of the respondents were aware that COVID-19 is caused by a virus, 115 (20.8%) attributed COVID-19 to causes other than a virus, while 97 (17.5%) reported not knowing the cause of the disease. Five hundred and twenty-two (94.2%) of the respondents were aware that COVID-19 signs and symptoms manifest between 2nd and 14th day after contact, 519 (93.7%) reported that there is no specific drug or remedy to treat COVID-19, and 533 (96.2%) reported that there is no specific vaccine for COVID-19. Most 523 (94.4%) of the respondents correctly classified a suspected case of COVID-19 as a person who had contact with a person who is sick of Coronavirus disease. The most frequently reported signs and symptoms of COVID-19 were fever 541 (97.7%), cough 527 (95.1%), difficulty in breathing 525 (94.8%). Overall, 145 (74.9%) respondents had good knowledge, while 62 (11.2%) had excellent knowledge about Covid-19 Table 4.

Table 3. Awareness about COVID-19 among study participants.

	Frequency	Percentage
Heard of COVID-19 (n = 555)		
No	1	0.2
Yes	554	99.8
Source of information about COVID-19* (n = 554)		
Radio	539	97.3
Television	445	80.3
Health facility	380	68.6
Social media (Facebook, Twitter, WhatsApp)	375	67.7
Fliers	328	59.2
GSM/SMS	323	58.3
Church	300	54.2
Health Educator	296	53.4
Town announcer	268	48.4
Newspaper	264	47.7
Family member	257	46.4
Peer/friends	251	45.3
Internet sites	238	43.0
Journal	187	33.8
Market	173	31.2
Neighbourhood	149	26.9
Mosque	57	10.3
Others	6	1.1

* = Multiple response; Others (School, Training).

Table 4. Knowledge about COVID-19 among study participants.

	Frequency (n = 554)	Percentage
Causes of COVID-19		
Virus	342	61.7
Causes other than a virus	115	20.8
I don't know	97	17.5
Time of manifestation of signs and symptoms of COVID-19		
Less than 2 days	5	0.9
Between 2 and 14 days	522	94.2
More than 14 days	10	1.8
I don't know	17	3.1
There is specific drug or remedy to treat COVID-19		
No	519	93.7
Yes	10	1.8
I don't know	25	4.5
There is a specific vaccine to prevent COVID-19		
No	533	96.2
Yes	4	0.7
I don't know	17	3.1
Suspected case of COVID-19*		
A person who had contact with a person who is sick of Coronavirus disease	523	94.4
A person who travelled back from Coronavirus disease high-risk country or city but shows no symptom of the disease	487	87.9
A person with a fever plus one or more symptoms of respiratory diseases	434	78.3
A person with fever or without symptoms of a respiratory disease like cough and shortness of breath	230	41.5
Person coughing and sneezing with no history of travel from high-risk country nor contact with coronavirus disease patient	305	55.1
A person who had contact with a person that died with symptoms of Coronavirus disease	411	74.2
A person who had contact with a person suspected of having Coronavirus disease but yet to be laboratory confirmed	387	69.9
Signs and symptoms of COVID-19*		
Fever	541	97.7

Continued

Cough	527	95.1
Difficulty in breathing	525	94.8
Sore throat	403	72.7
Weakness	317	57.2
Headache	288	52.0
A general feeling of unwell	275	49.6
Body pains	150	27.1
Diarrhoea	118	21.3
Vomiting	72	13.0
Rash on the body	47	8.5
Knowledge Score		
Poor	77	13.9
Fair	415	74.9
Good	62	11.2

* = Multiple response.

3.3. Attitude towards Covid-19 Prevention and Control Activities

Most 541 (97.7%) health workers would call the COVID-19 helplines when they see a suspected case of COVID-19, 148 (26.7%) would refer the patient to another health facility, while 64 (11.6%) would admit the patient immediately and commence treatment. A total of 532 (96.0%) respondents would call the COVID-19 helpline if they develop signs and symptoms of the virus. Four hundred and eighty (86.6%) of health workers asserted that they would live or work with a person with COVID-19 who has been treated, tested negative, and discharged Table 5.

3.4. Perception about Covid-19 Prevention and Control Activities

Five hundred and thirty-five (96.4%) of the respondents opined that COVID-19 is a problem in the state, 390 (70.3%) felt that they can contract the virus, and 113 (20.3%) feel the government is not doing enough to contain the virus Table 6.

3.5. Practice of Covid-19 Prevention

Health workers were asked to demonstrate hand washing as a safe practice for COVID-19 prevention, 525 (94.6%) washed between the fingers, 478 (86.1%) washed the back of fingers, 470 (84.7%) washed the back of the hand, 463 (83.4%) washed the palm, 447 (80.5%) washed the base of the thumb and, 437 (78.7%) washed the fingernails. However, 365 (65.8%) of the respondents washed all critical parts of hands and were scored 100% Table 7.

Table 5. Health worker's attitude towards COVID-19.

	Frequency (n = 554)	Percentage
What I'll do when you see a COVID-19 patient*		
Call the COVID-19 helplines	541	97.7
Refer to another health facility	148	26.7
Admit patients immediately and commence treatment	64	11.6
Mind my business	5	0.9
Send the patient away from the health facility	4	0.7
Do not see patients	2	0.4
Others	14	2.5
What I'll do when I develop signs and symptoms of COVID-19*		
Call the coronavirus help number	532	96.0
Go to the hospital	283	51.1
Stay at home	165	29.8
Pray	38	6.9
Treat myself	6	1.1
Go to a traditional healer	3	0.5
Hide	3	0.5
Others	1	0.2
What I'll advice a family member, relative or neighbour who develops signs and symptoms of COVID-19*		
Call the coronavirus help number	531	95.8
Go to the hospital	292	52.7
Stay at home	169	30.5
Pray	34	6.1
Go to a traditional healer	3	0.5
Home treatment	3	0.5
Hide	1	0.2
Go to a religious centre	1	0.2
Do nothing	1	0.2
I would live or work with a person with COVD-19 who has been treated, tested negative and discharged		
No	75	13.4
Yes	480	86.6

*Multiple response.

Table 6. Health worker's perception towards COVID-19.

	Frequency (n = 554)	Percentage
COVID-19 is a problem in Rivers State		
No	10	1.8
Yes	535	96.4
I don't know	10	1.8
Reasons why COVID-19 is not a problem in Rivers State (n = 10)*		
There are only a few cases	5	50.0
It is just being exaggerated	4	40.0
Others	1	10.0
Reasons why COVID-19 is a problem in Rivers State (n = 535)*		
It is highly infectious	432	80.7
It has affected activities in the state	404	75.5
It has no cure	399	74.6
It is a deadly disease	395	73.8
It creates a lot of panic	362	67.7
It is an attack from the Western world	104	19.4
Others	19	3.6
Do you think you can contract COVID-19		
No	140	25.2
Yes	390	70.3
I don't know	25	4.5
Why you think you cannot contract COVID-19 (n = 140)*		
I observe all the preventive measures	121	86.4
I am very careful	82	58.6
It is not my portion (my faith protects me)	37	26.4
Coronavirus does not exist	3	2.1
Others	2	1.4
Think the government is doing enough to contain the COVID-19 outbreak		
No	113	20.3
Yes	423	76.3
I don't know	19	3.4

*Multiple response.

Table 7. Health workers practice regarding COVID 19 prevention.

	Frequency (n = 554)	Percentage
How you prevent yourself from getting COVID-19*		
Regular hand washing with soap and water	529	95.5
By keeping your distance from any person with suspected Coronavirus disease	521	94.0
Regular use of hand sanitizer	402	72.6
Wearing face or nose masks	378	68.2
Avoid touching your mouth, nose, and eyes with unwashed hands	377	68.1
Avoid crowded places or events	358	64.6
Wearing hand gloves	326	58.8
Staying at home	293	52.9
Avoid air-conditioned room, office, or car	39	7.0
Regular handing with water only	36	6.5
Regular gargling or drinking of water	28	5.1
Avoid cold food and drinks	25	4.5
Bathing with hot or warm water	18	3.2
Drinking concoctions (lime, ginger, garlic, etc)	15	2.7
Avoid eating bush meat	13	2.3
Drinking alcoholic gins or hot drinks	12	2.2
Talking chloroquine	10	1.8
Going for special prayers	7	1.3
Bathing with saltwater	5	0.9
Eating bitter kola	3	0.5
I don't know	7	1.3
Hand washing practice*		
Washing between the fingers	525	94.8
Washing the back of fingers	478	86.3
Washing the back of the hand	470	84.8
Washing the palm	463	83.6
Washing base of the thumb	447	80.7
Washing the fingernails	437	78.8
Overall hand washing practice		
Correct	365	65.9
Incorrect	189	34.1

* = Multiple response.

4. Discussion

This research provides insights into gaps in awareness, knowledge, attitude, perception, and practice of Covid-19 prevention among health care workers in Rivers State. Most healthcare workers had heard about Covid-19. However, their source of information at the time of the survey was mostly through radio and television. This finding on source of information, agrees with that of other researchers [2] [3] [7] [9]. This reflects the effectiveness and influence of broadcast media in disseminating information to the public. It is therefore important that the pandemic response collaborates with broadcast media agencies to ensure right and consistent messaging for COVID-19 prevention.

Most of the respondents were aware of COVID-19, however a third of respondents did not know that it is caused by a virus. This alludes to the fact that there is a gap in knowledge of the aetiology of the disease. This gap may be because of the paucity of non-technical sources of information about the disease. This gap in knowledge could have deleterious effect on the risk perception, attitude, and behaviour of these health workers. While almost all respondents claimed they would call the NCDC phone lines for suspected cases, one-tenth of respondents will treat the suspected case themselves. This finding is corroborated by the findings of other researchers who reported similar attitude of respondents [10] [12] [13] [14] [15]. This demonstrates a gap in attitude towards COVID-19 and can lead to unnecessary risk taking in managing suspected or confirmed cases of the disease. There were also about one-fifth of all respondents have the perception that government authorities are not doing enough to curb the pandemic. This perception exposes a distrust in government and has the potential to facilitate an unwillingness among health workers to go the extra mile in implementing prevention and control measures against COVID-19. Finally, whereas it is expected that all health workers are competent in all the handwashing steps, only two-thirds of respondents demonstrated the correct handwashing technique.

The findings of this survey viz-a-viz similar research underscore the need for cascade training at all levels of healthcare such that correct knowledge and information about aetiology and disease transmission dynamics is imparted to healthcare workers who will, in turn, be veritable sources of information to the public. Accurate knowledge empowers healthcare workers to respond safely and effectively as an antidote to fear-driven responses such as turning patients away from health facilities. As seen in this study, social media is not yet a pervasive source of information at the healthcare facilities in the local government areas of the state unlike more developed climes such as Europe and the US [15] [17]. However, the major means of communication from the National Centre for Disease Control (NCDC) is social media. This implies a gap between the provision of information and guidance and access to this information which has resulted in health workers and the masses in many rural communities not utilizing the information provided. Although there are ample information, education,

and communication materials on the NCDC website, these need to be printed as posters, handbills, infographics, other materials especially for community-based education for healthcare workers. The gaps identified in attitude, perception, and preventive practices will be best addressed through risk communication activities targeted at boosting knowledge, and confidence of healthcare workers in Covid-19 prevention. Health workers with good knowledge, attitudes, and practice of Covid-19 prevention are less likely to get infected with the SARS-Cov-2 virus.

This survey was carried out among many healthcare workers across all the Local Government Areas of the state with responses that cut across primary and secondary facilities. This is a strength of this study because the results are generalizable to similar populations. A limitation of this study however is the cross-sectional nature of data collection which was done six weeks into the state outbreak response. The dynamic nature of this pandemic and its response implies that a lot of changes in knowledge, attitude, perception, and practice could have occurred after the survey. A follow-up survey would be needed to access any changes that may have occurred. Finally, the findings from this study are relevant to all pandemic response teams in Nigeria and Sub-Saharan Africa for purposes of planning gap bridging interventions in knowledge, attitude, and practice of Covid-19. These findings can also be projected to the response to other highly pathogenic infectious diseases.

5. Conclusion

This survey highlights some gaps in knowledge, attitude, perception and practice of COVID-19 prevention among health workers at primary and secondary healthcare facilities in Rivers State. Interventions are needed to bridge the gaps identified because ensuring that healthcare workers have excellent knowledge, attitude, and practice of Covid-19 prevention and control is imperative for a successful response.

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Authors' Contributions

OM conceptualized the research, wrote the research protocol, the first draft of the data collection tool, and the final manuscript.

GO, IN, OM, DA, CT-W, CO, JNP, and CO reviewed and fine-tuned the research concept, the research protocol, data collection tools and all drafts of the manuscript.

OM, VA, EA, NE, DN, CO, IN, CO, and CN supported the training of the data collectors, supervision of field activities and reviewed the final draft and manuscript.

OM, CO, AO analyzed the data set, wrote up the results section and critically reviewed the final manuscript.

All authors approved the final draft of the manuscript.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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