

FACTORS INFLUENCING COMPLETION OF IMMUNISATION SCHEDULE AMONG CHILDREN UNDER FIVE YEARS; A CASE OF KOMAMBOGA HEALTH CENTER III; A CROSS-SECTIONAL STUDY.

Denis Ndyamuhaki*, Lydia Anywar
Medicare Health Professionals College.

ABSTRACT

Background

The purpose of this study was to examine factors influencing the completion of immunization schedules among children under five years old at Case Komamboga Health Center III. The objectives of the study were; to determine the child-related factors, parent/caretaker, and health facility-related factors influencing the completion of immunization schedule among children below 5 years at Komamboga Health Center III.

Methodology

The study used a cross-sectional design. Data was collected using a questionnaire method and a questionnaire as a tool. Simple random sampling was used to collect data from the 71 mothers/caretakers. Data was sorted and entered into Microsoft Excel and later presented into pie charts and tables

Results

The majority (78%) of the respondents had their children immunized however only 56.4% had completed the immunization schedules. The majority of the children that were fully immunized were 12-23 years old (45.1%), were firstborn (32.3%), and were female children (54.8%). Most of the fully immunized children were from the parents/caretakers who were 25-34 years old (61.8%), had secondary education (35.4%), and earned about 100,000-250,000 shillings (41.1%). The majority of the fully immunized children were residing less than 5 kilometers from the health facility (91.7%), and their parents/caretakers stated that the healthcare providers were not friendly (54.8%) and that vaccines were always available (93.5%).

Conclusions

Generally, child, mother/caretaker, and hospital-related factors influence the completion of immunization schedules among children under five years.

Recommendations

The study recommends that policies designed to promote child immunization should incorporate age, birth order, distance to health facility, and sex into their policies to have policies impactful.

Keywords: Factors, completion, Immunization, Children Below 5 Years, Komamboga Health Center III.

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Corresponding author: Denis Ndyamuhaki*

Email: kstardennis@gmail.com

Medicare Health Professionals College.

Background of the study

Low levels of immunization as a result of failure to complete the immunization schedule, results in a high risk of death from vaccine-preventable diseases. Immunization is one of the most effective and widely implemented public health interventions to prevent under-five Child mortality (Negussie et al., 2020). World Health Organisation (WHO) initiated and launched the Expanded Programme on Immunization (EPI) which was adopted by all countries in the 1980s to ensure maximum protection of children (Salmon, 2018), EPI aims at delivering the primary immunization series at least 90% of infants although this objective is still not met by many low resource countries (Negussie et al., 2020).

Failure to complete immunization accounts for about a quarter of the 8 million deaths occurring annually among

children under 5 years of age, especially in low-income countries such as Uganda (Okello et al., 2022).

Various strategies including mass immunization programs against various vaccine-preventable diseases and education programs have been employed by the Ministry of Health Uganda to improve the immunization coverage and ensure completion of the immunization schedule (Babirye et al., 2022). Despite all these strategies, there seems not to be any significant improvement in the completion of immunization of children below 5 years in Kawempe shown by the available DPT vaccine and measles vaccine dropout rate of 16% and 20% as earlier noted (MOH, 2016).

Failure to complete the immunization schedule as per the UNEPI recommendation predisposes children to vaccine-preventable diseases, and increases hospital stays due to

illnesses which increases the morbidity, and mortality of children. However, the factors influencing the completion of immunization are still unknown. Therefore, this study will focus on assessing the factors influencing the completion of immunization among children below 5 years at Komamboga Health Center III.

Methodology

Study Design

The study adopted a cross-sectional design since it saves time and aids faster collection of data on a large population within a short period.

Study area

Komamboga Health Center III is located in Kawempe, Kampala district, Uganda. According to the in charge of the health center of Komamboga health center every week they receive about 200 patients from the surrounding areas like Kulambiro, Katalemwa, and Kawempe divisions seeking immunization services

Study population

The target population was mothers/caretakers seeking health services for their children below 5 years. This age group is chosen because they are the ones who are immunized in most immunization programs by the Ministry of Health.

Sample size determination

The sample size was determined using the Kish & Leslie (1965) formula given below:

$$n = z^2PQ/d^2$$

n= the required sample size, Z = the standard normal level at 95% confidence level (1.96), P is the proportion of children that are to receive vaccinations which are at 90%,

$$Q = (1-P)$$

d = the precision (5%)

$$n = \frac{(1.96^2 \times 0.9 \times (1-0.9))}{(0.05)^2}$$

$$= 78 \text{ respondents.}$$

Sampling technique.

The study used a simple random sampling technique for selecting the 78 mothers/caretakers because it is cheap, easy, takes little time to use, and eliminates bias.

Data Collection method.

The study used questionnaires and an interview guide. These methods were used because they save time, are cheap, and offer enough privacy to the respondents.

Data collection methods and tools

An interviewer-administered questionnaire was used to collect quantitative data from mothers/caretakers of children seeking immunization services at the selected health center. This is a quantitative investigating tool composed of multiple closed-ended questions to gather

data from the target participants of the study. The closed-ended questions in this survey questionnaire were structured in that part A was the consent section, Part B was the socio-demographic characteristics of participants, and parts C, D, and E presented questions on 1st, the 2nd and 3rd study objectives respectively.

Quality control

Quality control was ensured by training research participants by pre-testing the questionnaire and making necessary corrections. The study also carried out validity and reliability tests to ensure the quality of the research tools

Selection criteria

Inclusion criteria

The study population included parents, and caretakers of children below 5 years because these are responsible for taking the children for immunization services

Exclusion criteria

The following were not considered for the study; all caretakers/parents found outside Komamboga County. All caretakers who are deaf, dumb, or mentally ill and those who were very sick. The healthcare providers were also excluded from the study

Pretesting the data collection tool

The questionnaire was pretested in Nabweru HC III in the Wakiso district. This helped to improve questions to be more understandable and added missing information.

Data analysis and presentation

The study ensured the completeness of data while in the field, questionnaires were used, and the researcher cleaned, sorted, and entered data into Microsoft Excel. Descriptive statistics in percentages (%) and frequency (n) were used to analyze categorical variables. Data was presented in tables and pie charts

Ethical consideration

The study sought an introductory letter from the institution's research committee presented to the director of public health Kampala capital city authority to in-charge Komamboga Health Center III seeking permission to carry out the research study from Komamboga Health Center III. The study ensured anonymity, and privacy and ensured the respondents of utmost confidentiality. The study explained the purpose, pros, and cons of the study to the respondents and sought consent from the respondents.

Results

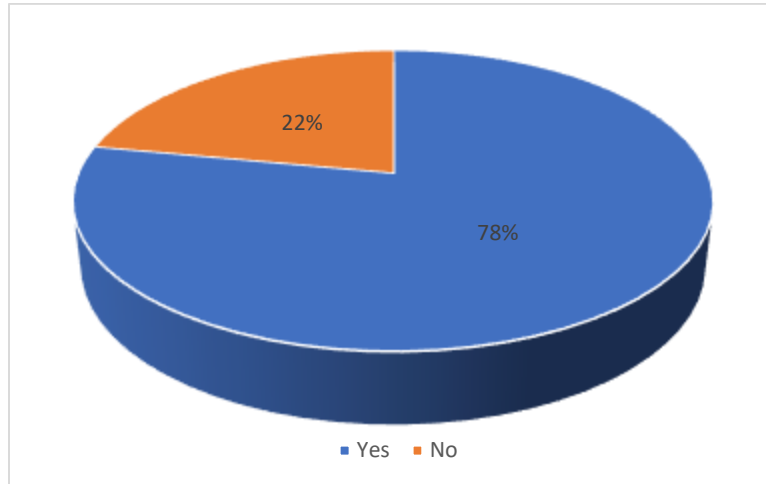
Response rate

A total of 78 questionnaires were distributed among the target sample population in the field however 71 of them were filled and returned representing 91% of the response rate. According to smaller organizations, a response rate

of 80% and above is considered good in 21st-century research (Morton et al., 2012)

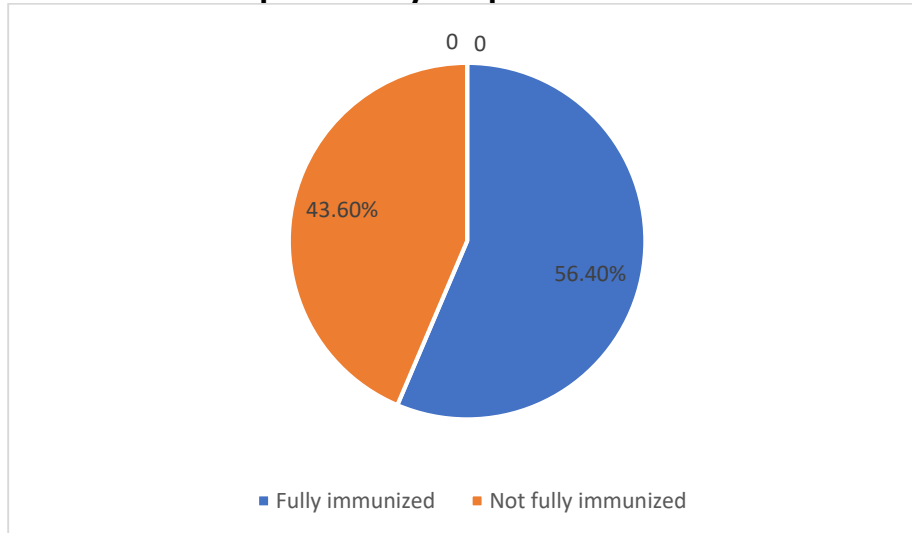
Immunization status

Figure 1: Distribution of respondents by whether their children were Immunized or not (n=71)



From Figure 1, the majority of the respondents, 78% (55) had had their children immunized and the least, 22% (16) had not immunized their children.

Figure 2: Distribution of respondents by completion of Immunization schedule (n=55)



Majority, 31(56.4%) of the respondents were immunized fully whereas 24(43.6%) were not fully immunized

Child-Related Factors That Influence Completion of Immunization Schedule among Children Below 5 Years

Table 1: Distribution of respondents by child Related Factor That Influence Completion of Immunization Schedule among Children below 5 Years

Factor	Frequency (%)	Immunized		Immunization completion	
		Yes Frequency (%)	No Frequency (%)	Completed Frequency (%)	Didn't complete Frequency (%)
Age					
0-11 months	21(29.6)	14(25.5)	07(43.7)	00(0.0)	14(58.3)
12-23 months	27(38.0)	24(43.6)	03(18.8)	14(45.1)	10(41.7)
24-35 months	11(15.5)	09(16.4)	02(12.5)	09(29.0)	00(0.0)
36-47 months	9(12.6)	06(10.9)	03(18.8)	06(19.4)	00(0.0)
48-59 months	3(4.2)	02(3.6)	01(6.2)	02(6.5)	00(0.0)
Total	71(100%)	55(100)	16(100)	31(100)	24(100)
Birth order					
First	15(21.1)	13(23.6)	02(12.5)	10(32.3)	03(12.5)
Second	22(30.9)	21(38.2)	01(6.3)	07(22.6)	14(58.3)
Third	10(14.1)	08(14.5)	02(12.5)	05(16.1)	03(12.5)
Fourth	11(15.5)	06(11.0)	05(31.2)	04(12.9)	02(8.3)
Fifth	9(12.7)	05(9.1)	04(25.0)	04(12.9)	01(4.2)
Sixth and above	4(5.6)	02(3.6)	02(12.5)	01(3.2)	01(4.2)
Total	71(100)	55(100)	16(100)	31(100)	24(100)
Sex of the child					
Male	23(32.4)	16(29.1)	07(43.8)	14(45.2)	02(8.3)
Female	48(67.6)	39(70.9)	09(56.2)	17(54.8)	22(91.7)
Total	71(100)	55(100)	16(100)	31(100)	24(100)

Source: Field data 2023

The majority, 24(43.6%) of the immunized children were between the age of 12-23 months of which 14(45.1%) were fully immunized whereas the least were in the age bracket of 48-59 months of which 2(3.6%) were immunized and all, 02(6.5%) were fully immunized.

The majority, 21(38.2%) of the immunized children were second of which 07(22.6%) were fully immunized whereas the least of those immunized, 02(3.6%) were in sixth and above birth order of which 01(3.2%) were fully immunized.

The majority, 39(70.9%) of the immunized children were female of which 17(54.8%) were fully immunized whereas the least of those immunized, 16(29.1%) were males of which 14(45.2%) were fully immunized.

Caretaker /parents related factors that influence completion of immunization schedule among children below 5 years

Table 2: Distribution of respondents by age

Variable	Category	Frequency (%)	Immunized		Fully immunized	
			Yes Frequency (%)	No Frequency (%)	Yes Frequency (%)	No Frequency (%)
Caretaker/parent's age in years	13-24	16(23.0)	10(18.2)	06(37.5)	09(29.0)	01(4.2)
	25-34	36(51.0)	34(61.8)	02(12.5)	12(38.7)	22(91.6)
	35-49	19(26.0)	11(20.0)	08(50.0)	10(32.3)	01(4.2)

Total		71(100)	55(100)	16(100)	31(100)	24(100)
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The majority of the children who were immunized, 34(61.8%) had parents/caretakers whose ages were 25-34 years, and about 12(38.7%) of those children were fully immunized whereas the least of the immunized children, 10(18.2%) had parents/caretakers between the age of 13-24 of which 09(29.0%) were fully immunized.

Level of education

Table 2: Distribution of respondents by their level of education

Level of education	Frequency (%)	Immunized		Fully immunized	
		Yes Frequency (%)	No Frequency (%)	Yes Frequency (%)	No Frequency (%)
None	16(22.5)	14(25.5)	02(12.5)	06(19.4)	08(33.3)
Primary	30(42.3)	16(29.1)	14(87.5)	08(25.8)	08(33.3)
Secondary	18(25.4)	18(32.7)	00(0.0)	11(35.4)	07(29.2)
Tertiary	7(9.9)	07(12.7)	00(0.0)	06(19.4)	01(4.2)
Total	71(100)	55(100)	16(100)	31(100)	24(100)

Source: Field data 2023

The majority of the children who were immunized, 18(32.7%) had parents/caretakers who had secondary education and about 11(35.4%) of those children were fully immunized whereas the least of the immunized children, 07(12.7%) had parents/caretakers who had tertiary education of which 06(19.4%) were fully immunized.

The amount earned per month

Table 4: Distribution of respondents by amount earned per month

Variable	Category	Frequency (%)	Immunized		Fully immunized	
			Yes Frequency (%)	No Frequency (%)	Yes Frequency (%)	No Frequency (%)
Amount of money earned per month	<100,000	12(17.0)	01(1.8)	11(68.7)	01(3.2)	00(0.0)
	100-250,000	17(24.0)	14(25.5)	03(18.7)	14(41.1)	00(0.0)
	250-500,000	24(34.0)	23(41.8)	01(6.3)	06(19.4)	17(70.8)
	>500,000	18(25.0)	17(30.9)	01(6.3)	10(32.3)	07(29.2)
Total		71(100)	55(100)	16(100)	31(100)	24(100)

Source: Field data 2023

The majority of the children who were immunized, 23(41.8%) had parents/caretakers who earned between 250,000-500,000 shillings, and most, 14(41.1%) of those fully immunized had parents/caretakers earning 100,000-250,000 whereas the least of the immunized children, 01(1.8%) had parents/caretakers who earn less than 100,000 shillings and they were not fully immunized.

Health facility-related factors influencing completion of immunization schedule among children below 5 years at Komamboga Health Center III. Distance to the health facility

Table 3: Distribution of respondents by distance to the health facility

Distance	Frequency (%)	Immunized		Fully immunized	
		Yes Frequency (%)	No Frequency (%)	Yes Frequency (%)	No Frequency (%)
<5km	45(62.5)	40(72.7)	04(25.0)	18(58.1)	22(91.7)
>5km	27(37.5)	15(27.3)	12(75.0)	13(41.9)	02(8.3)
Total	72(100.0)	55(100.0)	16(100.0)	31(100.0)	24(100.0)

Source: field data 2023

Majority of the children who were immunized, 40(72.7%) had parents/caretakers moving less than 5 kilometers to the health facility of which 18(58.1%) were fully immunized and 22(91.7%) of those children were not

fully immunized whereas the least of the immunized children, 15(27.3%) had parents/caretakers moving more than 5 kilometers of which 13(41.9%) were fully immunized and only 02(8.3%) were not fully immunized.

Friendliness of healthcare workers

Table 6: Distribution of respondents by how they feel the health workers are friendly to them.

Variable	Category	Frequency (%)	Immunized		Fully immunized	
			Yes Frequency (%)	No Frequency (%)	Yes Frequency (%)	No Frequency (%)
Friendliness of health workers	Yes	14(20.0)	14(25.5)	00(0.0)	14(45.2)	00(0.0)
	No	57(80.0)	41(74.5)	16(100.0)	17(54.8)	24(100.0)
Total		71(100.0)	55(100.0)	The majority	31(100.0)	24(100.0)

Source: Field data 2023

The majority of the respondents, 57(80.0%) who said healthcare workers are not friendly had about 41(74.5%) of their children immunized and 17(54.8%) fully

immunized whereas 14(20.0%) stated that healthcare workers are friendly with all their children being immunized and all being fully immunized

Availability of vaccines

Table 7: Distribution of respondents by their response on availability of vaccines

Variable	Category	Frequency (%)	Immunized		Fully immunized	
			Yes Frequency (%)	No Frequency (%)	Yes Frequency (%)	No Frequency (%)
Friendliness of health workers	Yes	48(67.6)	47(85.5)	01(6.3)	29(93.5)	18(75.0)
	No	23(32.4)	08(14.5)	15(93.7)	02(6.5)	06(25.0)
Total		71(100.0)	55(100.0)	16(100.0)	31(100.0)	24(100.0)

The majority of the respondents, 48(67.6%) who said vaccines were available had about 47(85.5%) of their children immunized and 29(93.5%) fully immunized whereas 23(32.4%) stated that vaccines are not always available with only 08(14.5%) of their children being immunized and 02(6.5%) being fully immunized.

The study revealed that 56.4% of the children were fully immunized. The study finding is slightly lower than the finding of a study in Senegal by Sarker, et al, (2019) which reported that 70.96% of the girls and boys were fully immunized with the coverage being higher in urban areas however, the finding is higher than the prevalence of immunization completion in Indonesia which reported that only 37.4% of the children were completely immunized (Efendi, et al, 2020)

Discussions

Prevalence of complete immunization schedule

Child-related factors influencing completion of Immunization schedule among children below 5 years at Komamboga Health Center III

The study findings revealed that the majority, 45.1%, of the fully immunized children were between 24-35 years of age. The findings are further in agreement with Negussie et al., (2020) who revealed that child age is a major factor influencing the completion of the immunization schedule. This was affirmed by (Mukungwa, 2019) in Zimbabwe who revealed that 69% of children of less than 5 years were fully immunized compared to 59% of children of >5 years. This could be attributed to the fact that this is the age at which most children are expected to have completed immunization.

Findings showed that most of the fully immunized children, 32.3%, were of the first birth order. This is in agreement with WHO, (2020) which indicated that completion of the immunization schedule is associated with firstborn children and decreases as the number of children given birth increases. This could be because most parents pay more attention to their firstborn children and would do everything to ensure that they are healthy including following immunization schedules up to completion.

Furthermore, the study revealed that more girls (54.8%) compared to boys (45.2%) were fully immunized. This could be because the majority of the children available at the time of data collection were girls. The finding doesn't mirror a study in middle-income countries by Cata-preta et al., (2021) which reported that girls were found to have significantly lower immunization than boys for BCG, DPT, and measles but, it mirrors a cross-sectional study on vaccination coverage and immunization timelines among children below 5 years in Senegal which reported that female children were more likely to have correctly timed vaccinations with MCV, Penta 3 and polio 3 (Salmon, 2018).

Parents/caretakers related factors that influence completion of immunization schedule among children below 5 years

The findings of the study showed that most (38.7%) of the fully immunized children were from parents/caretakers who were 25-34 years old. The finding agrees with the findings by Salmon et al., (2018) who reported that immunization coverage increases as maternal age increases, and also agrees with findings by Negussie, (2016) which further revealed that the risk of defaulting their child's vaccine series is higher in younger mothers than older mothers. Maternal age. This is attributed to the accumulation of experience as a mother age on the importance of immunization and also could be due to the deaths of children that could have occurred due to lack of immunization.

Also, the findings revealed that the majority (35.4%) of the fully immunized children were from mothers/caretakers who had attained secondary education. The finding agrees with the findings by

Forshaw et al., (2017) which indicated that the odds of full childhood vaccination were 2.3 times greater in children whose mothers received secondary or higher education when compared to children whose mothers had no education. Maternal education is attributed to changes in attitudes, traditions, and beliefs that may be against immunization, increasing autonomy, and control over household resources that enable healthcare-seeking.

More so, the study revealed that fully immunized children (41.1%) were from parents/caretakers who earn between 100,000 and 250,000. The findings are in disagreement with Galadima, (2021) in Nigeria who reported that mothers from higher wealthy families were highly more likely to have their children fully immunized unlike those born from mothers with low-income status and lower wealth index. This may be attributed to the availability of money to facilitate transport to health facilities for vaccination schedules.

Health facility-related factors influencing completion of immunization schedule among children below 5 years at Komamboga Health Center III

Study findings revealed that most (58.1%) of those who were fully immunized were coming from places less than 5 kilometers away from the hospital. Being that the distance is short makes it easier for the parents/caretakers to keep up with the immunization schedules. The findings are further in agreement with findings by Hobani & Alhalal, (2022) who revealed that distance to the health facility is a major limiting factor to immunization adherence and Xeuatvongsa et al., (2017) who reported that distance to the nearest health facilities is one of the well-known factors associated with vaccination status.

Also, the finding revealed that the majority of those who were fully immunized (54.8%) stated that the healthcare providers were not friendly. The findings are further in agreement with Oku (2017) on the factor of friendliness of healthcare providers where caregivers explained that once a mother is treated inappropriately, she may become resistant to any information delivered by the health worker and may resolve not to return to the health facility to continue with her child's vaccination.

Furthermore, the study showed that most (93.5%) of the fully immunized children their parents stated that vaccines were always available. Vaccine availability seems to be a contributing factor to following immunization schedules because for some people once they make time for immunization and don't get the vaccines available, they never come back and hence don't complete immunization. The finding agrees with the finding by Nankabirwa et al., (2020) who reported that unavailability of vaccines is one of the most common barriers to immunization adherence.

Conclusions

The finding indicates that the rate of immunization completion is lower than the national recommended average of 90% according to the World Health Organization (MOH, 2016)

It is concluded that is indicated that child-related factors age, birth order, and sex of the child significantly influence the completion of the immunization schedule. This implies that many policies directed to promote child immunization should incorporate age, birth order, and sex to make their policies impactful.

It is further concluded that the caretaker /parents-related factors that influence the completion of immunization schedules among children below 5 years were the age and level of education.

The health facility-related factors influencing the completion of immunization schedule among children below 5 years at Komamboga Health Center III are; the availability of vaccines and distance to the health center

Recommendations

The parents or caretakers should consider taking their children for immunization and completing their schedules as a priority for the good health of their children by noting or marking the different times for immunization routines so that their children are fully immunized while those below 5 years of age

To policymakers, in addition to the good prevailing policy on immunization in Uganda, it is important to identify interventions to increase vaccine series completion specifically for polio, DPT-Hib-HeB, and PCV that follow a series of doses by encouraging caretakers to take their children for immunization in order not to miss the above vaccines.

To health care providers, carrying out health education about immunization, reducing waiting time, and timely receipt of doses according to schedules could lead to defaults attributable to wrong perceptions about immunization during vaccination routines.

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LIST OF ABBREVIATIONS

BCG: Bacille Calmette-Guerin
CDC: Center for Disease Control
DPT: Diphtheria, Pertussis, and Tetanus

EPI: Extended Program on Immunization
HepB-Hib: Hepatitis B and Haemophilus influenza Type b
IPV: Injectable polio vaccine
PCV: Pneumococcal conjugate vaccine
MOH: Ministry of Health
TBA: Traditional Birth Attendants
UBOS: Uganda Bureau of Statistics
UNEPI: Uganda Expanded Program on Immunization.
UNICEF: United Nations Children's Fund
WHO: World Health Organization

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Conflict of interest

The author declares no conflict of interest.

Author Biography

Ndyamuhaki Denis, Diploma in Clinical Medicine and Community Health at the Medicare Health Professionals College

Lydia Anywar, Lecturer at the Medicare Health Professionals College

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