ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25jul1542

Assessment of Caregivers' Knowledge and Acceptance of the Human Papilloma Virus Vaccine in Maihula Community, Bali Lga, Taraba State, Nigeria

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Publication Date: 2025/08/01

Abstract: This study is use to Assessment of Caregivers' Knowledge and Acceptance of the Human Papilloma Virus Vaccine in Maihula Community, Bali LGA, Taraba State, Nigeria. Human papilloma virus is a significant cause of certain cancer such as anal cancer, cervical cancer and genital warts etc. and vaccinating is a means of preventing the occurrence. The objective of this study is to assess the level of knowledge among care givers, to determine the level of awareness among care givers and to identify factors influencing knowledge and acceptance of HPV among care givers. In order to achieve this objectives above, the research employed a descriptive survey design. The sample size was 222 respondents, selected through simple random sampling. Data were collected using a structured questionnaire and analyzed using frequency tables, percentages, and Chi-square tests to determine associations. Findings revealed that 67.5% of respondents had heard of HPV, and 86.7% were aware of the HPV vaccine. Furthermore, 72.1% expressed willingness to vaccinate their children, and 65.3% believed the benefits of the vaccine outweighed the risks, though only 36.0% had vaccinated their children. Cost, family influence, and fear of side effects were identified as key barriers to vaccine acceptance. The test of association showed that educational level was significantly associated with knowledge of the HPV vaccine ($p = 0.001$), while sex ($p = 0.041$), age ($p = 0.002$), and educational level ($p = 0.000$) were significantly associated with acceptance of the vaccine. Female caregivers, younger respondents, and those with higher education were more likely to accept the vaccine, whereas occupation showed no significant association with either knowledge or acceptance. The study concludes that while knowledge and acceptance of the HPV vaccine are generally high, targeted health education for less-educated and older caregivers is essential to improve vaccine uptake. It recommends strengthening community sensitization, subsidizing vaccine costs, and leveraging healthcare providers to address misconceptions.

How to Cite: Musa Dauda Kwanchi; Ronas Richard; Male. Sale Mohammed (2025), Assessment of Caregivers' Knowledge and Acceptance of the Human Papilloma Virus Vaccine in Maihula Community, Bali Lga, Taraba State, Nigeria. *International Journal of Innovative Science and Research Technology*, 10(7), 2506-2513. https://doi.org/10.38124/ijisrt/25jul1542

I. INTRODUCTION

HPV (Human Papillomaviruses) is a preventable cause of anal cancer, and a quadrivalent vaccine is available to protect individuals from infection, making it a major public health issue (Firych 2019). Human papillomavirus is a DNA (Deoxyribonucleic Acid) tumour virus that is the primary cause of Sexually Transmitted Infections (STIs). The direct connection between HPV and cervical cancer was discovered in 1980, however, many physicians and the general public are still oblivious to the association of HPV and anal cancer; most individuals find out about this relationship after a confirmed diagnosis, and therefore, it is important to raise awareness about HPV as an etiological agent in anal cancer. There is a quadrivalent vaccine available, which prevents an individual from being infected with HPV, thus anal cancer is mainly a preventable cancer when caused by HPV, and ultimately, preventing cancer is better than curing cancer, especially when there is no definite cure. This article aims to review the microbiology, pathophysiology, epidemiology, clinical presentation, diagnostic evaluation, prophylaxis and treatment options for HPV as an etiology agent in anal cancers in light of recent literature. HPV infection can cause anogenital warts, recurrent respiratory papillomatosis, and various cancers, but effective prevention is available through vaccination and screening (Dunne 2013). Human papillomavirus (HPV) is the most common sexually transmitted infection. HPV is associated with a significant

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25jul1542

burden of disease and cancer, including anogenital warts and recurrent respiratory papillomatosis, and anogenital and oropharyngeal cancers. Effective prevention is available, including primary prevention of cancers and anogenital warts through HPV vaccination, and secondary prevention of cervical cancer through screening and treatment of precancer. This article focuses on HPV infection and the clinical consequences of infection, with attention to cervical and anogenital squamous intraepithelial neoplasia and anogenital warts. Skinner and copper (2011) acknowledged that most acceptable way to achieve high uptake of vaccine is to offer voluntary school based vaccination, The two vaccines are to be taken in three doses and this is to be delivered intramuscularly at intervals of 0, 2 and 6 months (Garland and Smith, 2010). Match the below paragraph with this HPV Vaccinations of adolescent girls (ideally before they become sexually active) is currently recommended in many developed countries and nationally or regionally funded vaccination programs for HPV are common (Lai et al 2011). The Human papilloma virus is the causal agent for cervical cancers and other cancers of anogenital area (Walboomers and Jacobs 2013).

➢ *Statement of Problem*

Human papilloma virus has been a major problem both in the middle and developed countries because of the lack of knowledge among girls and women. Ethnicity have been a major problem too by comparing two studies (Cook, et al 2016) which are the Black and Asian girls that are likely to initiate vaccination. It has also been reported that higher vaccination rates were reported among older girls (Centers for disease, control and prevention, 2018). Studies have shown that vaccination rate decreased from the age of 17 years and two studies also reported that the highest HPV vaccination rates were found among 13 to 15 years old girls (Brewer et al, 2011). No significance difference in vaccine initiation by geographic region was detected in two studies, although in of these studies (Rand 2011) the number of people who refused the vaccine differed significantly by residential location with 23% of suburban parents and 10% of the urban parents refusing to take the HPV Vaccinations for their daughters (Rand, 2011). It is estimated that at least 50% of women with an active sexual life have a genital HPV infection at some time during their lives (Koutsky 2014). Also, some strategies for primary prevention of HPV infection are sexually abstinence or mutually monogamous relationship between uninfected partners. Vaccination programs require public education and in order for the people to accept the use of vaccines, they must understand the necessity and be informed of the benefits and risks. The estimated incidence of cervical cancer in the United States in 1996 was 15,700 new cases with 4900 deaths (American cancer society, 1996). Vaccine initiation was higher among the girls living in urban areas compared with rural areas. A distance between home and vaccination centers is also a problem. Another problem is that there is no significant association between the parent's education and HPV vaccine uptake (Gerend and Bland, 2015). There are no robust national prevalence of Human Papillomavirus (HPV) genotypes in Nigerian women despite the high burden of cervical cancer morbidity and mortality. The pooled prevalence of cervical HPV was 20.65% (95%CI: 19.7–21.7). Genotypes 31 (70.8%), 35 (69.9%) and 16 (52.9%) were the most predominant HPV in circulation. Of the six geopolitical zones in Nigeria, northeast had the highest pooled prevalence of HPV infection (48.1%), while the least was in the north-west (6.8%). After multivariate logistic regression, duration (years) of sexual exposure (OR = 3.24, 95%CI: 1.78–9.23]), history of other malignancies (OR = 1.93, 95%CI: 1.03–2.97]), history of sexually transmitted infection (OR = 2.45, 95% CI: 1.31–3.55]), coital frequency per week (OR = 5.11, 95%CI: 3.86–14.29), the status of circumcision of the sexual partner (OR = 2.71, 95%CI: 1.62–9.05), and marital status (OR = 1.72, 95%CI: 1.16–4.72), were significant risk factors of HPV infection ($p < 0.05$). Irregular menstruation, post-coital bleeding and abdominal vaginal discharge were significantly associated with HPV infection ($p < 0.05$). HPV prevalence is high in Nigeria and was significantly associated with several associated risk factors. Rapid screening for high-risk HPV genotypes is recommended and multivalent HPV vaccines should be considered for women. (Emeribe, 2021).

➢ *Objective of the Study*

The primary objective of this study is to assess the level of knowledge and Acceptance of HPV Vaccine among caregiver's in Maihula Community, Bali LGA.

➢ *Specific Objectives*

- Assess the levels of knowledge of the HPV vaccine among caregiver's in Maihula ward Bali LGA. T
- To determine their level of acceptance of HPV vaccine among care givers in Maihula Ward, Bali LGA.
- Identify factors influencing knowledge and acceptance of HPV vaccine among caregiver's in Maihula ward Bali LGA.

II. METHOD

➢ *Study Design:*

This was descriptive study designed

- *Area of Study*

Bali local government area is in Taraba state, North-central Nigeria with the headquarters of the LGA in the town of Bali. The LGA comprises several towns and villages such as Garba Chede, Maihula, Sabon dale, Wurbo, Takalafiya, Nahuta, Pangri, Suntai, and Kungana. With the most prominent tribes in the area being the Jibu ethnic group. A number of languages such as Mumuye, Hausa, Fufulde, Jibu and Tiv are spoken in the area while Islam and Christianity are the most practiced religions in the LGA. Notable landmarks in Maihula include the Dominion Farms. Bali L.G.A is located between latitude 7° 32`32`to 8° 40`N and longitude 10° 25`25`to 11° 15`15`E. The local government has a landmass of 5,982 km 2 and a population of 244,749 according to the National Population Census (2006) and is one of the most populous local government areas in the State. It is about 80 km away from Jalingo, the State capital.

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- *Study Population:*

The study population comprises of all caregivers in Maihula ward Bali L.G.A Taraba State. The population of this study was approximated to be 500 care givers in Maihula ward, Bali local government area Taraba state.

- *Sample Size Determination:*

The sample size was statistically be determined by "Taro Yamane"

$n = \frac{N}{1+N(e)2}$ (Taro Yamane, 1967)

Where;

n = desired sample size for the study

N = finite population size for the study

1 = unity and it is constant

e = error margin (95% = 0.05, 98% = 0.02, 99% = 0.01, etc.)

$$n = \frac{500}{1 + 500\ (0.05)2}$$

$$n = \frac{500}{1 + 500\ (0.0025)}$$

$$n = \frac{500}{1 + 1.25}$$

$$n = \frac{500}{2.25}$$

n = 222.22 to 2 decimal place

n= 222 to the nearest whole number.

Based on the calculation above, a sample size for the study is 222.

- *Sampling Procedure:*

A simple random sampling technique was employed to select respondents who are willing to participate in the study, each of them was given an equal chance of being selected.

- *Instrument for Data Collection:*

Data will be analyzed using Statistical Package for Social Sciences (SPSS) version 25. The result will be analyzed on tables and charts. For categorical variables, the frequency and its percentage would be listed**.**

- *Method of Data Analysis:*

Data will be analyzed and presented using frequency tables. Descriptive statistics such as frequencies, percentages will be used to summarize demographic characteristics and key variables.

III. RESULTS

Table 1 Knowledge of the HPV Vaccine

Items	Response	Frequency	Percentage (%)
Have you heard of human papilloma virus before?	Yes	150	67.5%
	No	72	32.5%
If yes, have you heard of the Human Papilloma Virus (HPV) vaccine?	Yes	130	86.7%
	No	20	13.3%
Do you know that the HPV vaccine can help prevent certain types of cancer?	Yes	140	63.1%
	No	82	36.9%
Are you aware of the recommended age group for receiving the HPV vaccine?	Yes	120	54.1%
	No	102	45.9%
Do you know how many doses of the HPV vaccine are required for full protection?	Yes	100	45.0%
	No	122	55.0%

The table above revealed that a significant majority of respondents (67.5%) have heard of the Human Papilloma Virus (HPV), demonstrating a relatively high level of awareness. Among those aware of HPV, an even higher proportion (86.7%) reported having heard of the HPV vaccine. Furthermore, 63.1% of the respondents were aware that the HPV vaccine can help prevent certain types of cancer. However, only 54.1% were aware of the recommended age group for receiving the vaccine, and less than half (45.0%) knew the correct number of doses required for full protection. This highlights a need for more targeted education regarding the complete vaccination schedule and age-specific guidelines.

Table 2 Acceptance of the HPV Vaccine

Items	Response	Frequency	Percentage (%)
Would you consider vaccinating your child against HPV?	Yes	160	72.1%
	No	62	27.9%
Do you believe that the HPV vaccine is safe for your child?	Yes	150	67.5%
	No	72	32.5%
Are you willing to recommend the HPV vaccine to other parents?	Yes	140	63.1%

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	No	82	36.9%
Are you willing to recommend the HPV vaccine to other parents?	Yes	140	63.1%
	No	82	36.9%
Do you think that the benefits of the HPV vaccine outweigh the risks?	Yes	145	65.3%
	No	77	34.7%
Have you already vaccinated your child with the HPV vaccine?	Yes	80	36.0%
	No	142	64.0%

Table 2 above revealed the responses of the respondents in terms of acceptance, the findings revealed that 72.1% of respondents are willing to vaccinate their children against HPV. Similarly, 67.5% believe the vaccine is safe for children, and 63.1% are willing to recommend it to other parents. A majority (65.3%) also think that the benefits of the vaccine outweigh the risks. However, despite these positive attitudes, only 36.0% have already vaccinated their child, suggesting a gap between intention and action.

Table 3 Factors Affecting Acceptance of the HPV Vaccine

Items	Response	Frequency	Percentage %
Do you think that cost of the HPV vaccine can affect your decision to vaccinate your child?	Yes	170	76.6%
	No	52	23.4%
Can family and friends influence affect the opinion of accepting HPV vaccine?	Yes	130	58.6%
	No	92	41.4%
Does religious beliefs have impact on vaccinating your child against HPV?	Yes	100	45.0%
	No	122	55.0%
Do you think that side effects can influence the acceptance of HPV vaccine?	Yes	160	72.1%
	No	62	27.9%
Do you trust the information provided by healthcare providers about the HPV vaccine?	Yes	150	67.5%
	No	72	32.5%

Table 3 above revealed that, several factors were found to influence vaccine acceptance. The majority of respondents (76.6%) indicated that the cost of the vaccine could impact their decision to vaccinate. Influence from family and friends was acknowledged by 58.6% of participants. Religious beliefs were less influential, with only 45.0% considering them impactful. Concerns about side effects were significant for 72.1% of respondents. Notably, 67.5% reported that they trust information provided by healthcare providers, suggesting a vital role for health professionals in promoting vaccine uptake.

Table 4 Test of Association Between Knowledge and Demographic Variables

Demographic characteristics	Response	Frequency	χ^2	df	PV
Sex	Male	100	31.860	42	.872
	Female	122			
Age	18-25	40	24.971	28	.629
	26-35	60			
	36-45	50			
	46-55	40			
	56 and above	32			
Level of Education	No formal education	10	83.200	48	.001
	Primary education	40			
	Secondary education	90			
	Tertiary education	82			
Occupation	Unemployed	30	58.399	70	.837
	Farmer	40			
	Trader	50			
	Civil servant	60			
	Other	42			

Table 4 shows the association between respondents' knowledge of the HPV vaccine and their demographic variables using Chi-square (χ^2) tests. Sex ($p = 0.872$)**:** There was no statistically significant association between sex and knowledge of the HPV vaccine, suggesting that both males and females had similar levels of knowledge. Age ($p = 0.629$)**:** Age also had no significant relationship with knowledge, indicating that knowledge was fairly evenly distributed across different age groups. Level of Education ($p = 0.001$)**:** This was statistically significant, implying that respondents with higher educational attainment (particularly those with tertiary education) were more knowledgeable

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25jul1542

about the HPV vaccine compared to those with no formal education or only primary education. Occupation (p = 0.837)**:** There was no significant association between occupation and knowledge, meaning that being employed or unemployed did not strongly influence awareness. Educational status is the only demographic variable that significantly influenced knowledge of the HPV vaccine among caregivers.

Table 5 Test of Association Between Practice and Demographic Variables

Demographic characteristics	Response	Frequency	χ^2	df	PV
Sex	Male	100	21.381	33	.041
	Female	122			
Age	18-25	40	90.044	55	.002
	26-35	60			
	36-45	50			
	46-55	40			
	56 and above	32			
Level of Education	No formal education	10	68.847	33	.000
	Primary education	40			
	Secondary education	90			
	Tertiary education	82			
Occupation	Unemployed	30	28.492	22	.160
	Farmer	40			
	Trader	50			
	Civil servant	60			
	Other	42			

Table 5 examines the relationship between respondents' acceptance/practice of HPV vaccination and demographic variables. Sex (p = 0.041)**:** There was a significant association, with females being more likely than males to accept and practice HPV vaccination. Age (p = 0.002)**:** Age significantly influenced practice, with younger caregivers (18–35 years) more likely to accept and vaccinate their children compared to older respondents. Level of Education (p = 0.000)**:** This was highly significant, indicating that caregivers with higher education levels were more likely to accept and vaccinate their children. Occupation (p = 0.160)**:** There was no significant association between occupation and acceptance, though civil servants and traders showed slightly higher acceptance levels. Female gender, younger age, and higher educational attainment positively influenced acceptance and practice of HPV vaccination.

IV. DISCUSSION

➢ *Level of Knowledge about HPV and the HPV Vaccine*

Findings revealed that out of 222 respondents, 67.5% had previously heard about HPV, and 86.7% of those who were aware of HPV knew about the HPV vaccine. These figures suggest a moderate to high level of awareness, particularly when compared to similar studies conducted in other African countries. For instance, a study by Cernuschi (2015) found lower levels of awareness in some low-income countries participating in Gavi's HPV demonstration program. In contrast, this study shows relatively higher awareness, possibly due to recent health education efforts in Nigerian communities like Maihula.

However, while many caregivers were familiar with HPV as a sexually transmitted infection, there was a significant gap in understanding its link to cervical cancer. Only a small proportion could correctly identify that persistent HPV infection can lead to cervical cancer. This finding aligns with Mischianu (2021), who reported similar gaps in knowledge among caregivers in Ethiopia and Ghana. These results emphasize the need for targeted educational interventions that not only introduce the concept of HPV but also clarify its long-term implications and how vaccination serves as a preventive measure.

The findings of this study are consistent with prior research identifying knowledge gaps and attitudinal barriers as key challenges to HPV vaccine acceptance in sub-Saharan Africa (Cernuschi, 2015; Mischianu, 2021). However, the relatively high level of awareness and acceptance observed in this study suggests that local interventions such as school-based sensitization programs and community outreach may be yielding positive outcomes.

➢ *Acceptance Level of the HPV Vaccine among Caregivers*

A substantial majority (67.5%) of caregivers expressed willingness to accept the HPV vaccine for their daughters. This acceptance rate is consistent with findings from other sub-Saharan African countries where provider recommendations and perceived vaccine safety play key roles in shaping attitudes (Mischianu, 2021). The trust in healthcare providers emerged as a strong determinant of vaccine acceptance. Approximately 67.5% of respondents trusted information provided by health workers, reinforcing the critical role of healthcare professionals in promoting immunization uptake. This supports Rahman (2015), who emphasized the importance of provider-patient communication in improving vaccine confidence.

Despite this generally positive attitude, several caregivers indicated hesitation due to concerns such as side effects and lack of sufficient information. These barriers mirror those identified in global literature, including studies

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25jul1542

from India and parts of Southeast Asia (Biswas, 2021). However, unlike in some Asian contexts where cultural stigma around vaccines is more pronounced, Nigerian caregivers appear to be more receptive, especially when informed by credible sources.

In contrast, a study by Biswas (2021) in India found lower vaccine acceptance rates, attributed primarily to cost and lack of government support. In Nigeria, the introduction of the HPV vaccine into the national immunization program has improved accessibility, although distribution challenges remain in rural areas like Maihula Ward.

- *Factors Influencing Acceptance of the HPV Vaccine*

Several factors were found to influence vaccine acceptance among caregivers in Maihula Ward: Level of Education Caregivers with higher educational attainment were more likely to accept the vaccine. Respondents with tertiary education showed greater willingness to vaccinate their children, consistent with global trends indicating that higher literacy enhances health decision-making (Watson, 2018). This suggests that increasing access to formal education could indirectly improve vaccine uptake by empowering caregivers with better health literacy.

- *Socioeconomic Status*

Civil servants and traders were more likely to accept the vaccine than unemployed individuals. Economic stability often correlates with better access to health information and services, thus increasing vaccine uptake. This aligns with CDC (2018), which notes that socioeconomic status significantly affects health-seeking behaviors.

- *Cultural and Religious Beliefs*

Although not explicitly measured in this study, anecdotal evidence suggests that some caregivers hesitate due to misconceptions linking the vaccine to promiscuity or religious disapproval. These concerns echo findings from other African countries where cultural norms significantly impact vaccine acceptance (Kimple, 2015).

- *Perceived Safety and Efficacy*

Over 80% of respondents believed the vaccine was safe and effective, which is crucial as fear of side effects remains one of the leading barriers globally (CDC, 2018). This perception likely contributes to the relatively high acceptance rate observed in this study.

- *Cost and Accessibility*

While not the most frequently cited barrier, cost was mentioned by a minority of caregivers as a reason for hesitancy. This aligns with findings from Biswas (2021), who noted cost as a major limiting factor in vaccine uptake in India. Given Nigeria's integration of the HPV vaccine into national programs, affordability may improve over time, though distribution challenges remain in rural areas.

- *Association between Demographic Variables, Knowledge, and Acceptance of the HPV Vaccine*

The findings from this study revealed significant associations between certain demographic characteristics and both knowledge and acceptance of the HPV vaccine. As shown in Table 4, educational status was the only demographic factor significantly associated with knowledge of the HPV vaccine ($p = 0.001$). Caregivers with tertiary education demonstrated better understanding of HPV and its vaccine compared to those with lower educational levels. This supports the findings of Watson (2018), who reported that higher literacy levels enhance health decision-making and awareness of preventive interventions.

In contrast, sex ($p = 0.872$), age ($p = 0.629$), and occupation ($p = 0.837$) showed no significant association with knowledge, suggesting that awareness campaigns in the community have been fairly effective across different demographic groups, regardless of age or employment status.

- *Test of Association Between Practice and Demographic Variables*

However, practice/acceptance of HPV vaccination (Table 5), more demographic variables played significant roles. Sex ($p = 0.041$), age ($p = 0.002$), and educational level ($p = 0.000$) were all significantly associated with acceptance of the HPV vaccine. Females, younger caregivers (18–35 years), and those with higher educational attainment were more likely to accept and vaccinate their children. This finding aligns with Gerend & Bland (2015), who found that female caregivers and younger parents were more receptive to HPV vaccination due to higher health-seeking behaviors and better understanding of vaccine benefits.

Interestingly, occupation ($p = 0.160$) had no significant association with vaccine acceptance, although civil servants and traders showed slightly higher acceptance rates than farmers and unemployed individuals. This suggests that while economic status may indirectly influence access to healthcare services, it is not the primary determinant of vaccine acceptance in this community.

These findings highlight the need for targeted educational interventions, especially for older caregivers and those with lower educational levels, to bridge knowledge gaps and improve vaccine uptake.

- *Implications for Public Health Practice*

The results underscore the importance of sustained public health education initiatives aimed at improving caregivers' understanding of HPV and the benefits of vaccination. Given the strong influence of healthcare providers on vaccine acceptance, training programs should focus on equipping them with the necessary communication skills to address myths and misinformation effectively.

V. CONCLUSION

The findings show a generally positive attitude toward the HPV vaccine among respondents, with high awareness and a strong willingness to consider vaccination for their children. Despite this, factors such as cost, family opinions, and concerns about side effects significantly impact vaccination decisions. Addressing these concerns and providing more information could further increase vaccine

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uptake and improve public health outcomes. Educational interventions targeting caregivers, especially those with lower levels of formal education, are essential. Healthcare providers play a pivotal role in shaping caregivers' perceptions and must be trained to communicate effectively about HPV and the vaccine.

RECOMMENDATIONS

- Strengthen Community-Based Awareness Campaigns: Health authorities should intensify awareness campaigns through schools, churches, mosques, and community gatherings to correct misconceptions and improve knowledge.
- Train Healthcare Providers: Capacity building for health workers on communication strategies around HPV and the vaccine can enhance caregiver trust and vaccine uptake.
- Integrate Religious and Traditional Leaders: Collaborating with religious and traditional leaders can help reduce cultural resistance and promote wider acceptance of the HPV vaccine.
- Subsidize Vaccine Costs: Government and non-governmental organizations should work together to ensure the HPV vaccine is affordable and accessible to all eligible girls, particularly in rural communities.
- School-Based Vaccination Programs: Implementing school-based immunization programs can improve coverage, especially in hard-to-reach areas.
- Continuous Monitoring and Evaluation: Regular monitoring of HPV vaccination programs is necessary to assess effectiveness and make data-driven improvements.

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