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Research

Social determinants of immunization services uptake in developing countries: a systematic review

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Abstract

Introduction: Immunization is a strong pillar of community health. Attainment of the desired immunization coverage is always dependent on a range of determinants. These determinants are normally put into broad categories as immunization system based, clients based and service providers based. The objective of this study is to explore determinants of immunization services uptake in developing countries. This study reports magnitude of system, providers, and clients based determinants of immunization uptake in developing countries. **Methods:** Systematic documentary review was a method for this study. Literature searches were made using Research4Life, HINARI and other online publication sources to identify relevant research articles. Twenty-six articles were reviewed. **Results:** Seventeen Key Determinants were identified with frequencies in brackets: caregivers' social status (25); caregivers' knowledge on immunization (22); access to immunization services and information (20); health workers' knowledge attitude and practice (12); social influence and support (110); quality of immunization services (10); alternative strategies for hard-to-reach populations (9); caregivers' perceptions about immunization (7); gender (7); and care givers' beliefs and attitude towards immunization (6). Overall, 62.3% of the key determinants were clients based; 29.5% were immunization system based; 8.2% were providers based. **Conclusion:** Majority of immunization services uptake determinants are based on clients. Therefore, immunization interventions in developing countries should majorly focus on social behaviour change communication.

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Introduction

Immunization is a strong pillar of community health, as it is a cost-effective intervention to prevent illness and disability, and saves millions of lives every year and also a key to achieving the Millennium Development Goals (MDGs). At that time developing countries managed to attain basic immunization coverage of only about 5%. For stance, by 1990 EPI-Tanzania with multilateral and bilateral support recorded and average coverage of over 70% for the six antigens which caused a dramatic fall in incidence of vaccine preventable diseases. This was a result of intensification of fixed, mobile and outreach strategies accompanied with communication, advocacy and community mobilization. Thereafter, the coverage fell down. This down fall was mostly attributed to initiation of health sector reforms in which health services were integrated. This resulted into shortage of transport, and finance which slowed down the pace of immunization services [1]. In 1970s World Health Organization (WHO) initiated the Expanded Programme on Immunization (EPI). This initiative came next to a successive campaign of small pox eradication. EPI goals at that time were to have every child protected against childhood tuberculosis, polio, diphtheria, pertussis, tetanus, and measles by the time he or she was one year of age. Routine immunization was initiated in Tanzania in 1975 with establishment of the Expanded Programme on Immunization (EPI). Currently, the overall goal of EPI is provision of immunization services to all eligible children, women of child bearing age. The programme was expected to cause an impact in reduction of child morbidity and mortality- improvement of child survival and achieving MDG4 (a two-thirds or greater reduction in childhood deaths and illness due to vaccine preventable diseases by 2015 as compared to 2000. To attain this, the programme relies on the country wide health services delivery system and structures [2]. In Tanzania, each district was to reach immunization coverage of at least 90% by the year 2015 [3]. Attainment of the desired immunization coverage is always dependent on a range of determinants including the social ones. These determinants are put into broad categories as immunization system based, client based and service providers based [4]. This systematic review was conducted to explore the prevailing social and immunization services determinant in developing countries.

Methods

Study design: Systematic reviews was a method for this study on social determinants of immunization services uptake in developing countries. A literature search was made using Research4Life, HINARI and other online publication sources to identify relevant studies and articles. The literature search used combinations of the following subject headings: immunization determinants, vaccination determinants, immunization factors and vaccination factors. Twenty-six articles from international peer reviewed journals were found relevant and reviewed.

Data management and analysis: An annotated bibliography was developed listing the citation of each article on excel spread sheet. Under each citation, Specific Determinants (SD) influencing full utilization of routine immunization were identified and noted. The SD statements were standardized by rephrasing it into one statement representing meaning of all similar statements in different articles. The standardized statements of SD were coded into Key determinants (KD). The KDs were further categorized and quantified into one of the following Broad Determinants (BD) categories namely; immunization system based determinants, immunization services provider based determinants and immunization clients based determinants. Weight of each SD in a hosting KD was established in terms of frequency. Weight of each KD in a hosting BD was determined in terms of frequency and percent. Weight of BD among all BDs was judged in term of frequency and percent.

Results

Key determinants: In reviewing the articles, 17 key determinants of immunization services uptake were identified and its frequencies across the articles were established and shown in brackets. The key determinants included Caregivers' social status (25), caregivers' knowledge about immunization (22), access to immunization services and information (20), health workers' knowledge attitude and practice (12), social influence and support (10), quality of immunization services (10), alternative strategies for hard-to-reach population (9), caregivers' perceptions about immunization (7), gender (7), caregivers' attitude towards immunization (6), caregivers competing priorities (4), planning of immunization services (4), utilization of other health services (3), family structure

(3), migration (2), community participation in immunization (1) and traditional health practice (1) (Table 1).

Broad categories of determinants: The KDs were coded, broadly categorized and percent of each category determined such as immunization clients based determinants (62.3%); immunization system based determinants (29.5%); and immunization services providers based determinants (8.2%) (Table 2).

Clients based determinants : The broad category of Clients Based Determinants (CBD) had a cumulative frequency of 91 equivalent to 62.3% of all three broad categories. It included twelve key determinants which are Caregivers' social status; Caregivers' knowledge on immunization; social influence and support; Caregivers' perceptions about immunization; gender; Caregivers' beliefs and attitude towards immunization; Caregivers' competing priorities; utilization of other health services; family structure; migration; community participation in immunization; and traditional health practice. The KD of Caregivers' social status featured 25 times equivalent to about 27.5% of all KDs under CBD. The SD under this KD with its frequency in bracket included formal education (8); marital status (2); occupation (1); ethnicity (1); financial income (8), Place of residence (rural/Urban) (1) and religion and culture (4). The KD of Caregivers' knowledge on immunization had frequency of 22 across the reviewed articles. This is equivalent to 24.2% of all KD under CBD. This housed six SD indicated below with its frequency in brackets: unspecified knowledge about immunization 10); knowledge on vaccination schedule (5>); knowledge on immunization sessions (2); knowledge on immunization benefits (2); knowledge on vaccine preventable diseases (2); and knowledge on vaccine efficacy in preventing the diseases (1). The KD of social influence and support featured 10 times equivalent to 10.9% of all KD falling to CBD. This KD covered seven specific determinants such as rumors (1); social approval of immunization (2); social network (2); family support (1); unspecified social support (1); and personal advocacy (3). Caregivers' perceptions about Immunization was another KD. It featured 7 times that is 7.6% of all KDs under CBD and housed three specific determinants including perception about safety/side effects of immunization (3); perception about benefits of immunization (2); and unspecified perception about immunization (2). The KD Gender was identified; it had a frequency of 7 equivalent to 7.6% of all KDs under CBD. It included five key determinants such as male participation in immunization (1); mothers´ power to make decision (3); parent´s gender (1); sex of a baby/child (1); and sex of head of household (1). The KD of Caregivers' attitude towards immunization had frequency of 6 that amounts to 6.6% of all KDs falling to CBD. The KD included five specific determinants such as unspecified beliefs and attitude towards immunization (8); belief about vaccine safety (2); and belief about vaccine efficacy to prevent diseases (1). Caregivers' competing priorities was one of the KDs. It featured 4 times that is a proportion of about 4.4% of all KDs belonging to CBD. The KD housed three specific determinants: mothers/caretakers away from home (1); mothers/caretakers busy (1); and unspecified competing priorities (1). The KD of utilization of other health services had frequency of 3 that is equivalent to about 3.3% of all KDs under CBD. It housed one specific determinant that was place of delivery (3).

Family structure was also one of the KDs, it featured 3 times accounting to about 3.3% of all KDs falling to CBD. It had two specific determinants that were number of children in a family (2) and family size (1). KD Migration had frequency of 2 accounting to 2.2% of all KDs under CBD. It accommodated two specific determinants: migration (1) and seasonal migration (1). Community participation in immunization was a KD with one frequency equivalent to about 1%, covering one specific determinant that was role of community leaders (1).

Traditional health practice was a KD with one frequency, a proportion of 1.1% of all KDs under CBD; it covered one specific determinant that was traditional healers (1). For instance, financial income and parent's level of formal education had influence over uptake of immunization services. A cross-sectional surveys conducted in Delhi, India and Pakistan found that maternal formal education was a crucial determinant of full child immunization. A study conducted in Nigeria provided evidence of religion and culture influence over immunization uptake where immunization coverage among Christians was 66% and only 32% among Muslims. In Ghana associated significant differences of immunization coverage among religions with marginalization and alienation while another study in Benin proved it to be due to religious leaders preaching against immunization. In Kirifi, Kenya and Papua New Guinea rural children has less timely and number of immunization doses compared to their urban counterparts even though all over Africa the urban poor people have low immunization coverage compared to the rich population. Studies done in Guinea Bissau and Dhaka, Bangladesh confirms that social support is key to adoption of healthy behavior including immunization utilization. In Uganda reduced participation in polio immunization campaign was partly

caused by perception that vaccines may cause malaria or contain contraceptives; even though mothers are the frontline caretakers of children but, a decision to a child for vaccination is reached by fathers. In South Africa and rural India women are socially, economically and culturally disadvantaged compared to those in developed countries. This affects their decision making and uptake of immunization services; therefore, significant disparity of immunization coverage among girls and boys. In Haiti, utilization of services of traditional healers by mothers caused low utilization of child immunization services. In Nigeria, people who migrated to a new place are more likely to miss immunization than the host community [5].

Additionally, in Nairobi's informal settlements parents' wealth and level of formal education had influence over immunization uptake [6]. Religion and culture were significant determinants in Ekiti province, Nigeria where Christians had 24.2% and Muslims had 8.8% coverage of immunization even though overall knowledge on immunization was good. There was a wide spread perception that polio vaccine prevents all diseases; this lead to judge immunization ineffective when a children have any other diseases such as Malaria [7]. In Lagos state parents' culture, marital status, level of education and religion had influence over immunization uptake; however, parents' gender didn't [8]. Moreover, number of children in a family, place of birth, parents' level of formal education, knowledge on availability of immunization services in the area, advice on next date of immunization session and social opinion on the services were determining the uptake of immunization services in per-urban areas of Kenya [9]. In Bangladesh caregivers' knowledge on immunization influenced immunization uptake. More than half of women living in hard to reach areas of rural Bangladesh had no knowledge on benefits of completing immunization; in hilly area only about 80% of women had no knowledge on the benefits; some of the women knew that immunization protects all diseases; 10% of them lacked knowledge on immunization sessions; 54% of them did not present their children for immunization due to fear of side effects and needles. Children were missing immunization due to caregivers being busy or away from home [10]. In Nigeria immunization uptake increased with increase in mother's level of formal education; children of older mothers had higher chance of being immunized than those of younger mothers; the uptake was higher among children from families led by men than those led by females; family wealth and health facility delivery maximized uptake of child immunization [11]. In northern Nigeria social influence was one of the determinants for immunization uptake; other determinants included place of child birth, mother's ideation about immunization and power of making decision [12]. Moreover, social networks, personal advocacy and support to mothers are factors behind increasing immunization uptake [13, 14]. Level of formal education, social networks and economic status stimulated immunization uptake [15].

Immunization system based determinants: The broad category of Immunization System Determinants (ISD) had cumulative frequency of 43 equivalent to 29.5% of all three broad categories. ISD included five KD namely: Access to Immunization Services and Information; Quality of Immunization Services; Health Workers Knowledge Attitude and Practice; Alternative strategies for hard-to-reach populations; and Planning of immunization services. KD of access to immunization services and information featured 20 times equivalent to 46.6% of all KD within ISD. This KD accommodated four specific determinants shown here with frequency in bracket: availability of immunization services (2); costs for immunization services (5); distance/travelling time to immunization point (10); and unspecified access (3). KD of quality of immunization services had frequency of 10 accounting to 23.3% of all KD under ISD. This KD included six specific determinants with its frequency in brackets such as waiting time (2); availability of vaccines and related supplies (2); availability of skilled health workers (3); clients services satisfaction (1); number of vaccines given at a time (1); health workers' transport to immunization outreach sites (1). Alternative strategies for hard-to-reach populations was another KD under ISD. This KD had a frequency of 9 and housed nine which is a proportion of 20.9% of KD under ISD. Specific determinants under this KD included; community based approaches (1); social mobilization (1); participatory communication (1); reminders to clients (1); use of mass media (1); community health workers (1); health education (1); spiritual leaders education and unspecified strategy(1). Planning of immunization services was also one of the KD under ISD with 4 frequencies carrying the proportion of 9.3% of all KD under ISD. This KD had three specific determinants such as choice of day and time of immunization session (2); immunization target population estimates (1); and multi-sectoral collaboration (1). For example, in South Africa health workers shortage and attrition, inadequacy of fund, inadequate advocacy and social mobilization and insufficient collaboration between private and public sectors were hindrances to immunization services delivery [16]. In rural Bangladesh full immunization status of children also depended on distance to health facility and immunization coverage by mass media [17]. In Cambodia,

inequality in immunization services existed leading to inadequate uptake of the services. Remedial measures such as re-planning the services at health facility level to reach the disadvantaged population, improving monitoring system, improving communication and networking, ensuring funding, management and political will resulted into increase of uptake [18]. In Bayelsa state, Nigeria uptake of immunization services were higher in urban than rural; the rural areas were affected by unreliable availability of vaccinators and vaccines [19]. Failure of health facilities to inform the public on time and place where immunization will take place; shortage of vaccines and long distance to health facilities were constraints to caregivers [20]. Alternative strategies for hard to reach populations such as social mobilization and health education through spiritual leaders helped to increase utilization of immunization services in Akre district, Iraq [21]. In South-west Nigeria, unreliable availability of immunization services workers, inadequate motivation to service providers, associated costs, long waiting time and difficult accessibility were setbacks against immunization services delivery and uptake [22].

Services providers based determinants: Health workers knowledge, attitude and practice was the only KD in the broad category of services providers based determinants (SPBD). This KD featured in 12 times equivalent to 8.2% of all the three broad categories of determinants. This KD accommodated the following specific determinants: Unspecified attitude of HWs (5); unspecified practice of HWs (1); HWs knowledge and skills (2); provision of information on date of next immunization (1); time spent by HWs in immunization outreach sites (2); provision of immunization education to community (1) and HWs demand for money for immunization services (1). For instate, in Dili, Timor inadequate immunization staff and transport hindered outreach services; also staff lack technical updates; unreliable immunization sessions; some antigens were provided in a limited number of days in a week; limited access to health services and lack of information constrained the uptake [23]. In Bangladesh, training to immunization services providers that improved their knowledge, attitude and skills; and complementation with community support groups contributed to increase in immunization uptake [24].

Discussion

Caregivers' social status was top among the key determinants. The leading specific determinants within it were formal education, financial income, and religion and culture. Improvement in formal education and financial income requires commitment of high amount of resources and long term multi-sectoral interventions and will cause a significant and sustainable utilization of immunization services [25, 26]. Improvement in religion and cultural perspectives towards immunization may require relatively small amount of money and medium duration of intervention time. This may be realized through education and engagement of religious and cultural leaders who will eventually cause changes to their followers. The results of this study suggest that the religious and cultural leaders should be a priority group to engage in order to increase uptake of immunization services in developing countries. Caregivers' knowledge on immunization was the second most famous KD. This housed the SD such as knowledge on vaccination schedule, immunization session, immunization benefits, vaccine preventable diseases, and vaccine efficacy in preventing the diseases. A comprehensive knowledge on immunization is regarded to be of paramount importance on high and sustainable uptake of immunization services [27- 29]. KD access to immunization services and information consisted SD such as availability of immunization services, costs for immunization services, and distance/travelling time to immunization point. The leading SD was distance/travelling time to immunization services point. This situation may be due to geographical distance, topography and roads condition. This is challenging the immunization delivery system to provide the services to all populations including the hard to reach ones. The costs of immunization were direct to the health facility/health workers and those indirect such as transport fare. In developing countries immunization services have to be delivered free of payment; but, in some cases payments are provided to the health facility as cost sharing. Other payment may be provided to health workers as a bribe [29]. KD Health workers' knowledge attitude and practice accommodated SD: HWs knowledge and skills, provision of information on date of next immunization, time spent by HWs in immunization outreach sites, provision of immunization education to community and HWs demand for money for immunization services. The HWs are a link between the immunization system and clients. Therefore, their knowledge, attitude and practice are important determinants of quality of the services and consequentially increased uptake.

Social influence and support was another KD. This housed SD such as rumors, social approval of immunization, social networks, family support and personal advocacy. The immunization services delivery system has any time be able to know the prevailing rumors about immunization and timely clarify it through multi media. Social approval, networks and personal advocacy normally happen at grassroots level and finds its roots on immunization comprehensive knowledge. The community members with this level of knowledge will stimulate approval of immunization; serve as hubs in social networks; and provide personal advocacy. This should not be left to happen by chance. There are should be tailored and coordinated mechanism for it to happen [29]. Quality of immunization services was one of the KD. It was covering a number of SD such as waiting time, availability of vaccines and related supplies, availability of skilled health workers, clients services satisfaction, number of vaccines given at a time, health workers' transport to immunization outreach sites. The outstanding SD were availability of skilled HWs and vaccines and related supplies. This has been a case in most of developing countries and strong determinant for uptake of immunization services. Strengthening of the immunization system should address quality of the services [29]. Other KD such as alternative strategies for hard-to-reach populations; caregivers' perceptions about immunization; gender; caregivers' beliefs and attitude towards immunization; caregivers' competing priorities; planning of immunization services; utilization of other health services; family structure; migration; community participation in immunization and traditional health practice are also influencing the uptake [29] . Out of the seventeen key determinants, twelve fall under the broad category of clients based determinants with cumulative frequency of 101 equivalent to 62.4%. Four key determinants fall under immunization system based determinants carrying 48 frequencies equivalent to 29.6%; and one falls under services providers based determinants representing 13 frequencies matching to 8.0%. In simple terms it sounds that about 62% of the determinants are social ones (Clients side) while, about 38% are from the program side. Both sides are important for increasing immunization services uptake. But, more weight fall to the social determinants. This suggests that more efforts should be directed to demand creation for the services uptake.

Conclusion

Attainment of desired immunization coverage demand utilization of measures to address client based, immunization system based and immunization service providers based determinants. Majority of immunization services uptake determinants are based on clients. Therefore, immunization interventions in developing countries should majorly focus on social behaviour change communication.

What is known about this topic

- Uptake of immunization services is dependent on clients, system and providers based determinants;
- There are still people who either totally miss the recommended immunization or do not complete the recommended schedule of immunization.

What this study adds

- This study provides a point of view that will enable the immunization services managers and implementers to internalize and appreciate the importance of and deploy comprehensive and effective measures to address the social determinants of immunization services uptake.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Fikiri Makene Mazige: Primary author and was responsible designing the study, conducting journal reviews, analysis, interpretation of results and drafting of the manuscript. Jumanne Daudi Kalwani: Supervising all processes of the study including designing, conducting journal reviews, analysis, interpretation of results and drafting of the manuscript. Deodatus Conatus Vitalis Kakoko: Supervising all processes of the study including designing, conducting journal reviews, analysis, interpretation of results and drafting of the manuscript.

Tables

Table 1: Key determinants of immunization services uptake
Table 2: Broad categories of routine immunization services uptake determinants

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Table 1: Key determinants of immunization services uptake		
S/N	**Key determinant**	**Frequency**
1	Caregivers' social status	25
2	Caregivers' knowledge about immunization	22
3	Access to immunization services and information	20
4	Health workers' knowledge attitude and practice	12
5	Social influence and support	10
6	Quality of immunization services	10
7	Alternative strategies for hard-to-reach populations	9
8	Caregivers' perceptions about immunization	7
9	Gender	7
10	Caregivers' attitude towards immunization	6
11	Caregivers' competing priorities	4
12	Planning of immunization services	4
13	Utilization of other health services	3
14	Family structure	3
15	Migration	2
16	Community participation in immunization	1
17	Traditional health practice	1
Total	-	146

Table 2: Broad categories of routine immunization services uptake determinants				
S/N	**Key determinant**	**Broad categories of determinants**	**Cumulative frequency**	**Percent**
1	Caregivers' social status	Immunization clients based determinants	91	62.3
2	Caregiver's knowledge about immunization			
3	Social influence and support			
4	Caregivers' perceptions about immunization			
5	Gender			
6	Caregivers' beliefs and attitude towards immunization			
7	Caregivers' competing priorities			
8	Utilization of other health services			
9	Family structure			
10	Migration			
11	Community participation in immunization			
12	Traditional health practice			
13	Access to immunization services and information	Immunization system based determinants	43	29.5
14	Quality of immunization services			
15	Alternative strategies for hard-to-reach populations			
16	Planning of immunization services			
17	Health workers' knowledge attitude and practice	Services providers based determinants	12	8.2
Total			146	100