CLASSROOM DEBATE ON INACTIVATED POLIOMYELITIS VACCINE AND ORAL POLIOMYELITIS VACCINE BY UNDERGRADUATE MEDICAL STUDENTS IN MALAYSIA

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ABSTRACT

A classroom Debate on "INACTIVATED POLIOMYELITIS VACCINE (IPV) AND ORAL POLIOMYELITIS VACCINE (OPV)" had been conducted as a Teaching learning activity. The activity had been organized by the 13 students of the rotation 3, Year3 students during the Paediatrics posting of 8 weeks' duration in addition to other teaching learning activities. The aim of this activity is to foster learning with a unique learning strategy; to enable students to develop constructive arguments to support opposing views of the given topic. The students have been briefed on day 1 of the posting and the topic given by the Course Coordinator. The rules and regulations had been presented at start of the Debate session held in 4 th week of posting, by the Chairpersons. The speakers were allocated a total of 30 minutes per group strictly managed by the two timers. The 3 speakers each from the proposition and the opposition groups spoke, in alternate turns, to put across the message for or against the motion. A panel of 3 adjudicators scored the performances according to marking scheme template. The other students did the photography and video documentation. The Best speaker and the Best group were awarded prizes. all prizes being sponsored by principal author. Conclusion is according to the winning team message that OPV is better, as it is a totally proven fact that it really helps in eradicating poliomyelitis worldwide and IPV cannot stand alone without the OPV.

Keywords: Classroom debate; Inactivated poliomyelitis vaccine and Oral Poliomyelitis vaccine.

INTRODUCTION

The dramatic decline of polio, tetanus, pertussis, measles and Hemophilus influenzae type b due to childhood immunization has greatly reduced disability and death. The Malaysian National Immunization Schedule 2021 has TWO important features to be highlighted. The use of Inactivated Poliomyelitis vaccine (IPV) and the use of the Pneumococcal vaccine. The IPV was introduced in pentavalent combination vaccine for diphtheria, tetanus, pertussis, polio, and *Haemophilus influenzae* type b (DTaP-IPV/Hib) since 2008 in eight states, expanding it nationwide in 2010. The combination vaccine was given in three prime doses at age two months, three months, and five months, with one booster dose at 18 months. The Pneumococcal vaccine (PCV10) was introduced since December 2020 (but it had been used in private health facilities in Malaysia since 2009.) Subsequently, the Ministry of Health (MOH) had replaced the pentavalent combination vaccine with the hexavalent combination vaccine in the National immunization Schedule for children effective November 2020.

The monovalent Hepatitis B vaccine — which has been provided in MOH facilities since 1989 — used to be given separately to infants in three doses at birth, age one month, and age six

months. Now, MOH has been using the hexavalent combination vaccine in the National immunization Program me that includes Hepatitis B — protecting against diphtheria, tetanus, pertussis, polio, Hepatitis B, and *Haemophilus influenzae* type b (DTaP-IPV-HepB-Hib) — where four doses are being given to children at age two months, three months, five months, and 18 months. (The shot at age 18 months is a booster dose). The Hepatitis B vaccine is still to be given to children at birth, but doses at age one and six months will no longer be given since the Hepatitis B component vaccine had been included in the hexavalent combination vaccine.

According to the Health Director-General Dr Noor Hisham Abdullah, this change had been implemented in stages as early as November 2020, depending on vaccine supplies in MOH health facilities," He had explained that the new National Immunization Schedule with the hexavalent combination vaccine to prevent six diseases — diphtheria, tetanus, pertussis (whooping cough), polio, Hepatitis B, and *Haemophilus influenzae* type b — has reduced the number of shots required from seven to five. The reduction in the number of injections will enable parents to ensure that their children receive vaccination according to the set immunization schedule."

A Classroom Debate titled "Inactivated Poliomyelitis vaccine versus Oral Poliomyelitis vaccine "had been conducted as a Teaching Learning activity during Paediatrics posting of Rotation 3 Year 3 students. "The aim of this activity is to foster learning with a unique learning strategy; to enable students to develop constructive arguments to support opposing views of the given topic; to encourage critical thinking; to raise students' awareness that most issues are not straightforward and that students should learn to form opinions about their position that they can explain or defend with factual evidence. (Soe-Soe-Aye & Noor MAM, 2018).

LITERATURE REVIEW

All the students and the Faculty did the literature review relating to topic. Please refer to the List of the References

OBJECTIVE

The objective of this paper is to showcase the presentations made on this topic by the 3 speakers each for Proposition and Opposition group and highlight the Introduction, Discussion and Conclusions made upon the Debate session by the Faculty.

METHODOLOGY

All the 13 students (09/2018) posted to the Paediatrics posting in rotation 3 for 8 weeks, participated in the conduct of the classroom Debate session introduced as one of the Teaching Learning activities. The students elected their own Chairperson and Timer for the session and 3 speakers each for PROPOSITION and OPPOSITION Team of the topic given by Course coordinator on day 1 of the posting. Each one of them did a Literature review as evidenced by the list of References given. The rules and regulations for conduct of the Debate session and the marking scheme for grading of their performances are given in the students' guidebook.

FINDINGS (PRESENTATIONS)

The speakers spoke in turns, one from each group alternating with speaker from other group. However, the 3 presentations from each group are given as below.

A. PROPOSITION TEAM

1ST SPEAKER: MS THISHALINNI A/P SIVABALAN

Today, my group and I will be supporting the motion wherein IPV vaccine is better than OPV. So, before we start with the main points of today's debate, allow me to give everyone a brief introduction about immunization, poliomyelitis and the vaccines used to prevent these notorious diseases. Immunization is one of the most effective and economic public health measures to improve the health of both children and adults. The most notable success has been the worldwide eradication of smallpox achieved in 1979, and the prevalence of many other diseases, including polio, has been dramatically reduced.

Immunity can be induced either passively through administration of antibody-containing preparations or actively by administering a vaccine or toxoid to stimulate the immune system to produce a prolonged humoral and/or cellular immune response. As of 2020, MOH will use the hexavalent combination vaccine as opposed to the previously administered pentavalent combination in the National Immunisation Programme that protects against diphtheria, tetanus, pertussis, polio, Hepatitis B, and Haemophilus influenzae type b (DTaP-IPV-Hep B-Hib).

So, what is poliomyelitis and why do we have to prevent the spread of this virus? Poliomyelitis is a disabling and life-threatening disease caused by the poliovirus leading to serious complications such as meningitis, paralysis and paraesthesia. Paralysis being the most severe symptom associated with polio because it can lead to permanent disability and death. Between 2 and 10 out of 100 people who have paralysis due to poliovirus infection dies, because the virus affects the muscles that are essential for breathing. There are three types of the polio virus – Type 1, 2 and 3. As of now, Polio remains endemic in 3 countries—Afghanistan, Nigeria, and Pakistan—with additional surrounding countries at risk for importation of polio and also number of countries continue to experience periodic outbreaks of importation polio.

Poliovirus vaccination included in the vaccination schedule in Malaysia is a 4-dose, all-inactivated poliovirus (IPV) regimen that include first dose in 2 months of life, second dose during 3 months of life and the third dose at 5 months of life. Finally, a fourth booster dose is given at 18 months of the child. Two types of vaccines are used to protect against the polio disease which include oral polio vaccine and inactivated polio vaccine. As its name suggests, oral polio vaccine is given orally through drops and consists of different types including a combination of two, or all three different types of attenuated, or weakened vaccine. On the other hand, IPV (inactivated poliovirus vaccine) is given parenterally and does not contain any live virus.

Since 2015, OPV vaccine has made the switch from a trivalent vaccine to a bivalent vaccine removing the type 2 component due to the risk of vaccine associated polio. This basically means that the new bivalent vaccine can only protect against type 1 and 3 polio virus and has been unable to provide any sort of protection towards type 2 polio virus. So, you may ask me, how am I going to protect myself against the type 2 virus then? Isn't there a risk of getting infected?

Well, this is when the benefits of IPV surpasses OPV as not only does it boost immunity against types 1 and 3, it also provides immunity against the type 2 virus without any side effects. This therefore prevents the emergence or reintroduction of wild or vaccine-derived poliovirus which may potentially result in a substantial polio outbreak or even re-establishment of global transmission. We for sure do not want all the hard work to eradicate this virus all these years

to go to waste right? So, with that I rest my case and strongly support that IPV is way more efficient compared to OPV.

2ND SPEAKER: MS SHARRU VIJAYA KUMAR

Ladies and gentlemen, let me start by asking you a question? For that, I would need to tell you a little about the history of OPV and IPV. IPV came into use in 1955 and OPV in 1961. In the United States, OPV was recommended for use from 1963 until 2000. Since 2000, only IPV has been used in the United States. Not only that, let us look in our country, oral polio vaccine (OPV) was given from 1972 in Malaysia and was changed to an injectable vaccine (IPV) in 2008. OPV was discontinued in 2016. So, my question here is, isn't this change alone enough to prove that many healthcare professionals believe that IPV IS better than OPV?

Therefore, today, we the proposition group, strongly and deeply believe in the motion which is IPV is better than OPV. Please do bear in mind that we are not stating that using OPV is not good. We are stating that when we compare both IPV and OPV, IPV has so much more to offer compared to OPV. But before I come to my own arguments, let us first have a look at what the opposition speaker has said. He claimed that all type 2 polio cases have been eradicated. But that is so untrue. According to the CDC, there is thirty-one ongoing and new cVDPV type 2 (cVDPV2) outbreaks documented during July 2019–February 2020. Therefore, whatever she claimed and said is sadly untrue.

Moving on to my own argument, I am the second speaker, so my point is to compare IPV and OPV in terms of its adverse effects. According to the Journal of Infectious Diseases published on November 2014, it is believed that OPV can cause vaccine-associated paralytic poliomyelitis (VAPP). Trends in VAPP epidemiology varied by country income level. In the low-income country, the majority cases occurred in individuals who had received >3 doses of OPV (63%), whereas in middle and high-income countries, most cases occurred in recipients after their first OPV dose or unvaccinated contacts (81%).

Let me explain to you what is VAPP and how does it occur? This is due to spontaneous neurovirulence of one of the viruses in the OPV. Neurovirulence basically means the tendency or capacity of a microorganism to cause disease in the nervous system. It typically develops within weeks of receiving OPV. The oral poliovirus vaccine (OPV) containing live-attenuated poliovirus strains has served as the primary tool to eradicate polio worldwide. Following OPV administration to susceptible individuals, the polio vaccine strains establish an infection and replicate in the pharynx and the intestine for 4–6 weeks, allowing the recipient to develop humoral and mucosal immunity. During replication, the Sabin strains mutate toward more genetically stable variants, sometimes reverting to neurovirulent variants that may enter the central nervous system and cause paralysis clinically indistinguishable from poliomyelitis caused by wild poliovirus (WPV); this is called vaccine-associated paralytic poliomyelitis (VAPP).

Because immunity to enteroviruses is antibody-mediated, patients with B cell immunodeficiencies have increased risk for VAPP compared with immunocompetent individuals. This effect is sporadic and rare. So, some of you might be thinking, why care if the adverse effects are less and rare? But our point today is, why even take the risk of having an adverse effect when there is a better option that has less adverse effects which is the usage IPV?

Next, according to the CDC on May 2018, OPV can cause vaccine-derived poliovirus (VDPV). So, VDPV is basically vaccine-derived poliovirus. A vaccine-derived poliovirus (VDPV) is a strain of the weakened poliovirus that was initially included in oral polio vaccine (OPV) and that has changed over time and behaves more like the wild or naturally occurring virus. The development of this according to WHO, OPV contains a weakened vaccine-virus that activates an immune response in the body. When a child is immunised with OPV, the weakened vaccine-virus replicates in the intestine for a limited period, thereby developing immunity by building up antibodies. During this time, the vaccine-virus is also excreted. In areas of inadequate sanitation, this excreted vaccine-virus can spread in the immediate community before eventually dying out. However, if a population is seriously under-immunised, an excreted vaccine-virus can continue to circulate for an extended period of time. The longer it survives, the more genetic changes it undergoes. In very rare instances, the vaccine-virus can genetically change into a form that can paralyse – this is what is known as a circulating vaccine-derived poliovirus (cVDPV).

Let me give you an example of a case that happened in our country Malaysia few years ago precisely in 2019. According to Malaysian Paediatric association, there was a three-month-old infant from Tuaran, Sabah contracted polio. He was under-immunised with polio vaccine and was thus not protected. According to the Malaysian National Immunisation Schedule, infants are to receive the inactivated polio vaccine (IPV) at ages two months, three months and five months of life. A booster shot also needs to be administered when the child is 18 months old in order to be fully protected. However, the infected infant had only received the first dose of polio immunisation, making him under immunised. A statement by the Health Ministry revealed that the baby was admitted to the intensive care unit of a hospital there before being diagnosed with vaccine-derived poliovirus type 1 (VDPV1). It was suspected that the boy acquired the VDPV1 from the environment via contaminated water or food or because of poor sanitation. The virus was most probably imported from the Philippines since the genetic lineage of the VDPV1 was similar with the one found during the outbreak in Philippines. For those of you who do not know that in the Philippines, oral polio vaccine is routinely given to children at 1 ½, 2 ½, and 3 ½ months, and inactivated polio vaccine at 3 ½ months. I think this example is already clear and enough to prove that OPV does more harm than IPV.

Members of the hall, before I end my presentation, let me briefly restate my main points. I have compared OPV and IPV in terms of their adverse effect. Remember, IPV does not cause vaccine vaccine-associated paralytic poliomyelitis. IPV does not cause vaccine derived poliomyelitis. I think the facts are crystal clear here. IPV is better than OPV. If the opposition still denies this, we the proposition team would like to impose a question for the opposition to answer and to explain to everyone. You claim that OPV is better than IPV, but can you tell us that OPV does not cause any adverse effects with proper prove? And if you believe these adverse effects are rare and it does not matter, would you tell this to the 3-month year old baby who suffered in the ICU for months? Remember, ladies and gentlemen, “Knowing is not enough; we must also understand’. With this I rest my case. Thank you.

3RD SPEAKER: MR MUHAMMAD RIDZUAN BIN NOOR MANJA

Thank you to the chairperson for giving me the chance to talk my way into today’s interesting debate. Well, I doubt that I have many things to say, as the previous proposition team speakers have given most of the solid points to support the today’s topic. As of the matter, I do not actually see the opposition replied to their point with something worth our time to respond to. Just for formality, I will be saying informational things regarding their so called ‘sound’ argument. For the opposition leader, I think that you do not pay heed to what the proposition

team speakers had point out and continue with rambling of some things. I will be magnanimous to once again humour you with today's motion that "IPV is a better option than OPV" and not what you claimed as to be opposite.

As for the 2nd opposition speaker, I am about to enlighten you that United States of America has been using only IPV for decades now, and there is not any outbreak there unlike certain country that used OPV such as Brunei, Africa and India which have recent outbreaks. I am for sure that we as Malaysians, do not want our country to be labelled as outbreak country of polio. It is better that we follow United States of America's step and take a step closer as a polio free country along with increasing our reputation as second grade among those rich countries.

Next, in the case of safety and side effect, we do agree that every vaccine has its own side effect but IPV side effect that include headache and vomiting would seem pale in comparison towards OPV complication. Before I forget, about the crude remarks where 700 over couple of millions who suffered from Vaccine-associated paralytic polio and Circularity Vaccine Derived Polio Virus, let me give you a piece of information that can be found anywhere which is immunosuppression. As we all know, immunosuppression is a serious thing, as small blunder would cost their life and in this case the blunder would be OPV as IPV doesn't omit this kind of risk. Why is that? Well, the answer would be the live virus in OPV could overpower the immune system once it gets its chance. Bear this in your mind that, all lives matter and as a matter of fact, the Government motto is always "ALL LIVES MATTER" instead of the opposition mindset where that is a little number to compare as if they are playing monopoly board game or something.

Well, it seems that I have taken a longer time than what was needed to explain and so, I would not want to waste our time anymore to talk on in infinite loop. Last but not least, I request the audience and the judges to open their eyes on seeing the truth and support us. Together we eradicate polio by using IPV rather than OPV. With that I rest my case and pass the floor to the last speaker of the opposition team.

B. <u>OPPOSITION TEAM</u>

1ST SPEAKER: MR UMMARUL NAZHAN ADIEL BIN MOHD NOH

With the existence of the current anti-vaccine movement, I do believe that we could have a potential polio outbreak soon. Today the Debate's motion is IPV is better than OPV. So, before I proceed with my points, I would like to respond on the definitions given by the proposition speaker. We do believe that OPV should be given together with IPV and not being neglected.

On the opposition side, we strongly believe that the current situation of polio which we thought that it was globally eradicated is still there in some areas of endemic of polio especially in Middle East. This is the reason why we do not agree for the OPV to be removed and advise all the countries not to go with IPV alone. Our main concern is, we do not want OPV to be removed from the National Immunization Program but instead we want it to be given together with the IPV as we want the desired effect from both types of polio vaccination.

Before I go further, I will be talking about why OPV is still necessary, then my second speaker will be talking about the safety and last speaker will be talking about the efficacy of the OPV vaccine. First and foremost, I will be starting with my points. According to the Global Eradication Initiative published by WHO in September 2014, it is clearly stated that IPV is recommended in addition to the oral vaccine and IPV does not replace the oral vaccine. Until polio is eradicated globally, OPV is still the main preventative measure against polio. This is

the reason why we cannot totally disregard the usage of the OPV vaccine. So, ladies and gentlemen, on the opposition side, we do strongly believe that OPV is still better and has a future still in the current vaccination program.

Apart from that, I would like to rebut the points provided by the first proposition speaker, which she mentioned that the switching of trivalent OPV to bivalent OPV will not cover against type 2 polio virus. Dear speaker, this is why we do have to understand the situation before we could understand the whole scenario of the polio virus and OPV. Dear speaker number one, you look so beautiful today, but you have missed out the important point. Why did they switch the trivalent OPV to bivalent OPV? This is because, type 2 polio was globally eradicated in 1999. It is the same year that I was born which was 22 years ago. So, why do we need to give something that is globally eradicated to kids? Moreover, by switching from trivalent to bivalent we could reduce the risk of paralytic type 2 occurence. It is proven by the journals published by WHO.

Ladies and gentlemen, on our stance, we do not want to neglect the existence of new IPV, no we do not! We want OPV to be acknowledged by the government side and how using OPV really helped in the early polio outbreak and in eradicating polio. Global cases of polio currently at 46 worldwide. In Malaysia, we reported 2 cases and the two cases were imported cases due to defaulted immunization in their country of origin. On behalf of the opposition, we are not saying that we are do not agree with the government, but we do partially agree, and we will totally agree when the OPV is being added together with IPV. By these measures, we strongly believe that we can provide high level of strength in terms of immunity towards polio virus. With this, I rest my case and pass the floor to the proposition second speaker.

2ND SPEAKER: MR SYAHMY ALIM BIN MUSTAZA

So, I will start by giving out my points as well as addressing some of the claims made by the proposition group. First, they claimed that the risk of Vaccine-derived Polio Virus (VDPV) makes Oral Polio Vaccine (OPV) less appealing as an option. However, they should also know that OPV has always been the main driver for the Polio Eradication Initiative (PEI) introduced by the World Health Organisation (WHO). OPV usage and coverage was enlarged extensively in the African region, which resulted in the eradication of wild polio in Ethiopia by 2001, which took only 5 years since the initiative's inception in 1996.

There are few safety concerns in regards to the VDPV as mentioned by the proposition speaker, however I would like to ask you if there is any vaccine or medication that is completely free from any side effects. Even IPV that is heralded by the proposition team has the risk of allowing circulation of polio virus to continue within the community due to its inability to prevent the virus from transmitting from person to person. The proposition speaker asked if we are okay with letting a very small percentage of children suffer from VDPV, and to that I would like to say of course not. However, that is as minimal a side effect that we can produce for a benefit that far outweighs the bad it produces.

VDPV is extremely rare and it only happens in places with low vaccine coverage. As of 2000, more than 10 billion OPV has been administered but only 760 VDPV cases have been reported. Furthermore, currently the trivalent OPV that contains type 2 component of polio virus is the main cause of VDPV. We are now in the process of replacing all trivalent OPV usage with bivalent OPV since 2016 which will remove concern of VDPV .. Plus, we are also studying the novel OPV2 which is specifically made to combat type 2 polio virus threat that is no longer

addressed by the bivalent OPV. In doing so, we hope that polio vaccination can progress as a whole and reduce the side effects even more than before.

The United States is currently vaccinating their population strictly using only IPV after switching from OPV a few years ago. However, this does not mean that IPV is the best vaccine for polio and that every other country should adopt to this strategy. In global settings, endemic cases of polio are still around and usage of OPV is crucial in stopping the circulation. Not to mention the cost difference. As a superpower country, the United States can afford to switch to IPV for their national vaccination program even when IPV is 5 times more expensive than OPV. Third-world countries cannot afford the cost of this program and the burden of the cost imposed might just cripple their vaccination program if they are forced to switch to IPV. Therefore, consideration on whether one vaccine is better than the other should always take into account the economy of certain countries and adjust accordingly.

In conclusion, every vaccine has its own side effects. And in the case of OPV, researchers have acknowledged its risk and are finding ways to circumvent it. Determining which vaccine is better is highly dependent on the vaccination coverage and endemicity of certain regions and also the countries' economic status.

3RD SPEAKER: MS RIGANESWARY A/P GANESWARAN

Today, I, Riga, would like to express my views against the motion "IPV is better than OPV globally". Please allow me to explain to the government group on how effectively OPV works against polio virus compared to IPV. The action of Oral Polio virus vaccine (OPV) is two-pronged unlike the IPV. OPV produces antibodies in the blood (serum immunity) to all three types of polio virus and in the event of infection, this protects the individual against polio paralysis to the nervous system. However, OPV has a unique ability to induce intestinal, local immunity which can stop wild polio virus transmission in the environment. OPV strains produce a local immune response in the lining (mucous membrane) of the intestines which is the primary site for polio virus multiplication.

The antibodies produced in the lining mucosa of the intestines inhibit the multiplication of subsequent infections of wild (naturally occurring) virus. This is not possible with IPV, an inactivated polio vaccine, which induces only very low levels of immunity to polio virus inside the gut, and as a result provides individual protection against polio, but unlike OPV, cannot prevent the spread of wild polio virus. This can be proved according to studies done by WHO which indicate that the degree of mucosal immunity in the intestine in IPV is significantly less than provided by OPV.

This immune response to OPV is probably a reason why mass campaigns with OPV have been shown to stop person-to-person transmission of wild polio virus. For an instance, a study carried out in China to examine changes in vaccine-induced intestinal mucosal immunity to polio virus by measuring the immunoglobulin A antibodies level in stool from 107 infants from different regions which results in 104 out of 107 children has higher level of IgA after OPV. In addition to that, as the vaccine virus replicates in the intestine, it is excreted in the faeces and can be spread to people in close contact. This means that, in areas where hygiene and sanitations are poor, vaccination with OPV can result in passive immunization of people who have not been directly vaccinated. After 3 doses of OPV, a person becomes immune for life and can no longer transmit the virus to others if exposed. This clearly proves the effectiveness of OPV. and again, thanks to this 'gut immunity', OPV is the only weapon to stop transmission of the polio virus when an outbreak is detected. Probably the proposition team who was

claiming IPV is better than OPV might not be aware of that. IPV is just an end game for polio virus but cannot be the main vaccine used when there is a polio virus endemic.

Furthermore, I would also like to say that OPV is safe, effective and is the essential tool available to protect all children against polio. It has no common side effects and has been used all over the world to protect children against polio. Over the last 20 years, this vaccine has saved 5 million people from permanent paralysis by polio. On very rare occasions, the live, attenuated (weakened) vaccine-virus can cause paralytic polio cases. But this is an extremely small risk (it only occurs in approximately 1 in every 2.5 million doses administered; this risk applies primarily to the first dose of vaccine administered and is reduced to virtually zero on subsequent doses). Children are in far greater danger from the circulating polio viruses than from any adverse effects from the polio vaccine.

Therefore, I would like to conclude that OPV is safe and very effective. Until polio is eradicated globally, OPV is still the main preventive measure against polio. IPV is recommended in addition to the oral vaccine but IPV does not replace the oral vaccine. Thus, we cannot completely neglect OPV and I would like to end my speech by saying we strongly believe OPV should not be abandoned but instead can be given as combination of OPV and IPV for a better result in eradicating polio virus globally.

DISCUSSION

CONCLUDING REMARKS by PROPOSITION TEAM -MS SHARRU VIJAYA KUMAR (after all three speakers had presented)

First, the opposition's first speaker has told that the change to trivalent to bivalent was due to eradication of type 2 poliovirus. But we have already proved to you guys that this is untrue, there are still evidence of ongoing type 2 cases according to the CDC. Then they said that IPV does not replace OPV, which is true. It does not replace therefore making IPV better. If it is just going to replace than it does not do any good.

Ladies and gentlemen, we kept on emphasizing that we are not saying we should administer IPV only or OPV only. We are not here to debate on how to administer the polio vaccine. We are here to compare IPV and OPV in terms of their benefits.

Next, they also stated that the side effects of OPV rarely happen. They even gave statistics. But we do not care about the numbers, we care about people's life. We think that even if the number of those effected are very low, they are lives still matter. Because we strongly and deeply believe that all lives matter. Because of this, we believe that IPV is better. We are not neglecting the fact that IPV does not have any side effects. But when we compare the adverse effects between IPV and OPV, IPV's adverse effect is so much less. In the end of the day what both sides want is, we want to eradicate polio and at the same time want our people to be safe. To do that, we need to take a look at the adverse effects and compare both of them.

Lastly, the third speaker also said that OPV does not have any side effect. But my dear, I think my team and I have already explained that OPV does cause VAPP and VDVP. Now I would be reinstating and summarizing what my team has told you. Our first speaker told that OPV is a bivalent vaccine whereas IPV is a trivalent vaccine. It covers 3 types of polio viruses which is much better. Besides that, I talked about the side effects of OPV. It has 2 main side effects which are VAPP and VDVP. Lastly, our third speaker has also explained that OPV is not recommended in immunocompromised and breastfeeding citizens but IPV is. So, we believe

that we have covered all the important points for this debate. We believe that IPV is better than OPV. Thank you.

CONCLUDING REMARKS BY OPPOSITION TEAM- MR UMMARUL NAZHAN ADIEL BIN MOHD NOH (after all three speakers had presented)

We on the opposition side are still standing with OPV is better, as it is totally proven that it really helps in eradicating polio worldwide and IPV cannot stand alone without the OPV. On the government side, up till now we still cannot hear from their side whereby IPV can stand alone without OPV. On our side, we clearly stated that IPV cannot replace OPV but instead IPV must be administered together with OPV so that it will give us the desired effect that we want which is we want polio virus being eradicated globally. According to the data provided by WHO, OPV has been used in vaccinating about 10 billion people worldwide and 760 cases were reported due to AEFI.

Ladies and gentlemen, on proposition side, they are talking about safety and ask if , we care about the lives of these 760 victims.? Let me be honest and let me make it clear to you guys, that all vaccinations have an AEFI now government sides please provide us with facts that which vaccinations that do not have an AEFI. You owe me an answer to this question okay.! Because we all acknowledge that all vaccines have an AEFI. It might be due to the vaccines itself or maybe due to the quality of manufacture and even maybe due to the adjuvant contents that are being added to the vaccine.

Even in the polio eradication endgame strategy they stated that, IPV must be addition to the OPV and not replacing OPV. The issue that keeps coming from proposition side is that the switching of trivalent to bivalent OPV will not covered type 2 and we already stated that this is due to type 2 virus is globally eradicated in 1999.

Ladies & gentlemen, on opposition side, we have highlighted upon three issues:

1) We prove to you that IPV is recommended only when OPV is being administered and does not replace OPV.
2) OPV is the main actor in eradication of the polio with the data and the numbers provided by my deputy opposition leader.
3) We told you guys about the safety factor and the mucosal immunity.

Ladies and gentlemen, when we are talking about the vaccines, we have to acknowledge the existence of anti-vaccination movement. Today, with their presence, it threatens the public health that have been build up for so many years and we believe that their existence could give a high potential for the polio virus to become the outbreak and become a pandemic instead of endemic globally. With that we on opposition side still stand on our ground and believe that IPV cannot be administered without OPV because it is proven that IPV cannot replace OPV. With that, I rest my case. Thank you.

REMARKS BY FACULTY

The six speakers had spoken with vigor and passion upon the pros and cons regarding the two-poliomyelitis vaccine. There are a lot to be discussed upon the two great vaccines. However, due to time constraints the Faculty will not be dwelling upon further discussion on them. We would like to congratulate the speakers upon their search for references and their mode of delivery and contents of their arguments put forward on both sides.

CONCLUSION

The winning team had accrued more marks than the other team based upon the THREE adjudicator's marking of their performance according to the given marking scheme made known to the students in their Student Guide book. So, they had won with their opposition view that IPV should be used in conjunction with OPV. This was because they are of opinion that OPV has greater added value.

As a postscript the current and recently introduced Malaysian, National Immunization Schedule, is illustrated as below for the readers to form their own opinions.

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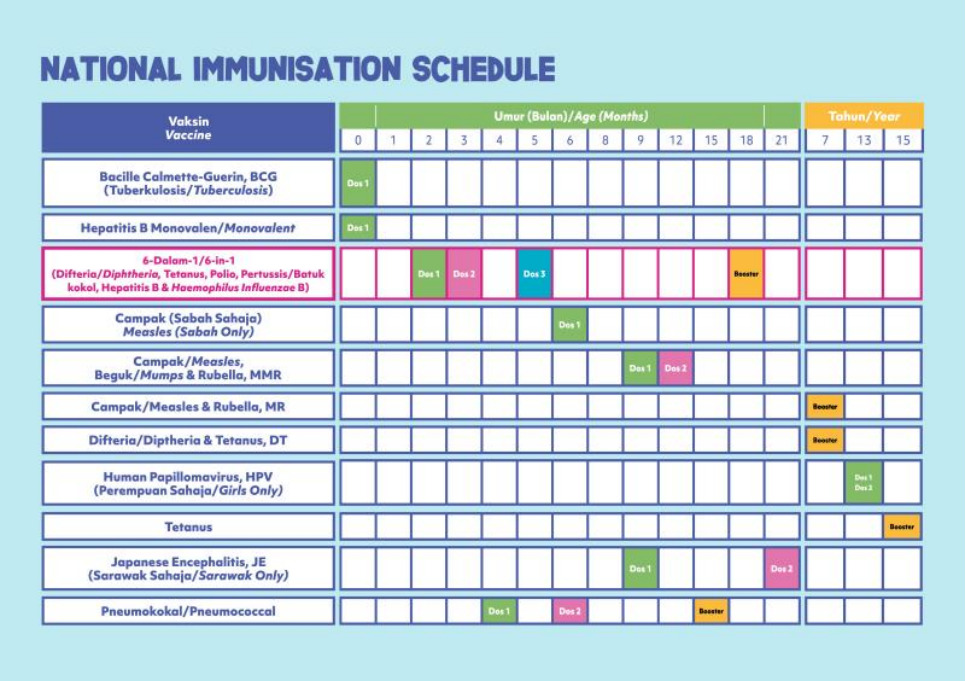

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