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Missed Opportune Children for Immunisation versus Immunisation Defaulters:

Why Are They Indistinguishable?

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Abstract

The two major global immunisation agenda framings (Missed Opportunity for Immunisation, MOI vs Immunisation Defaulting) are interchangeably and inappropriately used in public health research and practice with flawed or misleading strategies recommended and adopted in various settings globally. This is evident in the fact that many opportunities to adopt evidence/findings from immunisation coverage research in policy are grossly missed. Ineffectiveness of inappropriate interventions from biased evidence can discourage and mislead the governance to make radical decisions by discretion. This could be the reason for the inability of low-and middle-income countries to vaccinate 80% of their children and otherwise; this also poses a global health threat to capable nations. The current guideline and information on MOI and immunisation defaulting appear insufficient and a little clarification on it would assist forerunners in immunisation to achieve measurable progress in ensuring good coverage especially in low-and middle-income countries. Consequently, this paper is aimed at addressing this issue in immunisation practice with appropriate recommendations. Optimistically, this will stimulate further discussions, streamline differences, and gear global immunisation governance on the subject matter, to achieve the target coverage by 2030 in low-and middle-income countries.

Immunisation in the Global Agenda

Each year, close to a million African children – inclusive of newborns, die before their fifth birthday from vaccine preventable diseases; and every year, about 30 million children under five years of age get sick from vaccine-preventable diseases (VPDs) in Africa (1,2). Since the introduction of vaccines, the global mortality rates of vaccine-preventable diseases such as measles, mumps, rubella, polio, diphtheria, whooping cough (pertussis), and Haemophilus meningitis have declined by over 95 per cent (3). One can therefore say that, vaccination and immunisation programmes are highly effective and still needed in preventing illnesses, disabilities and deaths, among these age groups if these programmes are appropriately and factually implemented in respective countries and contexts.

In the year 1979, five (5) years after the creation of the extended programme for immunisation, about 100,000 cases of diphtheria were estimated to have occurred, while an approximated diphtheria cases of 8,819 were reported in 2017 using the joint reporting form (JRF) of the World

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Health Organisation (4,5). This shows significant reduction in cases of diphtheria which is as a result of vaccination/Immunization uptake. Although, there are few observable halts and reversed progress from 1990 till date. Take for example, the diphtheria surge seen in the 1990s with over 39,000 cases in 1994. This surge was as a result of a failed system in the former Soviet Union to vaccinate the eligibles during the dissolution of the Union (1988–1991). Furthermore, there has been a stalled progress of around 4,300 - 7,000 cases per year from 2006 till date. This global stagnation in the immunisation progress is a consequence of inadequate coverage and utilization of immunization against childhood diseases among high-burden and developing countries like Nigeria, Indonesia, Ukraine, Madagascar and Papua New Guinea (5). Apparently, the inability of low-and middle-income countries to vaccinate 90% of their children, still remains one of the toughest challenges in global health, and has resulted in a global health insecurity and threat to capable nations. Herein, the Global Immunisation Agenda 2030 has recommended that member states adopt fitting global strategies to leave no one behind by extending the benefits of vaccines to everyone, everywhere, and at every eligible age to set a course to control, eliminate or eradicate vaccine-preventable diseases (6,7).

Kindly note that, reduction of mortality and morbidities from vaccine-preventable diseases in developing countries involves successfully implementing strategies that ensure high vaccination coverage, minimal drop-outs and missed opportunities in their different and distinct contexts. Although all countries have well-established immunisation programmes, the level of vaccination coverage achieved is often linked to the country's immunisation agenda framings and its strategies, wherein the two global immunisation agenda framings (Missed Opportunity for Immunisation vs Immunisation Defaulting) are interchangeably and inappropriately used with flawed or misleading strategies recommended and adopted in various settings globally.

Arguably, immunisation programmes are cost effective when compared to antibiotics and indirectly decrease the antimicrobial resistance (AMR) trend in a country just like in the case of pneumococcal diseases (8). In this regard, understanding and differentiating the usage of these globally used agenda framings would not only help policy-makers and immunisation programme managers but public health researchers in recommending, adopting, monitoring and re-evaluating the most appropriate approach to immunisation agenda framings in their respective contexts among and within countries.

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Evidence of Mis-usage

The Global Immunization Agenda 2030 set a new course to address inequalities in vaccination coverage between and within countries (7). The World Health Organisation (WHO) has coined the phrases (missed opportunity for vaccination and immunisation defaulters) to direct country members on how and where to identify the immunisation needs of unvaccinated and under-vaccinated children. "Missed opportunity for immunisation (MOI)" also known as missed opportunity for vaccination (MOV) is defined by WHO as a scenario where a child eligible for vaccination with no valid contra-indication, visits a health facility but does not receive the recommended vaccines' doses they are due for (9). While, "defaulter" refers to individuals who miss his/her scheduled vaccination(s) for any reason from both the society and the health system including health facility problems, such as cancelled sessions or vaccine stock outs, etc (10). These definitions do not suggest absolutely that one is a subset of the other nor did it suggest that they can be interchangeably used. Repeatedly, these phrases are usually mis-interpreted and mis-applied by immunisation programme managers, health policy-makers and public health researchers.

Firstly, differentiating the two phrases includes understanding and distinguishing the right methodologies to use when searching for zero- and under-immunised children as recommended by WHO (11). However, there is still a gap in the WHO recommended methodology including the inclusion/exclusion criteria of participants, the choice of environment and settings needed to conduct these methodologies, etc. to propose the most appropriate interventions to the problems in their different contexts. Among others, not to talk about the time frame of the child's contact with the health service in the context of MOI, the age group has also been an increasing debate on the execution of the type of research/assessment methodology to conduct. Past researches have used 0 - 23 months as an inclusion criteria for their participants in determining associating factors with missed opportuned children for immunisation; while many others continually use 12-23 months for both MOI and immunisation defaulters assessment (12–17). On the other hand, defaulters are recently termed as a child being off track with their immunisation schedule (18) or delayed immunised child (19), has been defined as a child who have not received his eligible vaccine dose for 28 days or more of delay according to its country's recommended schedule. Nonetheless, these researchers have also used 0 - 23 months of age as their inclusion criteria (18,19).

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The WHO methodology for the assessment of missed opportunities for vaccination recommended using a health facility as the settings for conducting MOI assessment (20), while many research studies were conducted in the community; where a child can also have contact with the health service in the community (via the outreach immunisation session, mobile outreach clinics, supplemental immunization activities) and not necessarily at only the health facility in rural districts. If MOI can be viewed as a sequel of a weak operation mechanism of a healthcare service delivery facility with/without a triage system in it, immunisation defaulting should also be considered as an aftermath of an infirm health facility operation, incompetent district health system and weak local (district/county) governance from its incapacitation to integrate health service programs into other non-health communal activities which will inturn address the politico-and socio-cultural determinant of health in the geographical regions.

We should be aptly reminded that immunization visits have been expanded into the well-child visit, where contact with the health system is used to add other preventive interventions (like vitamin A and growth monitoring) (21,22).

Implication on Public Health Practice and Research

Agreeably, setting MOI in the country's agenda would improve immunisation coverage and health service delivery and promote synergy between programmes (20). The erroneous misuse of these two terms for one another will negatively impact the out-turn interventions targeting them. For example interventions for immunization integration programs into other health service programs would be suitable for targeting MOI rather than defaulters (23–25).

In sub-saharan Africa, MOI is being identified as the major hindrance to achieving targeted immunisation coverage. In this regard, it has been recommended that greater effort should be geared towards reducing MOI which will in turn help these countries attain their immunization targets. No doubt, reducing MOI will improve timeliness and immunisation coverage by 30% (11,20). Global mortality data trend (1990-2019) recorded the most gain for under-5 mortality, when compared to infant and neonatal mortality. Timeliness of interventions including immunisation is key and could have played a role in that outcome. If improved timeliness is one of the major aims of reducing MOI, therefore studies should use 0 - 12 months as their age inclusion criteria for the MOI research in countries where measles vaccine is scheduled to be given

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to children at 9 months of age, as against the target population of ≤23months of age that is currently used. (11,20). Notwithstanding, when adopting the WHO recommended target population, this paper strongly recommends that children between 0-23 months old should be sub-grouped into under-1 year-old and above-1 year-old, wherein, most studies evaluating MOI preferably used the age group 12-24 months, and few go to the extent of using under-5 year old children as their target population (26–28). Arguably, wrong methodology usage for assessing MOI and immunisation defaulters will result in inappropriate research results and this has continually led to limitations in conducting systematic reviews, follow-up by year, etc; and misleading output from comparisons between studies and contexts (29,30).

With the lack of distinction between these two terms and the use of different methodologies and scopes by studies, policymakers adopt inappropriate recommendations. This is evident in the fact that many opportunities to adopt evidence/findings from immunisation coverage research in policy are grossly missed. Ineffectiveness of inappropriate interventions from weak evidence can discourage and mislead the governance to make radical decisions by discretion. The seemingly gross overlap of factors often seen in many of the studies that looked at risk factors for missed opportunity for immunization and immunization defaulting separately and even simultaneously could have been different with clearer understanding of the difference between the two terms. This would prompt deeper reasoning and search for real risk factors, and better recommendations for improvement. Also, having clearer distinction between the terms could help with enhancing MOI accountability, which is essentially needed, and could form part of periodic accountability for clinician and health services providers which is either presently lacking in many settings or inadequate. Furthermore, it is unclear according to the WHO guideline on MOI assessment, if MOI assessment should be a state-owned assessment?. In such cases, what will be the role of researchers in the MOI agenda? How do we handle low commitment from the government to regularly conduct MOI assessment? If these questions are answered, surely there will be more progress in achieving a larger coverage in immunisation.

What Next To Do???

Creditably, there are significant gains in many areas of immunisation, however, there is an increasing consensus that suggest the need for the present World Health Organisation's information on the MOI and defaulters to be made more sufficient especially to guide studies, as

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a little more clarification on it would assist forerunners in immunisation to achieve progress in ensuring timely and good coverage in low-and middle-income countries. This is because a change in worldwide perspective on immunisation should begin at the current top of governance; advisably it should be included in the Immunization Agenda 2030: A Global Strategy To Leave No One Behind. Therefore, a re-orientation of health policy-makers, immunisation managers, researchers on the essence and usage of these two terms would be needed.

On the other hand, funding should not be directed to immunisation coverage assessments or research with wrong methodology. Allocation of funds to well-outlined research methodologies on these terms should have a wider coverage by geo-political or context wise.

As seen in WHO and UNICEF Estimates of National Immunization Coverage (WUENIC) by country, there is a need to have a proportion of MOI and immunisation defaulters by country, this would further help in accurately estimating our progress. Seeking funding to systematic review studies on the current state of MOI and defaulters by context (humanitarian/ non-humanitarian settings; non-conflict and conflicted regions; riverine and non-riverine areas) and geo-political regions (like high /LMICs; continents) should be a sub-agenda of research institutions. WHO's constitution of committees on "immunisation coverage and strategy" should also focus on sorting all research repositories for high-quality research and then classifying works and strategies into the different terms (MOI and defaulters); not excluding conducting modelling studies in estimating how far we need to go to achieve the target coverage by different contexts.

To achieve the above, commitment from countries to strengthen their _defaulters_ tracking system and also regularly conduct coverage gap (MOI and immunisation defaulter) assessment, such that each assessment findings _would_ be translated into adoptable intervention for usage at both facility and (community) district _levels_ where vaccination services are provided. In addition, if possible after year 2030, there will be a need to shift from using the 3rd-dose of Diphtheria-Tetanus-Pertussis (DPT-3) or the pentavalent vaccine to the 3rd-dose of the pneumococcal conjugate vaccine (PCV) as country target indicator for national coverage estimation; this will help in keeping us on track in the pursuit for a better coverage beyond 2030.

There is a need for re-visitation of the current (2014) WHO methodology for assessing MOV. Efforts are also needed to develop and implement programs that will improve the timely uptake coverage of immunisation, strengthen community surveillance of vaccine preventable diseases and adverse effects following immunisation (AEFI), and equally reduce risks of AEFI and improve its

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management.

Conclusion

In the pursuit for better immunisation coverage, it is high time the global immunisation governance created a resourceful environment as well as allocate resources to conduct accurate methodological studies which will succinctly identify the predictors of MOI and immunisation defaulting with respect to specific age groups, geographical areas, and immunization services delivery approach in countries with very low immunizations coverage.

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Authors' contributions:

IOI conceptualized this study, and wrote the manuscript. Applying wealth of field experience, GOA validated and revised the manuscript. The authors reviewed and approved the submitted manuscript.

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